Draft

Environmental Impact Statement for Special Use Airspace Optimization Holloman Air Force Base, New Mexico











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ENVIRONMENTAL IMPACT STATEMENT
SPECIAL USE AIRSPACE OPTIMIZATION
TO SUPPORT EXISTING AIRCRAFT
AT HOLLOMAN AIR FORCE BASE

October 2019

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Draft

Environmental Impact Statement for Special Use Airspace Optimization to Support Existing Aircraft at Holloman Air Force Base, New Mexico

October 2019

Lead Agency:	U.S. Department of the Air Force
Cooperating Agencies:	Federal Aviation Administration
	National Park Service
	U.S. Bureau of Land Management
Title of Proposed Action:	Environmental Impact Statement for Special Use Airspace Optimization to Support Existing Aircraft at Holloman Air Force Base
Affected Region:	Eastern Arizona and Southeastern New Mexico within parts of the following counties: Graham and Greenlee, Arizona; and Catron, Chaves, Eddy, Grant, Hidalgo, Otero, Sierra, Lea, and Socorro, New Mexico

Abstract

This Environmental Impact Statement has been prepared to evaluate the potential environmental impacts from the proposed optimization of special use airspace to support the training of F-16 pilots stationed at Holloman Air Force Base. The special use airspace in this region was created over 30 years ago and does not have the necessary volume or capabilities to support the training needs for pilots of modern aircraft. The Proposed Action includes expanding existing special use airspace or creating new special use airspace within parts of the following counties: Graham and Greenlee, Arizona; and Catron, Chaves, Eddy, Grant, Hidalgo, Otero, Sierra, Lea, and Socorro, New Mexico. The Proposed Action would include aircraft training operations from 500 feet above ground level up to approximately 51,000 feet mean sea level, supersonic flight above approximately 30,000 feet mean sea level, and the use of chaff and flares throughout the proposed airspace. The proposed airspace modifications would result in appropriately sized and configured airspace needed to conduct training activities for F-16 pilots stationed at Holloman Air Force Base.

This Environmental Impact Statement was prepared by the Air Force in cooperation with the Federal Aviation Administration, the National Park Service, and the Bureau of Land Management. The document has been prepared in accordance with the National Environmental Policy Act, the Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, the Air Force Environmental Impact Analysis Process promulgated at 32 Code of Federal Regulations Part 989, and Federal Aviation Administration Order 1050.1F, Environmental Impacts: Policies and Procedures.

Privacy Advisory

This Draft EIS is provided for public comment in accordance with the NEPA, the President's Council on Environmental Quality NEPA Regulations (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR 989, Environmental Impact Analysis Process.

The Environmental Impact Analysis Process provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EIS. As required by law, comments provided will be addressed in the EIS and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public hearings or to fulfill requests for copies of the EIS or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EIS. However, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EIS.

EXECUTIVE SUMMARY

This Environmental Impact Statement (EIS) analyzes the potential environmental consequences resulting from the United States Air Force (Air Force) proposal to optimize the special use airspace (SUA) available for current and anticipated future F-16 pilot training at Holloman Air Force Base (AFB). Much of the SUA used by pilots assigned to Holloman AFB was developed for legacy aircraft more than 30 years ago. As such, it does not have the optimum volume or attributes needed to meet the training requirements of pilots flying modern aircraft. Reconfiguring existing airspace and establishing new airspace would improve the availability of suitable training airspace for pilots stationed at Holloman AFB. This EIS also addresses relinquishing unneeded training airspace back to the National Airspace System.

This EIS was prepared by the Air Force in cooperation with the Federal Aviation Administration (FAA), the National Park Service, and the Bureau of Land Management. The document has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA, the Air Force Environmental Impact Analysis Process promulgated at 32 Code of Federal Regulations (CFR) Part 989, and FAA Order 1050.1F, Environmental Impacts: Policies and Procedures.

ES.1 Background

The F-16s at Holloman AFB have evolved from the original aircraft introduced by General Dynamics in 1974 to a fourth generation aircraft with all the technology and capabilities of an advanced weapons system. Changing threat environments since the development of the original aircraft have resulted in changes to weapons systems, communications, and sensors, requiring training time be devoted to a range of systems. The evolution and development of the F-16 expanded the pilot training and airspace requirements for the aircraft. The demand for appropriate airspace nationally to support more advanced weapons systems is part of the re-build of a combat-credible military force that is foundational to our National Security.

While the current SUA used by Holloman AFB is adequate, optimization of the existing, or creation of new optimized SUA would improve the training opportunity of F-16 pilots, increase efficiencies, and reduce disruptions to training. The need for the airspace optimization is not driven by the number of aircraft stationed at Holloman AFB, but rather the advancements and capabilities of the aircraft that have evolved over time without modifications to the airspace within which they train. The current Air Force scheduled SUA available to Holloman AFB pilots does not provide the optimal volume or attributes necessary to complete their training syllabus in an appropriate and efficient manner. This results in fewer pilots ready for the combat mission. The Air Force currently has a pilot shortage which is further affected by the disruption to training, ultimately impacting National Security.

F-16 training out of Holloman AFB currently occurs in several existing Air Force scheduled Military Operations Areas (MOAs) and restricted areas associated with White Sands Missile Range (WSMR) and McGregor Range at Fort Bliss. Due to its size, attributes, and proximity to Holloman AFB, the airspace associated with WSMR is a preferred training area for the F-16s and it currently supports approximately 5,500 F-16 sorties annually. An additional 3,400 F-16 sorties occur within the MOAs (specifically Talon, Beak, Pecos, Cato, and Smitty MOAs). The Proposed Action seeks to optimize the existing MOAs for which the Air Force has scheduling authority. The restricted areas are scheduled by the U.S. Army. While the Air Force can use this airspace, it does not have the authority to make changes to that resource nor does their training take priority. F-16 training within WSMR airspace is only allowed when it does not conflict

with the frequent research, development, test and evaluation activities that are the priority. As competing demands for testing and the use of restricted areas at WSMR increases, WSMR has less availability to support F-16 pilot training missions conducted by Holloman AFB. All of the F-16 sorties that currently occur within the restricted areas associated with WSMR and Fort Bliss would continue and the Air Force would use these areas to the maximum extent possible to continue to satisfy the F-16 training needs. However, modifications to the Air Force scheduled MOAs is necessary to provide suitable airspace that can be used to efficiently complete the F-16 training syllabus.

ES.2 Purpose and Need for the Action

Holloman AFB is located in southern New Mexico, six miles west of the city of Alamogordo. One of Holloman's primary missions is to train F-16 pilots, as well as provide requalification, senior officer, and instructor pilot training. The F-16 pilot training syllabus requires each pilot to fly multiple sorties (a sortie is the flight of a single aircraft consisting of a takeoff, mission, and landing). Each sortie flown is conducted to meet a specific training requirement. The particular training requirement can only be accomplished in airspace that has appropriate area, altitudes, proximity to the base, and attributes (such as ability to use defensive countermeasures or munitions). Consequently, the features of available training airspace determine where a particular sortie can occur.

The syllabus requires that pilots be trained using a very specific sequence of mission types which results in limited scheduling flexibility. The required dimensions (area and altitudes) of the suitable training airspace are driven by the type of mission being flown and the number of individual aircraft to be flown simultaneously. When airspace appropriate for a specific training mission is not available at the appropriate time during the pilot's training, training is delayed, which disrupts the progress of pilots in training and potentially results in an inability to complete the entire program in a timely manner.

The purpose of the Proposed Action is to modify existing airspace and establish new airspace in order to provide readily available and adequately sized training airspace with appropriate attributes needed to conduct training missions.

The need for the Proposed Action is to support required training missions for aircrews stationed at Holloman AFB. The F-16 training mission requires low and high airspace ranging from 500 feet above ground level (AGL) up to Flight Level (FL) 510 (approximately 51,000 feet mean sea level [MSL]) with approximate dimensions of 30 by 80 nautical miles (nm) that is capable of supporting supersonic flight and use of defensive countermeasures. The Proposed Action would increase training efficiencies and provide suitable F-16 pilot training airspace.

ES.3 Proposed Action and Alternatives

The Proposed Action includes expanding existing airspace or creating new SUA within parts of the following counties: Graham and Greenlee, Arizona; and Catron, Chaves, Eddy, Grant, Hidalgo, Otero, Sierra, Lea, and Socorro, New Mexico. The Proposed Action would include aircraft training operations from 500 feet AGL up to FL510, supersonic flight above FL300 (approximately 30,000 feet MSL), and the use of chaff and flares throughout the proposed airspace. The proposed airspace modifications would result in appropriately sized and configured airspace needed to conduct modern aircraft training activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under the Proposed Action, approximately 10,000 annual sorties would be dispersed throughout the proposed airspace and would occur at various altitudes with most of the training occurring above 10,000 feet AGL. The training activities would last between 30 minutes to an hour and require the pilots to operate within a large volume of airspace. A minimum of 20 by 20 nautical miles (nm) is required for some activities, while other activities require up to 30 by 80 nm. Training within the airspace would not be continuous, but could occur at any time during the Holloman AFB operation hours from 7:00 a.m. to 10:00 p.m., Monday through Friday.

To train with the full capabilities, the F-16 aircraft, would employ supersonic flight during approximately 10 percent of the proposed sorties (approximately 1,000 sorties annually). Supersonic flight within the proposed airspace would only occur at or above FL300.

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. Up to 15,360 chaff and 15,360 flares would be released annually during training activities. Flare use would be subject to existing fire safety restrictions chaff and flares would not be released below 2,000 feet AGL.

Aviation and Airspace Terminology

Above Ground Level (AGL): altitude expressed in feet above the ground surface. AGL is used to refer to lower altitudes (almost always below 10,000 feet), when clearance from terrain is a concern for aircraft operation.

Mean Sea Level (MSL): altitude expressed in feet measured above average (mean) sea level.

Flight Level (FL): 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.

Military Operations Area (MOA): SUA designated to contain nonhazardous, military flight activities. MOAs can have designated floors as low as ground surface and ceilings up to but not including 18,000 feet MSL.

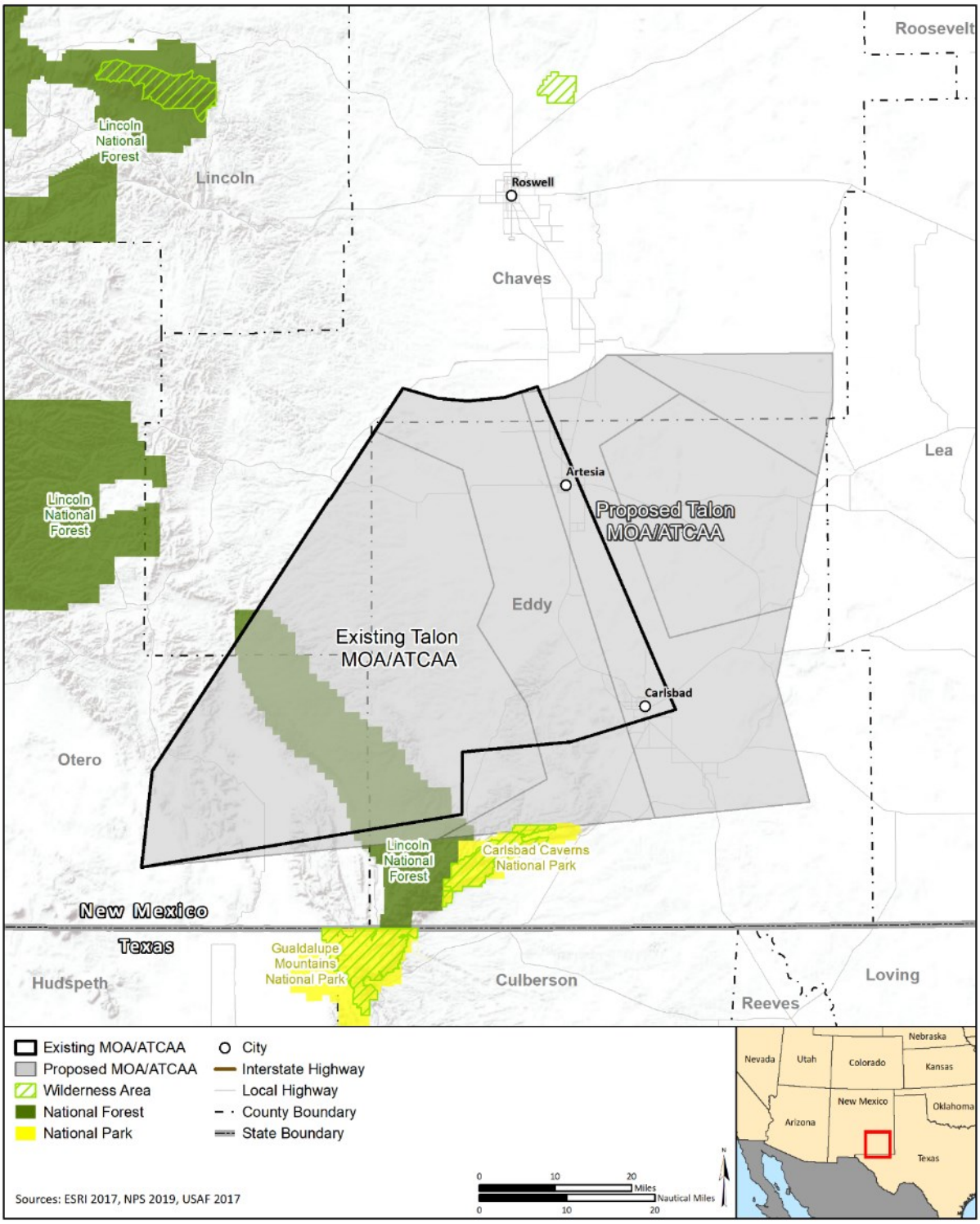
Air Traffic Control Assigned Airspace (ATCAA): airspace that has been designated in a Letter of Agreement with the FAA that can be used to extend the usable airspace of a MOA above 18,000 feet MSL.

Sortie: the flight of a single aircraft consisting of a takeoff, mission, and landing.

The EIS evaluates three Action Alternatives and the No Action Alternative.

ES.3.1 Alternative 1

Alternative 1 would expand the existing Talon Military Operations Area (MOA) to the south and east (**Figure ES-1**).



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

Figure ES-1. Alternative 1: Overview of Existing and Proposed Talon MOA

The proposed Talon MOA would be divided into two low (A and B) and three high (A, B, and C) MOAs offering a combined training airspace with a floor of 500 feet AGL (raised from the existing 300 feet AGL) and a ceiling up to 18,000 feet MSL. The existing Talon Air Traffic Control Assigned Airspace (ATCAA) would also be expanded with the same lateral dimensions as the proposed Talon High MOA.

The ATCAA would be assigned above the MOA expanding the usable airspace to FL510 (approximately 51,000 feet above MSL) when requested from the FAA and not needed for civilian use. As part of this alternative, the lower portion of the existing Talon Low MOA from 300 to 500 feet AGL, and three other MOAs (Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA) would be returned to the National Airspace System.

Table ES-1 provides a summary of the proposed airspace use. F-16 pilot training from Holloman AFB would constitute the majority of operations within the proposed Talon MOA/ATCAA; however, transient military aircraft (not based at Holloman AFB) could schedule and use the airspace as well.

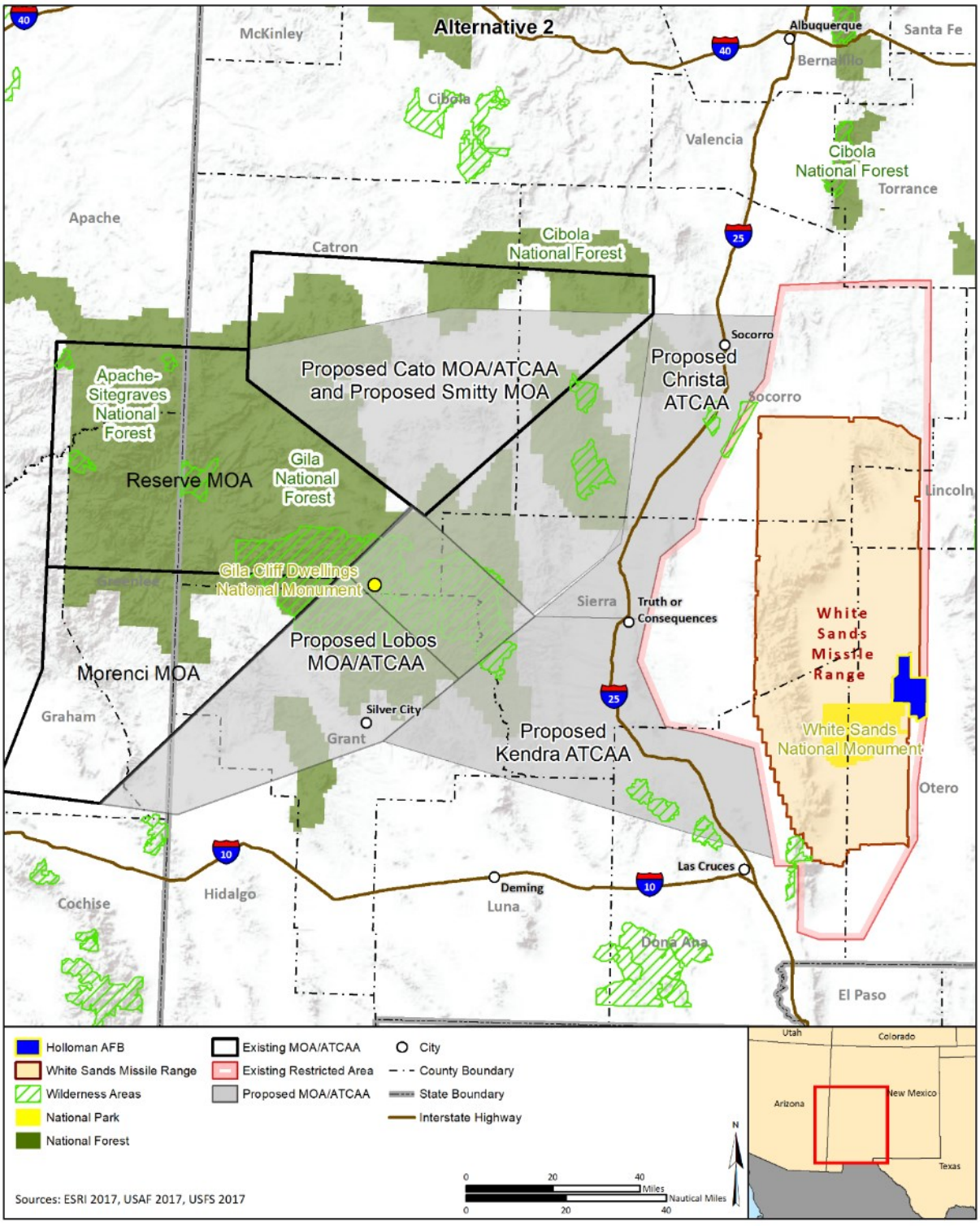
Table ES-1. Alternative 1: Proposed F-16 Sorties

Airspace	Altitude	Day (90%)	Night (10%)	Total
Talon High A and B MOA/ATCAA	12,500 feet MSL to FL510	5,400	600	6,000
Talon High C MOA/ATCAA	12,500 feet MSL to FL510	270	30	300
Talon Low A and B MOA	500 feet AGL to 12,500 feet MSL	3,330	370	3,700
Total F-16 Sorties		**9,000**	**1,000**	**10,000**
Potential Transient Aircraft				**1,000**
Total Sorties				**11,000**

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

ES.3.2 Alternative 2

Alternative 2 would reconfigure and expand the existing Cato MOA and the overlying Smitty MOA and the associated ATCAA to the southeast. The floor of these combined MOAs would remain 500 feet AGL and the ceiling would be up to 18,000 feet MSL. The overlying ATCAA would extend the training airspace to FL510 (approximately 51,000 feet above MSL). Alternative 2 also includes the creation of a new MOA, the Lobos MOA to the south of the proposed Cato and Smitty MOAs. The proposed Lobos MOA would have a floor of 500 feet AGL and a ceiling up to 18,000 feet MSL. The proposed Lobos MOA would also have an ATCAA above the MOA to extend the training airspace to FL510 (approximately 51,000 feet above MSL). Two additional ATCAAs (Christa and Kendra) would be established to the east of the proposed Cato, Smitty, and Lobos ATCAAs to serve as a temporary bridge to and from the airspace above WSMR. The ATCAAs would have a floor of 18,000 feet MSL and a ceiling of FL510. **Figure ES-2** illustrates the airspace components associated with Alternative 2. It should be noted that Air Force use of ATCAAs must be requested from the FAA and would only be available to the Air Force when not needed for civilian use. As part of this alternative, the northern portion of the existing Cato and Smitty MOAs, and three other MOAs (Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA) would be returned to the National Airspace System.



Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure ES-2. Alternative 2: Overview of Cato, Smitty, Lobos MOAs and Christa and Kendra ATCAAs

Table ES-2 provides a summary of the proposed airspace use. F-16 pilot training from Holloman AFB would constitute the majority of operations within the proposed Cato, Smitty, and Lobos MOAs/ATCAAs; however, transient military aircraft (not based at Holloman AFB) could schedule and use the airspace as well.

Table ES-2. Alternative 2: Proposed F-16 Sorties

	Altitude	Day (90%)	Night (10%)	Total
Cato and Lobos High MOAs/ATCAA with Christa ATCAA	13,500 feet MSL to FL510	3,600	400	4,000
Lobos High MOA/ATCAA with Kendra ATCAA	13,500 feet MSL to FL510	1,350	150	1,500
Smitty MOA	500 feet AGL to 13,500 feet MSL	2,610	290	2,900
Lobos Low MOA	500 feet AGL to 13,500 feet MSL	630	70	700
Total F-16 Sorties		**8,190**	**910**	**9,100[1]**
Potential Transient Aircraft				**1,300**
Total Sorties				**10,400**

Note: [1] The total proposed sorties for the Cato, Smitty, and Lobos MOAs/ATCAAs is less than 10,000 since the F-16 pilot training sorties currently occurring in Talon MOA (approximately 830) would continue.

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

ES.3.3 Alternative 3

Alternative 3 would be a combination of Alternatives 1 and 2 with the following differences. The proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

The proposed training would be distributed throughout all of the proposed airspace: approximately 6,800 annual sorties would occur in the proposed Talon MOA/ATCAA; and 3,200 annual sorties would occur in the proposed Cato, Smitty, and Lobos MOAs/ATCAAs and the Christa and Kendra ATCAAs. F-16 pilot training from Holloman AFB would constitute the majority of operations within the proposed airspace; however, transient military aircraft (aircraft not based at Holloman AFB) could schedule and use the airspace as well. For analysis purposes, it is estimated that transient aircraft could conduct 1,300 sorties (700 in the Talon MOA and 600 in the Cato, Smitty and Lobos MOAs) in addition to the Holloman AFB F-16 training sorties. Chaff and flare usage would be approximately 10,752 each annually in the Talon MOA/ATCAA and 4,608 each annually in Cato, Smitty, and Lobos MOAs/ATCAAs.

Table ES-3. Alternative 3: Proposed Sorties				
		Day (90%)	**Night (10%)**	**Total**
Talon High A and B MOA/ATCAA	12,500 feet MSL to FL510	3,780	420	4,200
Talon Low A and B MOA	500 feet AGL to 12,500 feet MSL	2,340	260	2,600
Cato and Lobos High MOAs/ATCAA with Christa ATCAA	13,500 feet MSL to FL510	1,440	160	1,600
Lobos High MOA/ATCAA with Kendra ATCAA	13,500 feet MSL to FL510	450	50	500
Smitty MOA	500 feet AGL to 13,500 feet MSL	990	110	1,100
Total F-16 Sorties		**9,000**	**1,000**	**10,000**
Potential Transient Aircraft				**1,300**
Total Sorties				**11,300**

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

ES.3.4 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB to support modern aircraft pilot training, particularly the F-16. F-16 aircrew training for pilots stationed at Holloman AFB would continue to take place in existing restricted areas at WMSR and Fort Bliss, and MOAs in the vicinity of Holloman AFB to the extent practicable. The boundaries of Talon, Cato, and Smitty MOAs would remain unchanged and they would continue to be used as they are currently. The Lobos MOA and the Christa and Kendra ATCAAs would not be created. There would be no SUA returned to the National Airspace System. The current inefficiencies in accomplishing F-16 pilot training would continue. The No Action Alternative does not meet the purpose of and need for the Proposed Action. However, the No Action Alternative is carried forward for analysis consistent with CEQ guidelines to provide a baseline against which to measure the impacts of the Proposed Action and alternatives.

ES.4 Summary of Environmental Consequences

Table ES-4 provides a summary of the environmental consequences for all alternatives.

Table ES-4. Comparison of Environmental Impacts			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Airspace Operations and Management			
• Civilian aircraft operating under VFR could transit the MOAs. • Some civilian aircraft operating under IFR below 12,500 feet MSL would be required to be re-routed around Talon Low MOAs A/B when they are active. • Some civilian aircraft operating under IFR above 12,500 feet MSL would be either routed around Talon High MOAs A/B/C when they are active, or stay below 12,500 feet MSL for a portion of their route to stay beneath the SUA. • Some civilian aircraft operating under IFR would be re-routed around the Talon ATCAAs when active. • There is no anticipated impact to local public or private airports beneath the proposed Talon MOA.	• Civilian aircraft operating under VFR could transit the MOAs. • Some civilian aircraft operating under IFR would be required to be re-routed around the proposed Smitty, Cato, and Lobos MOAs, and Christa and Kendra ATCAAs when they are active. Most of these deviations would be less than a minute. • The Catron County Airport, which is currently under the existing Smitty MOA, would no longer be under any SUA. • The Adobe Ranch and Chloride airstrips would lie beneath the proposed Smitty MOA boundaries. Aircraft using these airstrips would be VFR and would have to check NOTAMS to be aware of the MOA operating schedules. • The Beaverhead and Me-Own airstrips and the Whiskey Creek Airport would lie beneath the proposed Lobos Low MOA. Aircraft using these airstrips would be VFR and would have to check NOTAMS to be aware of the MOA operating schedules. • The Socorro Municipal and Truth or Consequences Municipal Airports would lie beneath the proposed Christa ATCAA. The ATCAA would begin at 18,000 feet MSL and would not impact the airports when active.	• Alternative 3 results in impacts that are less than any described in Alternatives 1 or 2, since the total operations would be spread across the east area (Talon MOAs/ATCAAs) and the west area (Cato and Smitty MOAs, Lobos MOAs/ATCAA, and the Christa/Kendra ATCAAs). • Talon High A and B MOAs would be used 30 percent less than Alternative 1, and impacts to civil aviation would be reduced proportionally. • The use of Talon Low A MOA would be reduced by 20 percent, and the use of Talon Low B MOA would be reduced by 54 percent, when compared to Alternative 1. The impacts to civil aviation and local airports would be reduced proportionally. • The use of Cato MOA would be reduced by 60 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The use of Smitty MOA would be reduced by 62 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The use of proposed Lobos High MOA would be reduced by 67 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The proposed Lobos Low MOA would not exist under Alternative 3, so all impacts to civil air traffic and local airports due to the establishment of proposed Lobos Low MOA in Alternative 2 would be eliminated.	• No change to existing airspace operations and management.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Airspace Operations and Management (cont.)			
	• The Casas Adobes Airpark would lie beneath the proposed Kendra ATCAA. The ATCAA would begin at 18,000 feet MSL and would not impact the airport when active.	• The use of proposed Christa ATCAA would be reduced by 60 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The use of proposed Kendra ATCAA would be reduced by 67 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally.	
Acoustic Environment			
• There would be no adverse impacts to hearing or health, and there would be no land use restrictions related to noise beneath the proposed Talon MOA. • It would be anticipated that there would be a perceptible increase to the subsonic noise levels attributed to aircraft activity to some areas beneath the proposed Talon MOA and ATCAA. • The greatest change in DNL would occur at Loco Hills, where the estimated DNL from aircraft operations would be 56 DNL. It would be near to the 55 DNL threshold set by USEPA for which adverse noise effects would not be expected to occur. The projected DNL would also be well below the 65 DNL threshold for land use restrictions. It would be anticipated that less than 6.48 percent of the population beneath the proposed airspace would be highly annoyed.	• There would be no adverse impacts to hearing or health, and there would be no land use restrictions related to noise beneath the proposed MOAs. • It would be anticipated that there would be a perceptible increase to the subsonic noise levels attributed to aircraft activity to some areas beneath the proposed MOAs and ATCAAs. • The greatest change in DNL would be at Magdalena and Old Horse Springs, which would have values of 50 DNL. All values would be well below the 65 DNL threshold for land use restrictions. 1.66 percent of the population beneath the proposed airspace would be expected to be highly annoyed at the subsonic noise. • Noise levels from supersonic activity at all of the POIs would be less than 42 CDNL which is the lowest CDNL with a relationship to annoyance. The anticipated CDNL would not exceed the threshold identified by USEPA that would be harmful to public health.	• There would be no adverse impacts to hearing or health, and there would be no land use restrictions related to noise beneath the proposed MOAs. • The greatest proposed increase in DNL value would occur at Loco Hills, with a projected 53 DNL. All values would be well below the 65 DNL threshold for land use restrictions. Approximately 3.31 percent of the population beneath the proposed airspace would be expected to be highly annoyed based on the highest DNL value. • Noise levels from supersonic activity at all of the POIs would be less than 42 CDNL which is the lowest CDNL with a relationship to annoyance. • Overpressures from sonic booms would be similar or less than those described for Alternatives 1 or 2 and would not be expected to cause structural damage.	• No change to the acoustic environment. Aircraft noise in the existing training airspace would continue as it does currently.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Acoustic Environment (cont.)			
• Supersonic noise levels at the POIs would be less than the 42 CDNL which is the lowest CDNL with a relationship to annoyance. The anticipated CDNL would not exceed the threshold identified by USEPA that would be harmful to public health. • Overpressures from sonic booms under the Proposed Action would not be expected to cause structural damage.	• Overpressures from sonic booms under the Proposed Action would not be expected to cause structural damage.		
Air Quality			
• The estimated criteria pollutant emissions associated with Alternative 1 would not alter the current attainment status of Chaves, Eddy, or Otero Counties. • Criteria pollutant emissions would increase though the proposed net increases for VOCs, CO, SO_2, PM, and HAPs would be less than the comparative thresholds used as a guide for assessing significance. • An additional 125,518 tons of GHG emissions would be created.	• The estimated criteria pollutant emissions associated with Alternative 2 would not alter the attainment status of Sierra, Catron, Socorro, or Hidalgo Counties in New Mexico or Graham County in Arizona. • Criteria pollutant emissions would increase though the proposed net increases for VOCs, CO, NO_x, PM, and HAPs would be less than the comparative thresholds used as a guide for significance. • The SO_2 net change in emissions, at 3.25 tons per year, does not exceed the 100 ton per year *de minimis* threshold under General Conformity (applies to Grant County, New Mexico and Greenlee County, Arizona). • An additional 102,525 tons of GHG emissions would be created.	• The estimated criteria pollutant emissions associated with Alternative 3 would not alter the attainment status of Chaves, Eddy, Otero, Hidalgo, Sierra, Catron, or Socorro Counties in New Mexico or Graham County in Arizona. • Criteria pollutant emissions would increase though the proposed net increases for VOCs, CO, SO_2, PM, and HAPs would be less than the comparative thresholds used as a guide for assessing significance. • The SO_2 emissions would not exceed the *de minimis* threshold (applicable to Grant County, New Mexico and Greenlee County, Arizona). • An additional 122,997 tons of GHGs would be created.	• No change to the existing air quality.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Natural Resources			
• Based on estimated noise levels, the proposed pilot training in the proposed Talon MOA would be expected to have minor impacts to wildlife inhabiting land beneath the proposed airspace. • Based on toxicological studies on chaff and flare residual materials, impacts to biological resources are not expected. • The possibility of an animal being struck by a dud flare, undeployed clump of chaff, or residual materials would be extremely remote. • The possibility of a wildfire from flare usage impacting wildlife habitat would be remote considering the release altitude under the Proposed Action. Flares would not be released below 2,000 feet AGL and are designed to burn completely within the first 400 feet of descent. The risk of wildfires from flare usage would be mitigated by operational constraints, including the prohibition of flares during periods of "Very High" or "Extreme" National Fire Danger Ratings. During periods of "High" fire danger, aircraft would not use flares below 18,000 feet MSL. • Domestic animal responses to low overflights vary, but typically include startling and eventually habituating to the noise. Low overflights are not expected to occur with any sort of regularity or frequency at any given location.	• The potential impacts to wildlife from aircraft noise and use of chaff and flares would be the same as those described for Alternative 1. • No significant impacts to special-status species expected. The potential impacts associated with the proposed training activities to special-status species would be the same as those described for wildlife. • Consultation with USFWS on impacts to species protected by the Endangered Species Act is ongoing.	• The potential impacts to wildlife from aircraft noise and use of chaff and flares would be the same as those described for Alternative 1. • No significant impacts to special-status species expected. The potential impacts associated with the proposed training activities to special-status species would be the same as those described for wildlife. • Consultation with the USFWS on impacts to species protected by the Endangered Species Act is ongoing.	• No change to the existing natural resources.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Natural Resources (cont.)			
• Horses are likely to be startled by low overflights and possibly bolt from the noise and the safety of the rider or handler would be of concern. Low overflights are not expected to occur with any sort of regularity or frequency at any given location. • No significant impacts to special-status species expected. The potential impacts associated with the proposed training activities to special-status species would be the same as those described for wildlife. • Consultation with the USFWS on impacts to species protected by the Endangered Species Act is ongoing.			
Land Management			
• Nearly 1.6 million acres including Brantley and Avalon Reservoirs, Living Desert Zoo and Gardens, and the towns of Carlsbad, Artesia, La Huerta, Atoka, Happy Valley, and Livingston Wheeler lie beneath the existing Talon Low MOA, the floor of which would be raised from 300 to 500 feet AGL. • The configuration of Talon MOA proposed under Alternative 1 would overlie an additional 1.17 million acres, primarily non-Federal lands, including the town of Loving, and land managed by the BLM in addition to smaller areas of the Lincoln National Forest and the extreme northern boundary of Carlsbad Caverns National Park.	• More than 2.25 million acres of land underlie the existing configuration of the Cato and Smitty MOAs. These lands are primarily non-Federal, including the town of Magdalena, or are managed by the BLM or USFS, including the Cibola, Gila, and Apache-Sitgreaves National Forests. • The proposed configuration of the Cato and Smitty MOAs would overlie an additional 297,442 acres of lands, primarily non-Federal land and larger areas of the Cibola and Gila National Forests, including the Apache Kid and Aldo Leopold Wildernesses. • Approximately 180,000 acres of the Apache-Sitgreaves National Forest that lie under the current configuration of the Cato and Smitty MOAs would not underlie the new configuration, and this airspace would be returned to the NAS.	• The proposed 10,000 annual flights would be divided among the Talon MOA to the east of Holloman AFB and the Cato, Smitty, and Lobos MOAs to the west, resulting generally in dispersal over a larger area and less frequent exposure to overflight noise on lands beneath all airspace. • The configuration of Talon MOA proposed by Alternative 3 would not include Talon High C, resulting in approximately 150,000 fewer acres of BLM and non-Federal land lying beneath the configuration of Talon MOA. • No areas beneath the configuration of Talon, Cato, Smitty, and Lobos MOAs and the Christa and Kendra ATCAAs proposed under Alternative 3 would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels, similar to	• No change to existing land management.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Land Management (cont.)			
• No areas would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels from military aircraft would be experienced beneath the proposed Talon Low A and B MOAs. • The communities of Loco Hills and Loving lie beneath the expanded boundaries of Talon MOA and would experience an increase in noise (56 and 42 DNL, respectively) from proposed aircraft operations within the MOA. While these levels would be perceptible, they are well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term.	• The proposed Lobos MOA would overlie a total of nearly 1.5 million acres of federally-managed land, including nearly 1 million acres of the Gila National Forest that includes the Aldo Leopold and Gila Wildernesses, lands managed by the Las Cruces District and Safford Field Offices of the BLM, and the Gila Cliff Dwellings National Monument. Additionally more than 1.1 million acres of non-Federal land lie beneath the proposed Lobos MOA including the communities of Silver City, Santa Clara, Arenas Valley, and Tyrone. • The proposed Christa and Kendra ATCAAs would overlie a total of more than 1.35 million acres of federally-managed land including nearly more than 230,000 acres of the USFS land that includes the Aldo Leopold Wilderness, lands managed by the Las Cruces District and Socorro Field Offices of the BLM, The Bosque del Apache National Wildlife Refuge, the BOR-managed Elephant Butte and Caballo Reservoirs, and the Jornada Experimental Station. • Approximately 387,000 acres of non-Federal land lie beneath the proposed ATCAAs, including: Hurley, Bayard, Mimbres, Hatch, Doña Ana, Radium Springs, Salem, Placitas, Las Cruces, and Truth or Consequences.	those experienced under Alternatives 1 and 2, would occur. • While these levels would be perceptible, they are well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term.	

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Land Management (cont.)			
	• The floor of these ATCAAs would be 18,000 feet MSL, consequently underlying lands such as the towns of Truth or Consequences and Socorro and managed lands like Bosque del Apache National Wildlife Refuge and Elephant Butte and Caballo Reservoirs would not experience any perceptible increase in noise above background levels. • No areas beneath the configuration of Cato, Smitty, and Lobos MOAs or the Christa and Kendra ATCAAs proposed under Alternative 2 would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels would be experienced beneath the proposed airspace. • While these levels would be perceptible, they would be well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term.		
Recreation			
• The proposed airspace modifications would not alter, prohibit, or otherwise limit the public's access to recreational areas beneath the MOA. • The proposed pilot training would generate noise, which could detract from the public's enjoyment of outdoor recreational areas.	• The impacts to recreation are similar to those described for Alternative 1, however recreational users of the lands under the ATCAAs would not experience an increase in noise from aircraft activity.	• The impacts to recreation are similar to those described for Alternatives 1 and 2, however the potential noise impacts under Alternative 3 would be less than the potential noise impacts in Alternatives 1 and 2, and none of the projected noise levels would be considered incompatible with recreational uses.	• No change to existing recreation resources.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Recreation (cont.)			
• Recreational users of some of the lands under the airspace would experience slight noise increases, but the projected noise would not be considered incompatible with recreational land uses. • Some training activity would occur at night (approximately 10 percent of the operations); therefore, people camping on land beneath the airspace would have the potential to hear aircraft after dark. • Many of the recreational areas beneath the proposed Talon MOA are under the existing Talon MOA and are currently subjected to aircraft training activity. • Sonic booms, if heard, would be a sudden and startling noise that could adversely impact the experience of recreational users.			
Socioeconomics			
Impacts Common to All Action Alternatives: • The Proposed Action would not result in an increase in personnel at Holloman AFB or within the region. Therefore, the population within the ROI would remain unchanged. • Given the low expected DNL values and the distribution of the training activity across such a large area, it would not be expected that the Proposed Action would have any quantifiable impacts to the existing housing values within the ROI. • Noise analysis indicates that the average noise resulting from the Proposed Action would not be at a level that would be considered incompatible with recreational land uses. Though studies show that noise from a number of sources, including aircraft, can affect visitor experience and enjoyment of parks and forests, it is not clear how such experience affects visitation. While it is possible that noise could reduce visitation, potentially reducing contributions to local economies, it is not possible to quantify the economic impact.			• No change to existing socioeconomics.
Environmental Justice			
Impacts Common to All Action Alternatives: • No significant impacts were identified in association with any resource areas that would be anticipated to adversely impact the health or environment of minority or low-income populations living under the areas affected by Alternative 1. Noise levels in the airspace would remain below 65 DNL. Because there would not be significant impacts that would adversely affect minority or low-income populations, there would be no impact to environmental justice.			• No change to environmental justice.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Safety			
Impacts Common to All Action Alternatives: • Ground operations and maintenance procedures conducted by Holloman AFB personnel would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, Technical Orders, and Air Force Occupational Safety and Health standards. There would be no aspects of the Proposed Action that would be expected to create new or unique ground safety issues or create additional risk. • Priority to life-flight status would not change with implementing the Proposed Action. Military training in the affected airspace would be stopped during such an event. • In the unlikely event of a crash within the proposed airspace area, local first responders would likely be first on the scene given the distance from Holloman AFB. Holloman AFB crash response would continue to follow standard procedures and plans. • Land within the proposed MOAs would continue to be managed for fire risk by local owners and agencies that manage that land. F-16 operations currently occur within airspace associated with Holloman AFB and have not presented an increased fire risk. • The type of training proposed would be the same as what is performed currently, and there would be no aspect of the Proposed Action that would increase the chances of Class A mishaps. The Air Force would make every effort to locate, document, and then clean up debris resulting from any accident. • It would be unlikely that F-16s using the proposed MOAs would generate vortices of sufficient strength or duration to reach the ground and pose a safety risk. • The safety risk to people under or immediately adjacent to the MOAs in which chaff and flares would be dispensed would be minimal. • Dud flares may be mishandled if discovered on non-DoD lands by the uninformed public; however, the probability of such an occurrence would be extremely low. • Additional fire restrictions for flare use would be implemented to reduce the risk of fires. Flares would not be used at altitudes less than 18,000 feet MSL under "High" fire conditions and flares would not be used at all under "Very High" or "Extreme" fire conditions. • The overall potential for bird aircraft strikes would not be anticipated to be statistically different with implementation of any of the alternatives. F-16 aircrews operating in the MOAs would be required to follow applicable procedures outlined in the Holloman AFB BASH Plan. • Vertical obstructions would be noted and avoided as they currently are in existing areas where obstructions intrude into proposed airspace.			• No change to existing safety conditions or procedures.
Cultural Resources			
Impacts Common to All Action Alternatives: • The Proposed Action would result in flights being distributed over a vast area of airspace, most of which would occur above 10,000 feet AGL. Due to the altitude of the overflights, small size of the aircraft, and the high speeds, the aircraft are not expected to be a visual intrusion at archaeological or architectural sites. • Chaff and flares deployed from the aircraft would not pose a visual intrusion. The likelihood of residual chaff and flare material to land at archaeological or architectural sites would be very rare and would not have an adverse effect on these resources. • Sonic booms would occur during supersonic flights, however, no structural damage to NRHP-listed archaeological or architectural resources would be anticipated since the overpressures would not exceed 1 psf. The risk of damaging structures at this level of psf would be very low, one in a billion.			• No change to existing cultural resources.

Table ES-4. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Cultural Resources (cont)			
To date, no known traditional cultural properties have been identified through government-to-government consultation, and it would be expected these resources would not be impacted.			
Hazardous Materials			
Impacts Common to All Action Alternatives: • There would be the potential for hazardous materials to be introduced into the environment in the case of an aircraft mishap. However, aircraft mishaps are rare, and in the event that one occurs, the Air Force has SOPs to identify potential hazardous materials and situations, protect responding personnel and the environment from immediate hazards, and to provide guidelines for the ultimate cleanup and disposal of the crash residues. • The components of chaff are not considered toxic and distribution of chaff filaments (primarily aluminum and silica) and residual materials would not affect ground or water quality. • The components and combustion materials of flares are not considered toxic. The amount of magnesium dispersed from flares is too small to result in levels that would be associated with acute exposure.			• No change to existing hazardous materials.

Legend: AFB-Air Force Base; AGL-Above Ground Level; ATCAA-Air Traffic Control Assigned Airspace; BASH-Bird Aircraft Strike Hazard; BLM-Bureau of Land Management; BOR-Bureau of Reclamation; CDNL-C-weighted Day-Night Average Sound Level; CO-Carbon Monoxide; DNL-Day-Night Average Sound Level; DoD-Department of Defense; FAA-Federal Aviation Administration; GHG-Greenhouse Gas; HAP-Hazardous Air Pollutant; IFR-Instrument Flight Rules; MOA-Military Operations Area; MSL-Mean Sea Level; NOTAM-Notice to Airmen; NO_x-Nitrogen Oxides; NRHP-National Register of Historic Places; PM-Particulate Matter; POI-Point of Interest; psf-Pounds per Square Foot; ROI-region of influence; SO_2-Sulfur Dioxide; SOP-Standard Operating Procedure; USFS-U.S. Forest Service; USFWS-U.S. Fish and Wildlife Service; VOC-Volatile Organic Compound; VFR-Visual Flight Rules.

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ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
AFB	Air Force Base
AFI	Air Force Instruction
AFSEC	Air Force Safety Center
AGL	above ground level
Albuquerque Center	Albuquerque Air Route Traffic Control Center
ANG	Air National Guard
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
BOR	Bureau of Reclamation
CAA	Clean Air Act
CDNL	C-weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulation
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDD	Department of Defense Directive
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMNRD	Energy, Minerals, and Natural Resources Department
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FL	Flight Level
FONSI	Finding of No Significant Impact
Fort Worth Center	Fort Worth Air Route Traffic Control Center
FTU	Formal Training Unit
FY	fiscal year
GHG	greenhouse gases
HAPs	hazardous air pollutants
Hz	hertz
IFR	Instrument Flight Rules
JTTOC	Joint Test and Training Operations Center
kHz	kilohertz
L_{dnmr}	Onset Rate Adjusted Day-Night Average Sound Level
L_{max}	Maximum Sound Level
MARSA	Military Authority Assumes Responsibility of Separation of Aircraft
MBTA	Migratory Bird Treaty Act
MEA	minimum en-route altitude
MOA	Military Operations Area
MSL	mean sea level
MTR	Military Training Routes
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	National Airspace System
NAVAIDs	Navigational Aids
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIPTS	Noise Induced Permanent Threshold Shift
nm	nautical miles
NMDGF	New Mexico Department of

	Game and Fish
NO_2	nitrogen dioxide
NOI	Notice of Intent
NOTAM	Notice to Airmen
NO_x	nitrogen oxides
NPS	National Park Service
NRHP	National Register of Historic Places
O_3	ozone
OSS	Operational Support Squadron
Pb	lead
PDARS	Performance Data Analysis and Reporting System
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers
PM_{10}	particulate matter less than or equal to 10 micrometers
POI	Points of Interest
PSD	Prevention of Significant Deterioration
psf	pound per square foot
RDT&E	research, development, test and evaluation
RMP	Resource Management Plans
ROAA	Record of Air Analysis
ROD	Record of Decision
ROI	Region of Influence
SEL	Sound Exposure Level
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SM	Statute Mile
SO_2	sulfur dioxide
SOP	Standard Operating Procedure
SUA	Special Use Airspace
TPY	Tons per year
U.S.	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	volatile organic compound
WSMR	White Sands Missile Range

1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States (U.S.) Air Force proposes to optimize the special use airspace (SUA) available for current and anticipated future pilot training at Holloman Air Force Base (AFB). Much of the SUA used by pilots assigned to Holloman AFB was developed for legacy aircraft more than 30 years ago. As such, it does not have the optimum volume or attributes needed to meet the training requirements of pilots flying modern aircraft. Reconfiguring existing airspace and establishing new airspace would improve the availability of suitable training airspace for pilots stationed at Holloman AFB.

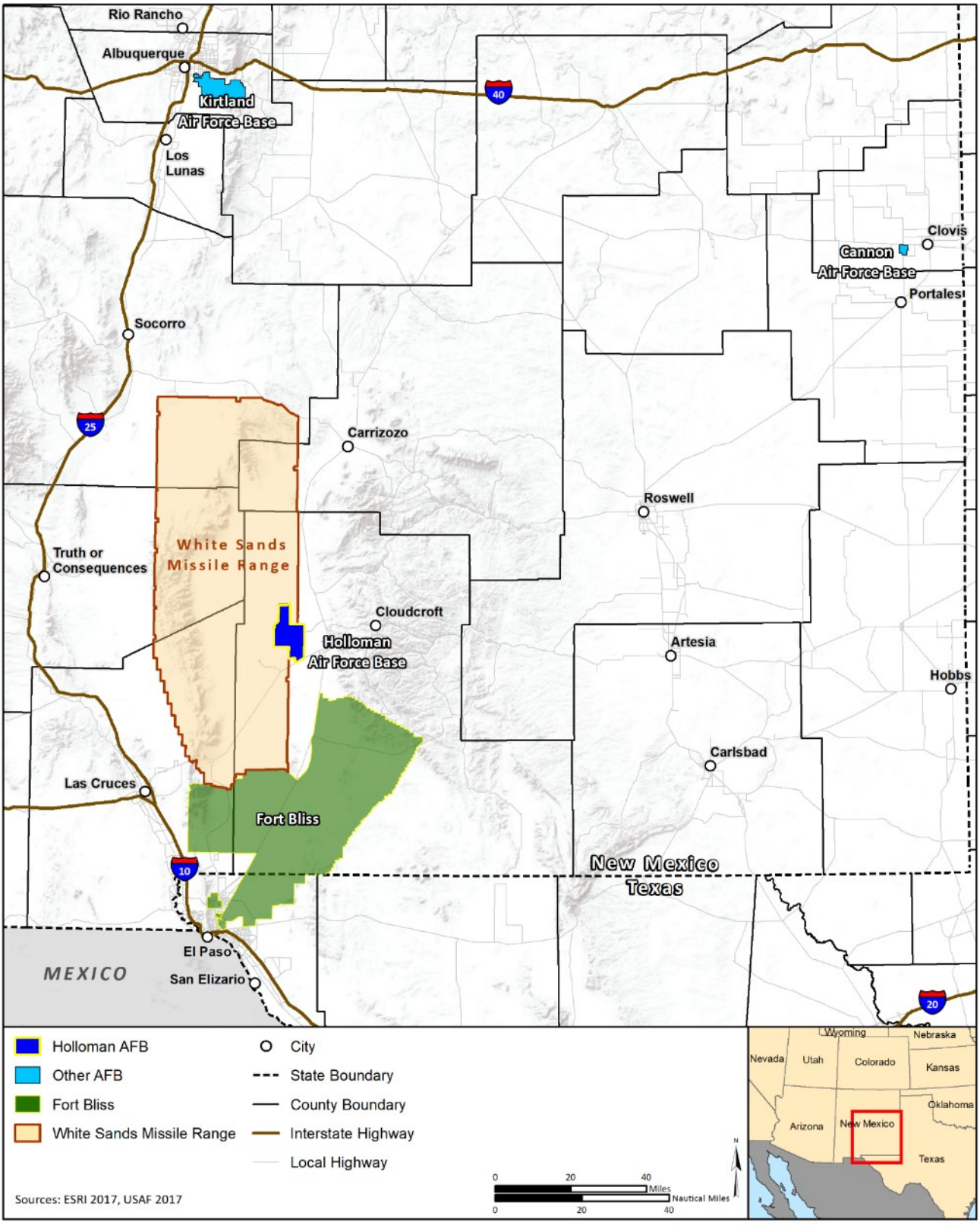
The airspace associated with the Proposed Action and alternatives lies within the jurisdiction of the Federal Aviation Administration (FAA) Albuquerque Air Route Traffic Control Center (Albuquerque Center); therefore, the Air Force is working in cooperation with the FAA for this proposal. The National Park Service (NPS) and the Bureau of Land Management (BLM) are also cooperating agencies for this proposal.

This Environmental Impact Statement (EIS) was prepared to evaluate the potential environmental impacts of this Proposed Action in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 Code of Federal Regulations [CFR] 1500-1508), the Air Force Environmental Impact Analysis Process promulgated at 32 CFR 989, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. This EIS was completed through the Air Force Civil Engineer Center NEPA Division in coordination with the Headquarters U.S. Air Force Operations, Plans, and Requirements, Air Combat Command (ACC), Air Education and Training Command, National Guard Bureau, and Holloman AFB.

1.2 BACKGROUND

Holloman AFB is located in southern New Mexico, six miles west of the city of Alamogordo (**Figure 1.2-1**). Holloman AFB's mission has changed several times over the past few years. In 2006, the decision to retire the F-117 aircraft and replace them with F-22 aircraft resulted in numerous upgrades to the Holloman AFB infrastructure and assets. In 2010, the Air Force announced plans to consolidate the F-22 fleet, resulting in transfer of the F-22s from Holloman AFB to other locations hosting F-22 squadrons. To effectively use the extensive infrastructure and assets vacated by the F-22 mission, the Air Force established a Formal Training Unit (FTU) that included the relocation of two squadrons of F-16 Fighting Falcons from Luke AFB, Arizona. The potential environmental effects of this action were analyzed in the *Recapitalization of the 49th Wing Combat Capabilities and Capacities Environmental Assessment*, dated July 29, 2011 (Air Force 2011) that resulted in a Finding of No Significant Impact (FONSI). The aircraft relocation was completed in 2015. In May 2017, the Air Force signed a FONSI to temporarily relocate two squadrons of F-16 aircraft to Holloman AFB from Hill AFB (Air Force 2017).

The F-16s at Holloman AFB have evolved from the original aircraft introduced by General Dynamics in 1974 to a fourth generation aircraft with all the technology and capabilities of an advanced weapons system. Most of the SUA utilized by Holloman AFB was developed in the 1970s for airframes no longer in the Air Force inventory.



Legend: AFB-Air Force Base.

Figure 1.2-1. Location of Holloman AFB

Since development of the original aircraft, changes in the threat environment and the corresponding changes to tactics, techniques and procedures, F-16 capabilities of weapons, communications, and sensors require training time be devoted to a range of systems. The evolution and development of the F-16 expanded the pilot training and airspace requirements for the aircraft.

While the current SUA used by Holloman AFB is adequate, optimization of the existing, or creation of new optimized SUA would improve the training opportunity of F-16 pilots, increase efficiencies, and reduce disruptions to training. The need for the airspace optimization is not driven by the number of aircraft stationed at Holloman AFB, but rather the advancements and capabilities of the aircraft that have evolved over time without modifications to the airspace within which they train. The current SUA available to Holloman AFB pilots does not provide the optimal volume or attributes necessary to complete their training syllabus in an appropriate and efficient manner. This results in fewer pilots ready for the combat mission. The Air Force currently has a pilot shortage which is further affected by the disruption to training, ultimately impacting National Security.

1.2.1 Training Airspace

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)[1]. SUA is depicted on aeronautical charts by name with the altitudes, times of scheduled use, the controlling agency[2] and the using agency[3]. Avoidance areas and other restrictions are depicted in graphical format on each chart. Additional information, including the airspace boundaries are found in FAA Order JO 7400.10A, *SUA*. Training airspace used by the F-16 includes restricted areas, Military Operations Areas (MOAs), and Air Traffic Control Assigned Airspace (ATCAA), which are discussed below.

A **restricted area** is SUA within which flight by non-participating aircraft is subject to restriction but is not wholly prohibited. Restricted areas can be designated as low as ground surface and up to but not including 60,000 feet mean sea level (MSL) (commonly designated as Flight Level [FL] 600). Restricted areas are established when it is necessary to confine or segregate activities considered hazardous to non-participating aircraft. 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

[1] Altitudes are presented in multiple ways with respect to airspace management and aircraft operation. 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. In this EIS, FL will be used for altitudes above 18,000 feet.
[2] The *controlling agency* is the FAA Air Traffic Control facility that exercises control of the airspace when the SUA area is not activated, a military Air Traffic Control facility may be assigned as the controlling agency.
[3] The *using agency* is 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.

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 7400.2M).

A **MOA** is a type of SUA designated to contain nonhazardous, military flight activities such as air combat maneuvers, air intercepts, low altitude tactics, etc. MOAs can have defined floors as low as ground surface level and ceilings up to but not including 18,000 feet above MSL[4]. MOAs also have defined horizontal boundaries as well as times when the airspace is available for military training. Specific activities allowed in MOAs, such as use of defensive countermeasures to include chaff and flare, or supersonic flight, are considered attributes and can vary for different MOAs. As with restricted areas described above, 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.

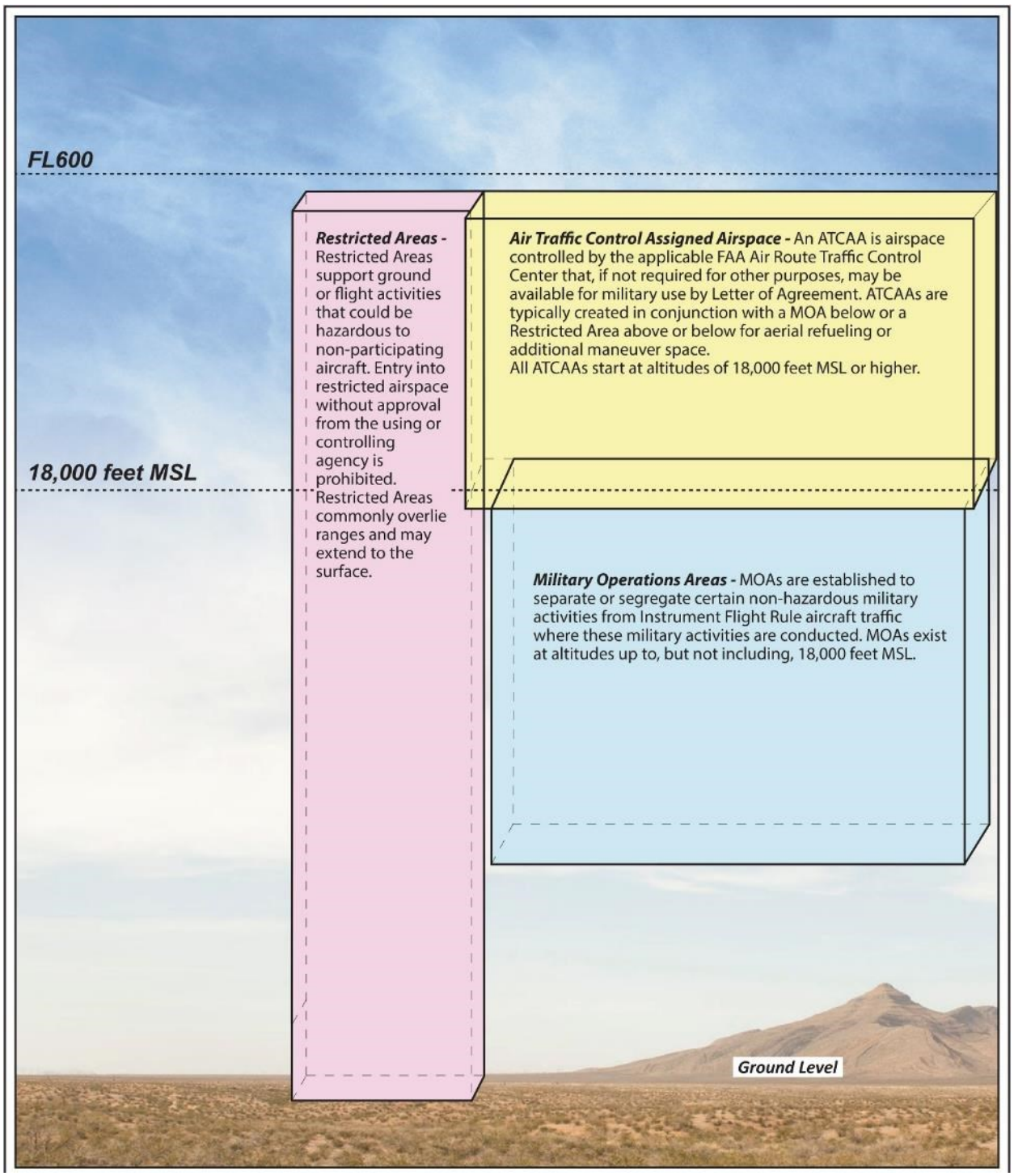
An **ATCAA** is not classified as SUA, but rather is an area that has been designated in a Letter of Agreement with the FAA that can be used to extend the usable airspace above the ceiling of a MOA. ATCAAs can support aerial refueling and high speed or combat maneuvering training similar to that occurring in MOAs. An ATCAA typically has the same horizontal dimensions of the underlying MOA and an agreed upon ceiling. When requested, ATCAA is released by the FAA for military use when not required for other air traffic control purposes (notably, commercial air traffic). It can be recalled by the FAA at any time. Each of these types of training airspace are illustrated in **Figure 1.2-2**.

1.2.2 F-16 Pilot Training

F-16 pilot training is outlined in Air Force Instruction (AFI) 11-2F-16, Volume 1, *Flying Operations F-16 Pilot Training,* and includes: Initial Qualification Training for new F-16 pilots and senior officers; Mission Qualification Training that trains pilots for their specific unit mission; Continuation Training that contains advanced courses; Weapons Employment Qualification that trains pilots in the employment of air-to-surface and air-to-air weapons; and other specialized training. The FTU at Holloman AFB supports all F-16 pilot training, but Initial Qualification Training constitutes the majority. The F-16 pilot training syllabus requires each pilot to fly multiple sorties (a sortie is the flight of a single aircraft consisting of a takeoff, mission, and landing). Each sortie flown is conducted to meet a specific training requirement. The particular training requirement can only be accomplished in airspace that has appropriate area, altitudes, proximity to the base, and attributes (such as ability to use defensive countermeasures or munitions). Consequently, the features of available airspace determine where a particular training sortie can occur.

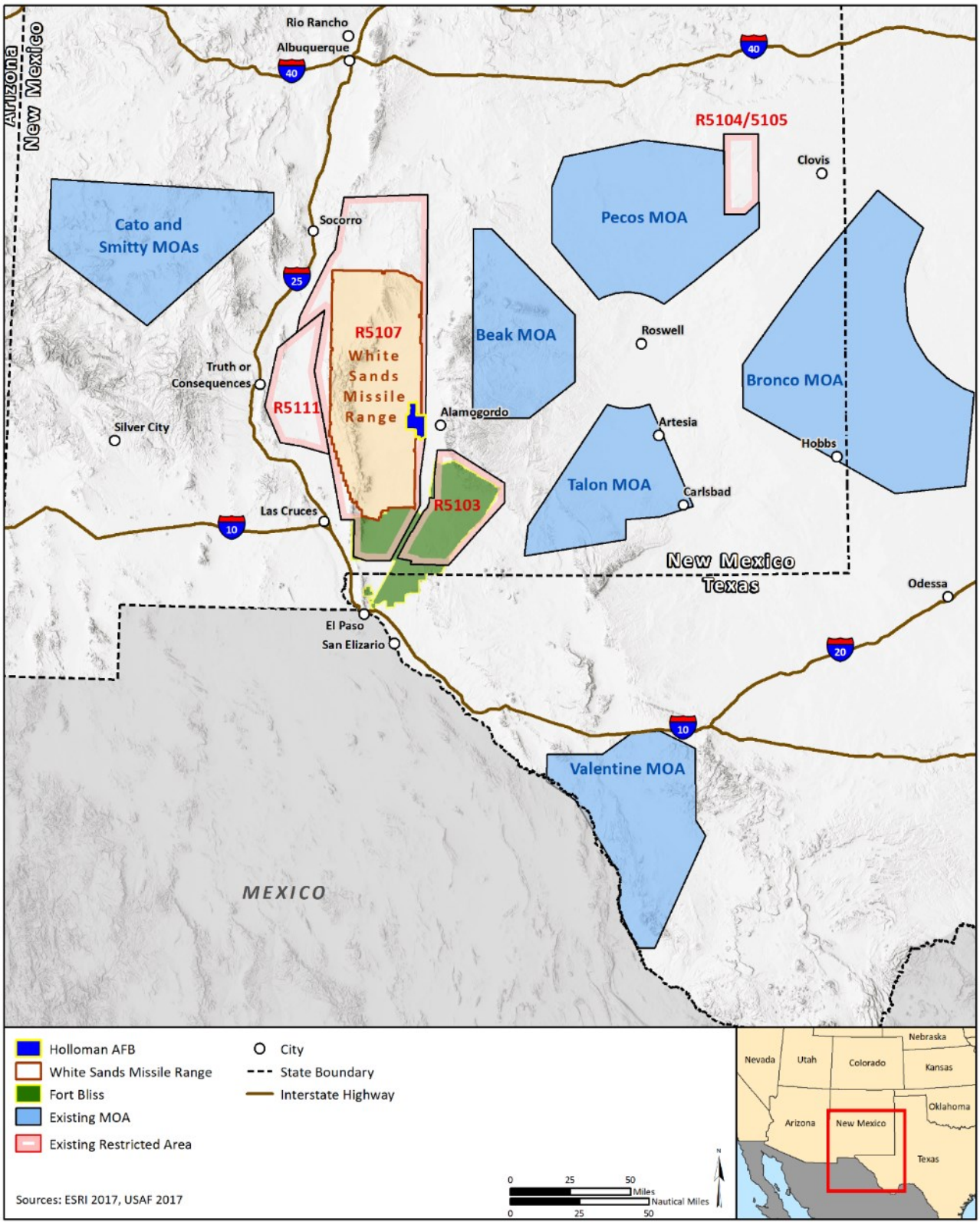
Air-to-air training activities normally take place in a MOA with an overlying ATCAA requested as needed to expand the MOA's altitude. Air-to-ground training activities that include the release of live ordnance are considered hazardous to non-participating aircraft and must be performed in a restricted area associated with a military training range. Some training activities require a combination of MOA and restricted areas. A range of restricted areas and MOAs in the vicinity of Holloman AFB are currently available for F-16 pilot training (**Figure 1.2-3** and **Table 1.2-1**). The available MOAs are scheduled by Holloman, Cannon, and Kirtland AFBs.

[4] The ceilings of MOAs can be designated "up to but not including 18,000 feet MSL". For simplicity, this EIS will use "18,000 feet MSL" when referring to the ceilings of MOAs. Unless stated otherwise, this implies "up to but not including 18,000 feet MSL".



Note: Figure not to scale.
Legend: ATCAA-Air Traffic Control Assigned Airspace; FAA-Federal Aviation Administration; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 1.2-2. Types of Training Airspace Used for F-16 Pilot Training



Legend: AFB-Air Force Base; MOA-Military Operations Area.

Figure 1.2-3. Airspace Available for F-16 Pilot Training

The available restricted areas are associated with U.S. Army ranges scheduled by White Sands Missile Range (WSMR) and Fort Bliss (discussed in **Sections 1.2.3** [White Sands Missile Range] **and 1.2.4** [Fort Bliss McGregor Range]).

Table 1.2-1. Airspace Currently Available for F-16 Pilot Training

Airspace	Scheduled By	Annual F-16 Sorties1
Restricted Areas		
R5107 and R5111	WSMR	4,962
R5103	Fort Bliss	611
R5107	Fort Bliss	0
MOAs (with associated ATCAAs)		
Beak	Holloman AFB	2,569
Bronco	Cannon AFB	0
Pecos	Cannon AFB	26
Valentine	Holloman AFB	0
Talon	Holloman AFB	831
Cato	Kirtland AFB	1
Smitty	Kirtland AFB	15

Notes: [1] The number of annual sorties were derived from airspace utilization data for a representative year (June 2017 to June 2018). The actual sorties vary from year to year depending on the training mission and the airspace available.
Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area; WSMR-White Sands Missile Range.

The training syllabus requires that pilots be trained using a very specific sequence of mission types. This results in limited scheduling flexibility. The required dimensions (area and altitudes) of the SUA are driven by the type of mission being flown and the number of individual aircraft to be flown simultaneously. When airspace appropriate for a specific training mission is not available at the appropriate time during the pilot's training, training is delayed, which disrupts the progress of pilots in training and potentially results in an inability to complete the entire program in a timely manner. In addition to increased training expenses for repeating or delaying a training program, incomplete training causes reductions in the number of qualified pilots ready to conduct combat operations and degrades mission readiness, both of which affect National Security.

1.2.3 White Sands Missile Range

WSMR is a U.S. Army military testing range located adjacent to Holloman AFB (see **Figure 1.2-1**), and due to this proximity, is a preferred training location for Holloman AFB. As the largest military installation in the U.S., WSMR provides national priority research, development, test and evaluation (RDT&E) programs for the Army, Navy, Air Force, and other customers. Training within WSMR is only allowed when it does not conflict with the frequent RDT&E activities. Above WSMR are designated restricted areas that support air-to-ground testing and training activities that would be hazardous to non-participating aircraft (i.e., live ordnance use).

Holloman AFB currently uses WSMR for air-to-ground training that must be conducted in restricted areas. Holloman AFB also uses WSMR for air-to-air missions. All Holloman training on WSMR occurs only when not scheduled for higher priority missions or testing activities. The Air Force and the Army have established a Joint Test and Training Operations Center (JTTOC) to maximize usage of WSMR.

With the standup of the JTTOC, there is a real time capability to adjust the schedule to increase access opportunities when there are last minute test or training mission changes.

1.2.4 Fort Bliss McGregor Range

Fort Bliss's primary mission is to support the U.S. Army's Air Defense Artillery training. McGregor Range is part of the Fort Bliss Training Complex and is located to the southeast of Holloman AFB (see **Figure 1.2-1**). The primary usage of McGregor Range is to maintain the operational readiness of active duty, reserve, and Army National Guard units through various live-fire training events, maneuver operations, and field exercises. The range contains 26 air defense missile firing sites. Airspace use at the range includes helicopters, fixed-wing aircraft, and remote piloted aircraft (also referred to as unmanned aerial vehicles or systems).

Restricted areas above McGregor Range are currently used by Holloman AFB aircraft, including F-16s and remote piloted aircraft. Remote piloted aircraft operations are generally performed in restricted areas.

1.3 PURPOSE AND NEED FOR PROPOSED ACTION

Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times, or attributes to support F-16 pilot training missions at Holloman AFB. The purpose of the Proposed Action is to modify existing airspace and establish new airspace in order to provide readily available and adequately sized training airspace with appropriate attributes needed to conduct F-16 pilot training missions.

The need for the Proposed Action is to support required training missions for aircrews stationed at Holloman AFB. The F-16 pilot training mission requires airspace from 500 feet AGL up to FL510 with approximate dimensions of 30 by 80 nautical miles (nm) that is capable of supporting supersonic flight and use of defensive countermeasures. The Proposed Action would increase training efficiencies and provide more scheduling flexibility to compensate for limited availability of existing suitable training airspace.

1.4 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION

Prior to making any detailed statement, the responsible Federal official shall consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved. The Air Force initiated interagency and intergovernmental coordination and consultation during the scoping phase of the EIS in accordance with the requirements of NEPA (40 CFR 1501.7(a)(1)). Coordination letters were provided to Federal and state regulatory and land management agencies to solicit comments on the proposal. The letters provided a project description, general project area map, and an invitation to attend any of the public meetings that were held throughout southwestern New Mexico. A similar letter was provided to Congressional, state, and county elected officials. Coordination letters distributed during scoping are provided in **Appendix B**.

Scoping letters were sent to U.S. Fish and Wildlife Service (USFWS) that provided a description of the Proposed Action and requested comments or concerns for threatened and endangered species or their designated critical habitat. Continuing consultation letters were also sent to the USFWS offices concerned. **Appendix H** provides copies of USFWS correspondence.

Scoping letters were also sent to the State Historic Preservation Officers (SHPOs) for Arizona and New Mexico to solicit their concerns for any cultural resource impacts from the Proposed Action. Likewise,

government-to-government consultation letters were provided to the Tribes and Pueblos potentially affected by the Proposed Action. **Appendix J** provides copies of correspondence with SHPOs, Bureau of Indian Affairs, Tribes, and Pueblos.

1.5 COOPERATING AGENCIES

The Air Force is the proponent for this EIS and the FAA, the NPS, and the BLM are cooperating agencies. As defined in 40 CFR 1508.5, a cooperating agency

> *"means any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment*."

1.5.1 Federal Aviation Administration

Congress has charged the FAA with administering all navigable airspace in the public interest as necessary to ensure the safety of aircraft and the efficient use of such airspace. As the agency with jurisdiction by law and special expertise in the establishment and configuration of SUA, the FAA is participating as a cooperating agency. As a cooperating agency, the FAA has participated in public scoping and has provided critical input in the development of the Proposed Action and alternatives, and preparation of the EIS.

Once public and agency comments on the Draft EIS are received, the FAA will cooperate with the Air Force on preparation of the Final EIS. The Air Force's decision on the proposed SUA modifications and activities in the MOA and ATCAA will be documented in an Air Force Record of Decision (ROD). The FAA will review the airspace proposal submitted by the Air Force in accordance with its policies and procedures, including FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and FAA Order JO 7400.2M, *Procedures for Handling Airspace Matters*, and issue their own ROD. The Air Force's goal in its cooperative effort with the FAA is for this EIS to fulfill the NEPA requirements of both agencies.

1.5.2 National Park Service

National Park units in the vicinity of Holloman AFB and the proposed airspace modifications include Carlsbad Caverns National Park, Gila Cliff Dwellings National Monument, Guadalupe Mountains National Park, and White Sands National Monument. As such, the Air Force requested that the NPS be a cooperating agency. The NPS has provided subject matter expertise during the development of the EIS. Unlike the FAA, the NPS does not have a NEPA requirement or a decision to make on this proposal and will not issue a ROD.

1.5.3 Bureau of Land Management

The BLM is a major Federal land manager beneath the airspace. There are over three million acres of BLM land within the region of influence (ROI) for the proposed airspace modifications. As such, the Air Force requested that the BLM be a cooperating agency. Unlike FAA, the BLM does not have a NEPA requirement or a decision to make on this proposal and will not issue a ROD.

1.6 PUBLIC INVOLVEMENT

The Air Force Environmental Impact Analysis Process (32 CFR 989), FAA Order 1050.1F, and CEQ regulations require an early and open process for identifying significant issues related to a Proposed Action

and obtaining input from the public prior to making a decision that could potentially affect the environment. These regulations specify public involvement at various junctures in the development of an EIS, including public scoping prior to the preparation of a Draft EIS and public review of the Draft EIS prior to finalizing the document. The FAA has participated in the public involvement activities for this EIS to satisfy their public involvement requirement per FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. Public involvement activities completed to date are summarized in the following sections.

1.6.1 Scoping Review Period

1.6.1.1 Notification

A Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* on August 25, 2017 (*Federal Register* Volume 82, No. 164, page 40572-40573) (**Appendix A**, Notice of Intent). The NOI provided a summary of the Proposed Action and the alternatives and invited all interested stakeholders to attend any of the public scoping meetings being held to provide additional information about this proposal. The NOI also listed an Air Force Public Affairs representative for questions or additional information and provided the address for the project website.

Concurrent with the NOI publication, coordination letters with an invitation to the public scoping meetings as well as a general project area map were mailed to elected officials (Congressional, state, and local); Federal, state, and local regulatory agencies; civilian airports; and non-governmental organizations located within the ROI or potentially interested in this proposal. **Appendix B** (Scoping Coordination Letters) contains copies of the scoping coordination letters.

1.6.1.2 Public Scoping Meetings

Open House style public scoping meetings were held at the locations, dates, and times provided in **Table 1.6-1**. These locations were considered central areas that would potentially be affected by the proposed airspace expansion. Several poster displays were staffed by Air Force representatives at each of these scoping meetings to provide information on the Proposed Action and alternatives and to answer questions. A handout was also provided to meeting participants that explained the NEPA process and how the public could be involved. For convenience, a blank comment form was available for meeting participants to provide written comments. These materials are included in **Appendix C** (Public Involvement Materials).

Table 1.6-1. Public Scoping Meeting Locations

Date	Time	Location
September 12, 2017	6:00 pm - 8:00 pm	Carlsbad Public Library 101 S. Halagueno Street Carlsbad, New Mexico 88220
September 13, 2017	6:00 pm - 8:00 pm	Ralph Edwards Auditorium Civic Center 400 W. 4th Avenue Truth or Consequences, New Mexico 87901
September 14, 2017	6:00 pm - 8:00 pm	Hilton Garden Inn Las Cruces 2550 S Don Roser Drive Las Cruces, New Mexico 88011

1.6.1.3 Stakeholder Meetings

In addition to the formal scoping meetings hosted by the Air Force (see **Section 1.6.1.2,** Public Scoping Meetings), Air Force representatives also attended several city council, County Commissioner, and stakeholder meetings to discuss the Proposed Action and alternatives (**Table 1.6-2**). These meetings were well attended by the public and stakeholders who were able to engage with Air Force representatives in a similar manner to the formal scoping meetings. The information presented at the formal scoping meetings was presented or available at these additional stakeholder meetings, and participants were encouraged to provide written comments through the project website or mail.

Table 1.6-2. External Stakeholder Meetings

Date	Stakeholder
October 12, 2017	Otero County Commission Meeting
October 30, 2017	Office of Senator Udall
November 13, 2017	Office of Senator Heinrich, New Mexico State Fish and Wildlife Director and other state agencies (teleconference)
November 15, 2017	Grant County Commissioner Meeting
November 17, 2017	New Mexico Airport Managers Association Briefing
November 21, 2017	New Mexico Military Affairs and Veterans Briefing
December 11, 2017	New Mexico Aviation Division
December 11, 2017	Albuquerque Center
December 12, 2017	Socorro County Commissioners
December 12, 2017	Main Gate United and Cattleman's Group
December 13, 2017	Roswell International Air Center
December 13, 2017	New Mexico State Representative Yvette Herrell; Roswell, Artesia, Carlsbad Airports
December 14, 2017	Catron County Commission Meeting
December 14, 2017	Very Large Array Radio Telescope Facility
January 31 & February 1, 2018	Albuquerque Center
March 7, 2018	Airport Managers for Carlsbad, Artesia, and Roswell
March 8, 2018	John Sanchez, Lt. Governor meeting in Silver City
April 5, 2018	New Mexico Aviation Conference
April 11, 2018	Eddy County Civic and Aviation Leaders
April 12, 2018	Chavez County Commissioner, Mayor of Roswell, and Roswell City Council
June 8, 2018	Col (Ret.) Susan Beck

Legend: Albuquerque Center-Albuquerque Air Route Traffic Control Center.

1.6.1.4 Scoping Comments

The 30-day scoping comment period began on August 25, 2017 and officially ended on September 25, 2017. Comments and stakeholder input received within the designated scoping comment period were considered during the development of the alternatives and the analysis presented in the Draft EIS. Many comments were received after the official closing of the scoping period and were also considered in determining the range of actions, alternatives, and environmental analysis of significant issues in the Draft EIS, to the maximum extent practicable, prior to its publication.

Normally, the Air Force responds to relevant substantive comments received subsequent to Draft EIS review, consistent with 40 CFR § 1503.4. However, since a large number of substantive scoping comments

were submitted, the Air Force elected to summarize the substantive scoping comments received and provide Air Force responses in this section.

Substantive scoping comments generally include, but are not limited to, comments that identify potential environmental impacts for analysis, identify reasonable alternatives for analysis, identify feasible mitigations for consideration, or otherwise recommend relevant information that should be considered in the development of the Draft EIS. Non-substantive scoping comments generally include, but are not limited to, comments that express a conclusion, an opinion, or a vote for or against the proposal itself, or some aspect of it; that state a position for or against a particular alternative; or that otherwise state a personal preference or opinion. All comments received on this proposal are included in the Administrative Record regardless of when they were received and, regardless of their substantive or non-substantive nature. **Table 1.6-3** provides a summary of the substantive comments or issues received during scoping and how the Air Force addressed those comments in this EIS. This table is meant to provide a summary of the substantive comments and not individual comments verbatim. Some comments were provided by multiple commenters. The substantive comments in the table have been organized into the following broad categories:

- Length of scoping period, meeting locations, advertisements
- Purpose and need, screening criteria, decision-making
- Cumulative actions, effects
- Noise, sonic booms
- Impacts to civil aviation
- Communication
- Use of chaff and flares
- Air quality concerns
- Aircraft mishaps
- Impacts to biological resources from overflights

Table 1.6-3 Summary of Scoping Comments and Air Force Responses

Comment	Addressed in EIS	If Yes, Location in EIS, If No, Rationale
Length of Scoping Period, Meeting Locations, Advertisements		
Some commenters requested that the comment period be extended because the website was not functioning.	No	The project website was monitored daily during the scoping process and was always found to be functioning. Further investigation of these comments determined these comments were likely concerning the Holloman AFB Public Affairs website and not the project website.
Several comments stated that no elected officials in their county (of specific note was Grant County) were made aware of the scoping meetings or the plan to prepare an EIS.	Yes	See **Section 1.6.1.1 and Appendix B**.

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Length of Scoping Period, Meeting Locations, Advertisements (cont.)		
Commenters requested that a public meeting be held in Otero County since Holloman AFB is located in Otero County. Several comments requested that a public meeting be held in Silver City, New Mexico.	Yes	An official scoping meeting was not held in Silver City, New Mexico or Otero County, however, Air Force representatives attended several City Council meetings in both locations in which the public attended and was able to ask questions and receive information on the project. See **Section 1.6.1.3**. In response to these comments, the Air Force expanded the number and locations planned for the Public Hearings that will be held during the Draft EIS comment period. See **Sections 1.6.1.5 and 1.6.2.2**.
A comment noted that the Silver City Daily Press should be used for advertisements in the area, not the Sun News.	Yes	The newspaper notification for the scoping meetings was advertised in the Silver City Sun News. For the Draft EIS and the Public Hearing notification, the Air Force changed the publication to the Silver City Daily Press. See **Section 1.6.2.1**.
Purpose and Need, Screening Criteria, Decision-making		
Several comments questioned the need for additional airspace when so much airspace already exists within New Mexico. Many comments indicated that use of WSMR needed to be evaluated. In addition, it was noted that much of the airspace (specifically White Sands Missile Range) is not utilized on weekends and, therefore, the analysis should focus on more efficient use of existing airspace instead of creating new airspace.	Yes	See **Sections 1.2.1, 1.2.3, 2.3.1, and 2.6.2**.
Additional comments stated that additional alternatives should include WSMR, Beak MOA, Bronco MOA, and Valentine MOA.	Yes	See **Sections 1.2.1, 1.2.3, 2.4.1, 2.4.4, and 2.6.2**.
Comments stated that the decision-making process should be provided to the public. The full set of criteria used for making a decision should be published.	Yes	A proposed action is developed based on a defined purpose and need. From that purpose and need, the Air Force identifies selection standards that aids the team in developing reasonable alternatives. These alternatives are then coordinated with our internal and external stakeholders through reviews, scoping, and public hearings. Through the analyses, mitigations as necessary are identified that aid in minimizing the potential impacts of the Proposed Action and alternatives. Once the EIS process has been completed, Air Force leadership weighs the needs of the mission against the potential environmental impacts and publishes a ROD. See **Sections 1.3, 2.3, 2.4, 2.5, 2.6, and 2.7**.

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Purpose and Need, Screening Criteria, Decision-making (cont.)		
The scoping period for this EIS occurred concurrently with the comment period for another proposed action lead by Holloman AFB concerning F-16 training within R-5111 C/D at WSMR. The area of potential impact for Alternative 2 of this EIS and the R-5111 project are in close proximity. In addition, both actions concern F-16 operations out of Holloman AFB. Most of the public and stakeholders that attended the Truth or Consequences, New Mexico meeting and/or submitted comments confused the two projects. Multiple comments stated that the Optimization EIS and the R-5111 EA should be considered together in one document.	Yes	See **Section 5.1.**
Comments concerned the cumulative effect of expanding airspace (specifically the proposed Lobos MOA and Cato and Smitty MOAs) in an area with contiguous MOAs – Morenci, Reserve, Outlaw, and Jackal. The proposed expansion would create a large contiguous block of airspace in Arizona and New Mexico.	Yes	See **Section 5.2.1.**
Comment concerned Alternative 2 and cumulative impacts associated with Taiwanese Air Force F-16 Relocation and Adversary Air to "what is widely considered the wildest area in New Mexico (Datil-Mogollon Section of New Mexico and the Mogollon Rim of Arizona)".	Yes	See **Section 5.1**.
Several comments stated the Air Force must analyze other cumulative actions regardless of the action proponent and some of these comments provided a list(s) of specific projects.	Yes	See **Section 5.0**.
Noise, Sonic Booms		
Many comments raised concerns about the potential noise impacts, particularly sonic booms, from F-16 operations, and requested specific analysis and calculations on the noise impacts for overflights and sonic booms.	Yes	See **Sections 4.3, 4.5** and **Appendix F.**
Many commenters were concerned about the impacts to local structures, such as the Caballo Lake Dam at Elephant Butte Lake and the Carlsbad Caverns, and impacts to species such as bats, migratory birds, and waterfowl, as well as domestic animals (including specific impacts to ranching operations and horseback riding).	Yes	See **Sections 4.5 and 4.11.**

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Noise, Sonic Booms (cont.)		
Several comments indicated that the area economy (specifically, Truth or Consequences and Silver City) is based on tourism from recreational areas (i.e. Elephant Butte, National Forests, National Parks) that could be severely impacted by an increase in noise.	Yes	See **Sections 3.7, 3.8, 4.7, and 4.8**.
Another area of concern was the health impact to residents from the increased noise, specifically veterans in nursing homes, children, and other residents with health concerns.	Yes	See **Sections 3.3.1.2, 3.3.1.3, 4.3.**
It was requested that a vibration study be performed for noise/sonic booms as part of this project to determine the impacts to structures and public health.	No	The results of the Noise Analysis presented in this EIS, specifically for supersonic noise from sonic booms, do not indicate the need for a vibration study. The anticipated sound pressure from this noise would not be at a level expected to damage structures.
Comments noted the inadequacy of cumulative noise metrics (depicted as DNL), Land Use Compatibility Guidelines, and Noise Dose-Response Relationships for land uses under the proposed Lobos MOA. Comments suggest the 10-dB penalty commonly used for nighttime operations should be applied to all training activity in sensitive areas such as Wilderness Areas. Comments noted DNL does not provide information on what someone actually hears during an overflight.	No	DNL is the U.S. Government standard for modeling the cumulative noise exposure and assessing community noise impacts. This EIS uses the best available noise modeling programs that have been accepted by the U.S. Government, MR_NMAP and BOOMAP 96, to calculate the potential noise exposure from the Proposed Action. Since the cumulative metric does not describe the "noise" that an observer may experience from an individual overflight, this EIS also presents the single event metrics for representative overflights. See **Sections 3.3 and 4.3**.
Many comments were concerned with noise impacts to sensitive areas such as Wilderness Areas, Carlsbad Caverns, recreation areas, cultural resources, and Native American ruins (specifically the Gila Cliff Dwellings).	Yes	See **Sections 3.6, 3.7, 3.11, 4.3, 4.6, 4.7, and 4.11**.
Impacts to Civil Aviation		
Comments concerned the impact to local airports that would be beneath proposed airspace, specifically those associated with the proposed Lobos MOA. Comments noted the EIS must consider the impact on those specific airports, particularly their access limitations for IFR aircraft. Aircraft flying under VFR can also be discouraged to fly to airports under SUA.	Yes	See **Sections 3.2, 4.2, Appendix D1, Appendix D2, and Appendix D3**.
Comment requested altitude stratification in proposed MOAs, specifically recommended mitigation of having a floor of 12,500 feet MSL in the proposed Lobos MOA to limit impact to civil aviation in this area.	Yes	Alternative 3 was developed after the scoping period in response to concerns and comments regarding the proposed Lobos Low MOA. Alternative 3 would not include the Lobos Low MOA; therefore, the floor of the MOA in this area would be 13,500 feet MSL. See **Section 2.8.3**.

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Impacts to Civil Aviation (cont.)		
Air Force should release SUA no longer needed back to the National Airspace System. Air Force should consider the long-term needs and utilization of surrounding regional SUA as it may indicate additional MOAs are not needed.	Yes	See **Sections 2.8.1.1, 2.8.2.1, and 2.8.3.1**.
Comment concerned the need for the Air Force to address the economic impact of general aviation in New Mexico. General aviation is vital to many aviation and non-aviation businesses in New Mexico, which use aircraft to move personnel, equipment, and products.	No	Limited or minimal impacts to civil aviation is of significant importance to this proposed action. One of the defined selection standards for determining the reasonable alternatives to include in this EIS was "Standard 4: Limit Impacts to Civil Aviation". The EIS provides an in-depth analysis for the potential impacts to civil aviation. The results of that analysis did not indicate a significant impact to civil aviation that warranted further detailed analysis on the secondary economic impacts to the aviation industry in New Mexico. This SUA proposal has been coordinated in detail with the FAA as a cooperating agency. See **Sections 2.3.4, 2.4, 3.2, 4.2, and Appendix D1, Appendix D3**.
There was a request to raise the floor of the proposed Talon Low MOAs to 700 feet AGL (as opposed to 500 feet AGL) to increase the distance between Air Force flights and pipeline patrol aircraft. General concern for the patrol of the oilfields in southeast New Mexico.	Yes	The proposed floor of the Talon Low MOA is based on the F-16 training syllabus. The discussion of this need and the potential impacts to civil aviation are addressed in the EIS. See **Sections 2.2.2, 4.2.1.1, and Appendix D3**.
Specific concerns were provided about the approach procedures to the Carlsbad and Artesia airports.	Yes	See **Sections 3.2.2.1, 4.2.1, Appendix D1, and Appendix D3**.
Concerns about the impact of proposed Talon Low MOAs to fuel and distance to routes into Carlsbad airport and initial approach fixes for arrivals.	Yes	See **Sections 4.2.1 and Appendix D3**.
Comment requested that the Air Force install an airport surveillance radar in the Artesia/Hobbs corridor to fill the existing low-level radar gap in the proposed Talon Low MOA areas.	Yes	The Air Force has worked with FAA as their cooperating agency to develop measures that would reduce or minimize the potential impact to civil aviation, to include the purchase of an additional radio to provide coverage in the Talon Low MOA area. See **Section 7.2**.
Comments included concerns about impacts to air ambulance aircraft that currently pass through the proposed low MOAs.	Yes	See **Sections 2.2.**1 **and 4.2.**

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Impacts to Civil Aviation (cont.)		
Concern that the proposed Talon High C MOA would make direct flights from Roswell to Midland, San Angelo, San Antonio, Austin and Houston, Texas difficult. Specifically if Bronco 3 and 4 MOAs were in use.	Yes	A mitigation measure has been included with Alternative 1 in which the Talon High C MOA and the Bronco 3 MOA would not be activated at the same time. In addition, Alternative 3 was created in response to scoping comments that does not include Talon High C. See **Sections 2.8.1.1, 2.8.3.1, and 7.2.**
Concern about commercial flights from Roswell, New Mexico to Dallas, Texas that cross Bronco 3 if traveling direct. If Bronco 2 was abandoned this would help by allowing a slight deviation to the north and better use of V14 and J166. Also consider abandoning Bronco 1 to allow direct flights from Roswell, New Mexico to Oklahoma City, Oklahoma.	Yes	See **Sections 2.8.1.1, 2.8.2.1, and 2.8.3.1.**
Communication		
Commenters mentioned frustration over where to submit noise and other overflight-related complaints in the future since there are many Air Force users in the area – Holloman AFB, Luke AFB, Arizona ANG at Tucson International Airport, Davis-Monthan AFB, Kirtland AFB, or other installations – and lack of responsiveness to some of their concerns involving F-16 overflights since scoping for the proposed action began..	Yes	See **Section 7.2.**
Use of Chaff and Flares		
Commenters raised the issue of chaff drift and the potential for chaff to be dispersed beyond MOA boundaries depending upon the altitude of release and the wind.	Yes	See **Sections 2.2.4 and 3.1.3**.
Comments also pointed out chaff clouds occasionally show up on weather radar and that once power was disrupted in San Diego when chaff drifted into utility lines.	Yes	The interaction of chaff and radar is discussed in the EIS. See **Sections 2.2.4.1, 3.10.2.3, and 4.10.1.3.** The disruption of power from chaff was documented in 1985 in San Diego. A newspaper article in the Los Angeles Times (January 16, 1985) indicated this was the result of a mechanical malfunction from a Navy aircraft right after takeoff at Miramar Naval Air Station that released several packages of chaff adjacent to a nearby power substation. This occurrence was a very isolated situation and not part of normal training activities. However, the Air Force avoids using chaff in populated areas to reduce the potential for situations such as this. Based on the amount of chaff proposed in this EIS and the rural environment of the area, normal chaff use as proposed is not expected to result in power disruptions.

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Use of Chaff and Flares (cont.)		
A comment citing to three major reports or documents on chaff use in the late 1990s stated that the gaps in information and outstanding questions make it difficult to determine chaff's impacts on waters and species. The comment points out that a 1997 Air Force study, *Environmental Effects of Self-Protection Chaff and Flares*, mentioned the following scenarios as calling for site-specific information or analysis: 1) very small confined bodies of freshwater that support sensitive aquatic species; 2) water bodies that support significant waterfowl, are used by migrating waterfowl, or provide habitat for threatened or endangered aquatic species; and 3) visible debris impacts to potentially sensitive areas such as Wilderness Areas, Wild and Scenic Rivers, parks, and outstanding visual resource areas.	Yes	A Supplement to the referenced 1997 document, entitled *Supplemental Report; Environmental Effects of Training with Defensive Countermeasures,* was developed in 2011. The results of that study address these concerns and are used throughout the Draft EIS. See **Sections 2.2.4, 3.1.3, 3.12.2.2, 4.5.1.2, and 4.12.1.2**.
At least one comment brought up the issue, raised but unanswered in a 1999 panel report commissioned by DoD, whether chaff upon discharge gets fragmented into inhalable particles (PM10 or smaller) or whether once such particles have settled on the ground it is possible for them to be re-suspended in the air again.	Yes	See **Section 4.4.**
Several commenters raised concerns about the Air Force use of defensive counter-measure flares due to the potential of wildfire risk under existing MOAs and, more specifically, as a result of the proposed establishment of the Lobos MOA (Alternative 2) over the Gila National Forest and Wilderness Areas.	Yes	See **Sections 2.2.4.2, 3.10.2.3, 4.5.1.2, and 4.10.1.3**.
Commenters raised concerns about the potential for injury from dud flares resulting from failed ignition of a flare and creating falling debris, and accidental detonation of a "dud" flare inadvertently found on the ground – all of which pose safety risks under existing and proposed MOAs.	Yes	See **Sections 2.2.4.2 and 4.10.1.3**.

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Use of Chaff and Flares (cont.)		
Dud flares and flares that have not been fully consumed are potentially explosive when mixed with water. This raises questions of potential hazards and chemical effects from flares falling into water bodies, as well as resulting impacts on biota. If a dud flare lands on the ground, it may react with latent moisture or it may remain intact, raising issues of chemical effects on soil and potential indirect impacts on groundwater and vegetation	Yes	See **Sections 3.12.2.2 and 4.12.1.2**.
Wildlife issues include whether light from flares might affect the vision of nocturnal animals.	No	Proposed nighttime operations are expected to be minimal (10 percent of proposed operations). Use of flares after dark would also be minimal. Flares burn for approximately 3 to 5 seconds and would be released at a relatively high altitude (no less than 2,000 feet AGL). Based on the short time the flare would be ignited and the altitude release, it is not expected that this would affect the vision of nocturnal animals.
Dud flares and flare debris may accumulate in areas underlying training airspace and result in land use and visual impacts.	Yes	See **Tables 3.1-2 and 3.1-3 in Section 3.1.3** for estimated dispersion/distribution of chaff and flare residual materials.
Concerning wildfires ignited by flares, comment requested protocol be identified for and measures to be taken to address wildfires started by chaff and flares, including reimbursement to the land management agency that responds to the fire.	Yes	See **Sections 3.10 and 4.10**.
Air Quality Concerns		
Another area of major concern was the impact to local air quality from the increased training operations. Some commenters raised concern about condensation trails (commonly referred to as “contrails”) from military jet overflights and expressed their perception that they involve the release of harmful chemicals (variously referred to as chemical trails or “chemtrails”). At least one commenter reasoned why these contrails (referred to as “vapor trails”) should not be concerning.	Yes	See **Sections 3.4 and 4.4**.
Comments stated the EIS must address: emissions in nonattainment areas and develop mitigation measures for those; visibility concerns in mandatory Class I areas; and greenhouse gases.	Yes	See **Sections 3.4, 4.4 and Appendix G**.

Table 1.6-3 Summary of Scoping Comments and Air Force Responses (cont.)		
Comment	**Addressed in EIS**	**If Yes, Location in EIS, If No, Rationale**
Aircraft Mishaps		
Comments stated that EIS should identify aircraft crash clean up and reclamation procedures, including agency coordination activities since the airspace occurs over public land. Procedures should emphasize use of existing roads rather than creation of new roads or routes. Of particular concern would be crashes in Wilderness Study Areas, Wilderness Areas, or National Monuments.	Yes	See **Section 4.10.1.1**.
Comments stated that in instances of fuel spills associated with a crash, clean up procedures could include soil testing and removal, fencing, re-contouring, soil stabilization, seeding, and posting signs.	Yes	See **Section 4.12.1.1**.
Analysis should include current number of crashes, the number of those crashes that occurred on public lands, and acres of disturbance for each crash. Analysis should present a predicted number of crashes and discuss implications of potential increase in crashes from increased sorties.	Yes	See **Section 4.10.1.1**.
Comments recommended the Air Force provide special training to first responders, specifically for dealing with hydrazine and composite materials.	No	The potential for an aircraft mishap or crash would be minimal, but if one were to occur, the procedures for ensuring protection of life and property would be site-specific and refined on a case by case basis. Crash response procedures are discussed in **Sections 3.10.2.1 and 4.10.1.1.** Hydrazine and composite materials are discussed in **Sections 3.12.2.1 and 4.12.1.1**.
Impacts to Biological Resources from Overflights		
Many comments concerned the impact to wildlife from aircraft overflights. Of specific concern were bats if flights would occur at predawn or dusk and migratory birds. Other notable concerns were for Mexican gray wolves, bighorn sheep, Mexican Spotted Owls, and birds of prey.	Yes	See **Sections 3.5 and 4.5.**
Some comments concerned range management concerns, specifically, noise impacts to lambs and ewes. Comments noted that noise can cause animals to abandon their young and even mortality for the lamb or ewe.	Yes	See **Section 4.5.1.2**

Legend: AFB-Air Force Base; AGL-above ground level; ANG-Air National Guard; dB-decibel; DNL-Day-Night Average Sound Level; DoD-Department of Defense; EA-Environmental Assessment; EIS – Environmental Impact Statement; FAA-Federal Aviation Administration; GHG-greenhouse gas; IFR-Instrument Flight Rules; MOA-Military Operations Area; MSL-mean sea level; PM_{10}-particulate matter less than or equal to 10 micrometers; ROD-Record of Decision; SUA-Special Use Airspace; U.S.-United States; VFR-Visual Flight Rules; WSMR-White Sands Missile Range.

1.6.1.5 Project Changes as a Result of Scoping

Based on the scoping comments, meetings with elected officials and other local representatives in New Mexico, and discussions with regulators and other stakeholders, the Air Force made several changes to the project. These changes affected the Proposed Action and alternatives and the planned public involvement activities for the Draft EIS phase.

Changes to Proposed Action and Alternatives in the Draft EIS

At the time of scoping, the exact location and dimensions of the proposed airspace modifications considered in Alternative 2 were not known. The Air Force presented the general area under consideration and solicited feedback during the scoping process. The Air Force took into consideration the comments received during the scoping process and feedback provided during stakeholder meetings when developing the specific dimensions and location for the proposed airspace modifications in this area. See **Section 2.8.2 (**Alternative 2: Cato, Smitty, and Lobos MOAs) for details.

The Air Force has included a new alternative in the Draft EIS that was not presented during the scoping meetings (see **Section 2.8.3**, Alternative 3: Talon, Cato, Smitty, and Lobos MOAs). The third alternative would result in fewer training operations in any one airspace area as well as establishing a higher floor for some of the new airspace in response to comments received during the scoping process concerning low-level overflights over noise sensitive areas and populated places.

Changes to Public Involvement Activities

During the scoping period, there were several comments concerning the geographic coverage of the formal scoping meetings hosted by the Air Force. In response, the Air Force expanded the range for the public hearings planned to take place after publication of the Draft EIS. These hearings will take place in eight locations throughout southern New Mexico (see **Section 1.6.2.2,** Public Hearings). Newspaper notifications for the public hearings were expanded to cover a wider geographic range.

1.6.2 Draft EIS Public Review Period

1.6.2.1 Notification

A Notice of Availability of the Draft EIS was published in the local newspapers identified in **Table 1.6-4**. The Draft EIS was posted on the project website for public review. In addition, paper copies of the Draft EIS were provided to the local libraries listed in **Table 1.6-5**. All stakeholders and interested persons that requested a copy of the Draft EIS during the scoping period were provided a copy.

Table 1.6-4. Newspaper Notifications for Draft EIS

Name	General Distribution Area
Artesia Daily News	Artesia, New Mexico
Silver City Daily Press	Silver City, New Mexico
Las Cruces Sun News	Las Cruces and Southern New Mexico
Carlsbad Current-Argus	Carlsbad, Artesia, Loving and all of Eddy County
Roswell Daily Record	Pecos Valley
El Defensor Chieftan	Socorro County, New Mexico
Herald of Truth or Consequences	Truth or Consequences, New Mexico
Hobbs New Sun	Lea County and Southeast New Mexico
Albuquerque Journal	New Mexico Statewide

Legend: EIS-Environmental Impact Statement.

Table 1.6-5. Libraries Provided Draft EIS		
Organization Name	**Address**	**City**
Holloman AFB Library	596 4th Street	Holloman AFB, New Mexico
Artesia Public Library	205 W Quay Avenue	Artesia, New Mexico
Thomas Branigan Memorial Library	200 E. Picacho Avenue	Las Cruces, New Mexico
Truth or Consequences Public Library	325 Library Lane	Truth or Consequences, New Mexico
Carlsbad Public Library	101 S. Halagueno Street	Carlsbad, New Mexico
Hobbs Public Library	509 North Shipp Street	Hobbs, New Mexico
Silver City Public Library	515 W College Avenue	Silver City, New Mexico
Socorro Public Library	401 Park Street	Socorro, New Mexico
City of Roswell Public Library	301 N Pennsylvania Avenue	Roswell, New Mexico
Marshall Memorial Library	110 S. Diamond St.	Deming, New Mexico
Ruidoso Public Library	107 Kansas City Rd.	Ruidoso, New Mexico
Lordsburg Hidalgo Library	208 E. 3rd St.	Lordsburg, New Mexico

Legend: AFB-Air Force Base; EIS-Environmental Impact Statement.

1.6.2.2 Public Hearings

Public Hearings will be held at the date, time, and locations listed in **Table 1.6-6**. The public hearings will begin with a 30-minute open house session with poster displays staffed by Air Force representatives. After the open house session, the formal public hearing will begin with a presentation by the Air Force on the Proposed Action and alternatives and the findings provided in the Draft EIS. After the presentation, the Hearing Officer will facilitate a verbal comment period, which will be recorded by a court reporter. All verbal comments, and those provided in writing during the defined comment period, will be reviewed and considered during the development of the Final EIS.

Table 1.6-6. Public Hearing Locations		
Date	**Time**	**Location**
November 18, 2019	5:30 pm - 8:30 pm	Hilton Garden Inn Hobbs 4620 Lovington Highway Hobbs, New Mexico 88240
November 19, 2019	5:30 pm - 8:30 pm	Roswell Convention and Civic Center 912 N. Main Street Roswell, New Mexico 88201
November 20, 2019	5:30 pm - 8:30 pm	Artesia Public Library 205 West Quay Avenue Artesia, NM 88210
November 21, 2019	5:30 pm - 8:30 pm	New Mexico State University Gymnasium, Room 103 1500 University Drive Carlsbad, New Mexico 88220
December 2, 2019	5:30 pm - 8:30 pm	Macey Center 801 Leroy Place Socorro, New Mexico 87801
December 3, 2019	5:30 pm - 8:30 pm	Commission Chambers 405 W. Third Street Truth or Consequences, NM 87901
December 4, 2019	5:30 pm - 8:30 pm	Grant County Chamber of Commerce 3031 Highway 180 East Silver City, NM 88061
December 5, 2019	5:30 pm - 8:30 pm	Ramada by Wyndham Las Cruces Hotel and Conference Center 201 East Avenue Las Cruces, NM 88005

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2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This chapter describes the Proposed Action, alternatives considered to meet the purpose of and need for the Proposed Action, and the selection standards used to select viable alternatives.

2.2 PROPOSED ACTION

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct F-16 pilot training activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

2.2.1 Training Airspace

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 Air Force in the development of the Proposed Action and alternatives to ensure compliance with airspace regulations. FAA regulations are defined in 14 CFR Chapter 1, Subchapter E, Parts 71-77, *Federal Aviation Administration, Department of Transportation*. The Proposed Action includes the modification or creation of ATCAAs and MOAs.

ATCAAs are not published on aeronautical charts and exist only when made available for military use by the FAA and can be authorized above 18,000 feet MSL. By definition, ATCAAs can be activated when not needed for other purposes. Furthermore, civilian and commercial traffic may transit an active ATCAA under FAA air traffic control guidance and procedures. The dimensions (horizontal and vertical) of the proposed ATCAAs and procedures for aircraft operation within the ATCAAs would be defined in a Letter of Agreement between the FAA and the Air Force. Once established, the Air Force could request use of the ATCAA for training purposes at specific times in accordance with the Letter of Agreement.

MOAs, situated below 18,000 feet MSL, comprise SUA designated by the FAA to identify areas where the military conducts nonhazardous operations and to separate these flight activities from non-participating air traffic. Non-participating civil and military aircraft flying under visual flight rules (VFR)[5] may transit an active MOA by employing see and avoid procedures. When operating under instrument flight rules (IFR)[6], non-participating aircraft must receive air traffic control clearance to enter an active MOA. Rules defining aircraft right-of-way are defined in 14 CFR 91.113:

> *"When weather conditions permit, regardless of whether an operation is conducted under instrument flight rules or visual flight rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft. When the rule of this section [Section 91.113] gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it unless well clear."*

[5] Visual Flight Rules (VFR) are 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.

[6] Instrument Flight Rules (IFR) are a set of regulations that dictate how aircraft are to be operated when the pilot is unable to navigate using visual references under VFR.

An aircraft in distress has the right-of-way over any other air traffic. Similar to an aircraft in distress, Life Flights are given higher priority and airspace access as necessary.

When multiple military aircraft are operating in a MOA, they often have to operate in close proximity and with close coordination. In these situations, it may be impractical for air traffic controllers to ensure safe separation of the aircraft. Military Authority Assumes Responsibility of Separation of Aircraft (MARSA) are procedures used when military aircraft must operate under these conditions. MARSA procedures delegate the separation authority temporarily to the military authority operating the training flights. Once these operations have concluded, the military relinquishes the authority back to air traffic control (FAA Order JO 7110.65X, *Air Traffic Control*).

Low altitude avoidance and noise sensitive areas for the proposed airspace would be charted and published by the FAA and/or identified in the local flight instructions for pilots. Pilots would be instructed to avoid these locations by horizontal and vertical distances to enhance flight safety, noise abatement, and environmental sensitivity. In accordance with FAA minimum safe altitudes (14 CFR 91.119), aircraft must 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. Outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet.

As defined in the FAA Aeronautical Information Manual (paragraph 7-4-6), pilots are requested to maintain a minimum altitude of 2,000 feet above the surface of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas, and Scenic Riverways administered by the NPS; National Wildlife Refuges, Big Game Refuges, Game Ranges, and Wildlife Ranges administered by the USFWS; and Wilderness and Primitive areas administered by the U.S. Forest Service (USFS).

2.2.2 Training Operations

All activities requiring the use of a restricted area would continue to occur in the restricted areas currently available at WSMR and Fort Bliss (R-5107, R-5103, and R-5111). It should be noted that training that includes the use of live ordnance is considered a hazardous activity that must be performed in an approved restricted area. The Proposed Action does not include training that involves the use of live ordnance.

Training activities to be conducted in the proposed airspace are detailed in **Table 2.2-1.** It should be noted that this table does not represent the full F-16 pilot training syllabus, but rather those activities that can occur outside of a restricted area in MOAs. Under the Proposed Action, approximately 10,000 annual sorties would be performed within the proposed airspace. Training would be dispersed throughout the proposed airspace and occur at various altitudes with most of the training occurring above 10,000 feet AGL. **Table 2.2-2** presents the typical altitude use for F-16 pilot training, these percentages may vary slightly with the Proposed Action. The training activities last between 30 minutes to an hour and require the pilots to operate within a large amount of airspace. A minimum of 20 by 20 nm is required for some activities, while other activities require up to 30 by 80 nm (see **Table 2.2-1**). Airspace activity would not be continuous, but could occur at any time during the existing Holloman AFB operation hours from 7:00 a.m. to 10:00 p.m., Monday through Friday.

Some operations must be conducted after dark so that pilots can meet nighttime training requirements. Approximately 10 percent of the proposed sorties would occur at night. For purposes of training, night operations consist of those performed any time after sunset. Due to penalties assigned to noise levels, "environmental night" extends from 10:00 p.m. to 7:00 a.m. Aircraft operating from Hollman AFB try to

fulfill the annual night flying requirements without flying during environmental night, but some of the night flying could occur at least partially during environmental night, particularly during the summer months when the sun sets much later. Use of the proposed airspace outside of normal operating hours would occur through the Notice to Airmen (NOTAM) process[7] as is the current practice.

Table 2.2-1. F-16 Pilot Training Activities to Occur in Proposed Airspace

Activity	Required Airspace			Time in Airspace
	Dimensions (nm)	Floor	Ceiling	
Transition	20 by 20	10,000 feet AGL	FL300	0.5 to 1.0 hour
Basic Fighter Maneuvers and Advanced Handling Characteristics	20 by 20	5,000 feet AGL and ≤ 11,000 feet MSL	FL300	0.5 to 1.0 hour
Air Combat Maneuvers	30 by 30	5,000 feet AGL and ≤ 11,000 feet MSL	FL300	0.5 to 1.0 hour
Tactical Intercepts 1 v 1*	25 by 40	15,000 feet MSL	FL400	0.5 to 1.0 hour
Tactical Intercepts 2 v 2*	30 by 60	15,000 feet MSL	FL400	0.5 to 1.0 hour
Tactical Intercepts 4 v X*	30 by 80	15,000 feet MSL	FL500	0.5 to 1.0 hour
Air Combat Tactics	30 by 80	500 feet AGL	FL500	0.5 to 1.0 hour
Surface Attack Tactics 2 aircraft	20 by 40	500 feet AGL	FL400	0.5 to 1.0 hour
Surface Attack Tactics 4 aircraft	30 by 60	500 feet AGL	FL400	0.5 to 1.0 hour
Opposed Surface Attack Tactics 4 v X*	30 by 80	500 feet AGL	FL500	0.5 to 1.0 hour
Close Air Support	20 by 20	500 feet AGL	FL400	0.5 to 1.0 hour
Low altitude Stepdown Training	25 by 40	500 feet AGL	FL300	0.5 to 1.0 hour

Notes: * 1 v 1, 2 v 2, and 4 v X refer to the number of aircraft used in the training exercise. For example, 1 v 1 means there are two aircraft, one flying as the aggressor and the other as the interceptor.
Legend: ≤-Less than or equal to; AGL-above ground level; FL-Flight Level; MSL-mean sea level; nm-nautical mile.

Table 2.2-2. Typical Altitude Use for F-16 Pilot Training

Altitude	Percent of Flight Hours
FL300 and higher	10
FL180 to FL300	33
10,000 feet AGL to 18,000 feet MSL	35
5,000 to 10,000 feet AGL	6
2,000 to 5,000 feet AGL	5
500 to 2,000 feet AGL	11

Legend: AGL-above ground level; FL-Flight Level; MSL-mean sea level.

2.2.3 Supersonic Flight

Supersonic flights exceed the speed of sound. To train with the full capabilities, F-16 aircraft would employ supersonic flight during approximately 10 percent of the proposed sorties (approximately 1,000 sorties annually). A portion of the supersonic flights would also occur at night. Supersonic flight within the

[7] A Notice to Airmen (NOTAM) is a notice to alert aircraft pilots of potential hazards along a flight route or a location that could affect the safety of a flight.

proposed airspace would only occur at or above FL300 (within the ATCAA). The size of the proposed airspace limits the maneuverability during supersonic flights (i.e., aircraft would generally travel straight flight paths while going supersonic speeds). The fuel demand when flying supersonic also limits the amount of time the aircraft could travel supersonic before having to return to the base to refuel. In general, an aircraft would only travel supersonic for approximately 30 seconds.

2.2.4 Chaff and Flares

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.

2.2.4.1 Chaff

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. Chaff that would be used would be RR188 (training chaff) that does not interfere with FAA 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 2.2-1**). **Table 2.2-3** provides the components of chaff. The combined weight of chaff material is 3.35 ounces (Air Force 1997). The chaff components and their toxicity are further discussed in **Section 3.12.2.2**, *Chaff and Flares*.

Chaff Reliability and Dispersion

Chaff is ejected from an aircraft by a small pyrotechnic charge (chaff itself is not explosive) and 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.) (Air Force 2011).

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. Assuming a 99 percent reliability rate and the large area covered by training airspace, encountering a clump of non-deployed chaff would be 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 20 square miles per year (Air Force 2011).

Table 2.2-3. 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: Air Force 2011



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 2.2-1. RR188 Chaff

2.2.4.2 Flares

Flare Characteristics

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 inches thick) case that is closed with a felt spacer and a small plastic end cap (**Figure 2.2-2**). The aluminum case remains inside the aircraft once the flare is deployed. The flare proposed for use in this EIS is the M206 flare and the discussion of flares throughout this EIS is specific to the M206.

Flares burn at a temperature in excess of 2,000 degrees Fahrenheit to simulate jet exhaust. A flare is designed to burn out within 500 feet from the time of release (generally 3 to 5 seconds) (Air Force 2011). The burning magnesium flare pellet is completely consumed and several small pieces of residual material fall to the ground to include a piston (typically made of plastic), end cap, one or two felt spacers, and a piece of the mylar wrapping that could be from 1-inch by 1-inch to 2-inches by 13-inches depending on the extent to which the burning flare consumed the wrapper.



Source: Air Force 2011.

Figure 2.2-2. M206 Flare

Flare Ejection and Reliability

When a flare is deployed, an electrical charge ignites the impulse cartridge. The impulse cartridge produces hot gases that push the piston, the flare pellet, felt spacers, and the end cap out of the aircraft into the airstream. All of this happens in less than one second. There are three types of ignition mechanisms for flares: non-parasitic, parasitic, and semi-parasitic. The non-parasitic flare is 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 the Safe and Initiation device permits the hot gases to ignite the flare pellet. The M206 flare has a parasitic ignition mechanism

meaning the flare ignites inside the case within the aircraft and is discharged already burning (Air Force 2011). The M206 flare does not have a Safe and Initiation device.

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 (Air Force 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 (Air Force 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 one 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 (Air Force 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 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.

Dud Flares

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 (Air Force 2011). Any dud flare found should be treated as Unexploded Ordnance. There is no instance of a dud flare or any flare striking an individual on the ground and the probability of such occurring would be extremely rare (Air Force 2011). A dud flare would probably not ignite even in a campfire unless it was on a very hot bed of coals. If a dud flare were shot with a bullet or cut with a power saw, the friction could cause it to ignite.

Fire Risk

Defensive countermeasures deployment in authorized airspace is governed by a series of regulations based on safety, environmental considerations, and defensive countermeasures limitations (see **Section 3.10.2.3**, *Chaff and Fares* for additional discussion of safety regulations). 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 (Air Force 2011).

Under this Proposed Action, prior to flare use, the local fire ratings for the specific training area would be reviewed (as is the current practice at Holloman AFB) and existing fire safety restrictions would be employed (**Table 2.2-5**). Existing fire safety restrictions prohibit the use of flares during periods of "Very High" or "Extreme" National Fire Danger Ratings. During periods of "High" fire danger, aircraft would not use flares below 18,000 feet MSL. If fire danger is less than "High" the minimum altitude for flare release would be 2,000 feet AGL. Flares would never be released below 2,000 feet AGL. The standard minimum altitude release of 2,000 feet AGL provides sufficient time for a flare to burn completely at least 1,500 feet above the ground. The minimum altitude and fire safety restrictions make the potential to ignite a fire from flares extremely remote.

Table 2.2-5. Fire Restrictions for Flare Use

National Fire Danger Rating*	Allowable Altitude for Flare Usage
Low	2,000 feet AGL and above
Moderate	2,000 feet AGL and above
High	18,000 feet MSL and above
Very High	Not Allowed
Extreme	Not Allowed

Note: * National Fire Danger Ratings are determined by the USFS to estimate today's or tomorrow's fire danger for a given area.
Legend: AGL-above ground level; MSL-mean sea level.

2.3 SELECTION STANDARDS

NEPA and CEQ regulations mandate the consideration of reasonable alternatives before undertaking any Proposed Action. "Reasonable alternatives" are those that could meet the purpose of and need for the Proposed Action. Per the requirements of 32 CFR 989, the Air Force Environmental Impact Analysis Process regulations, selection standards are used to identify alternatives that meet the purpose of and need for the Proposed Action.

The Air Force has developed a set of selection standards for screening the possible alternatives for the optimization of SUA within the vicinity of Holloman AFB. The following standards were used to identify and evaluate alternatives that meet the purpose and need of the Proposed Action.

2.3.1 Standard 1: Use Air Force Scheduled Airspace

Airspace is a valuable and finite national resource that is scheduled by the using agency as necessary to meet their needs. Air Force scheduled airspace is required to eliminate conflicts that have historically reduced the efficiency of F-16 pilot training. To ensure benefits to all users of the National Airspace System (NAS), the FAA encourages the use of existing SUA by the military. The Proposed Action would use existing SUA airspace, to the extent possible, to support the F-16 pilot training.

2.3.2 Standard 2: Maximize Training Time and Minimize Transit Time

Holloman AFB has a finite number of flying hours that can be used to train F-16 pilots. Therefore, in defining a search area for suitable airspace, the Air Force recognized the need to maximize training time and minimize low-value transit time. Flying long distances to remote training airspace and returning to

Holloman AFB would substantially limit valuable training time. F-16 aircraft need to fly to the training airspace, conduct training operations for a minimum of 30 minutes, and return to base with adequate fuel reserves for safety. Average training sorties without refueling last approximately 1 hour. Evaluation of the flying range (fuel capacity) of the F-16s reveals that utilizing training airspace within 120 nm travel distance from the base would optimize F-16 pilot training missions. While airspace outside of 120 nm travel distance can be used for some training missions and will continue to be used, this distance is too far to meet the requirements of the majority of F-16 pilot training operations. Therefore, 120 nm travel distance was established for this standard.

2.3.3 Standard 3: Required Airspace Size and Configuration

F-16 training needs airspace adequately sized and configured to permit the full spectrum of F-16 Tactics, Techniques, and Procedures (Air Force 1996). The required airspace dimension and vertical extent (floor and ceiling) of the airspace must provide the size and configuration to support up to three, four-ship engagements on simultaneous aerial combat training missions; permit long range, high speed aircraft combat; and allow the F-16s to operate at a broad range of altitudes consistent with combat tactics. As such, the airspace needs to offer (1) horizontal dimensions of 30 by 80 nm, and (2) a vertical span from approximately 500 feet AGL up to FL510 or could be feasibly modified or supplemented with new airspace to achieve the necessary dimensions. Based on the extent of vertical requirements, both MOA and ATCAA airspace are required.

2.3.4 Standard 4: Limit Impacts to Civil Aviation

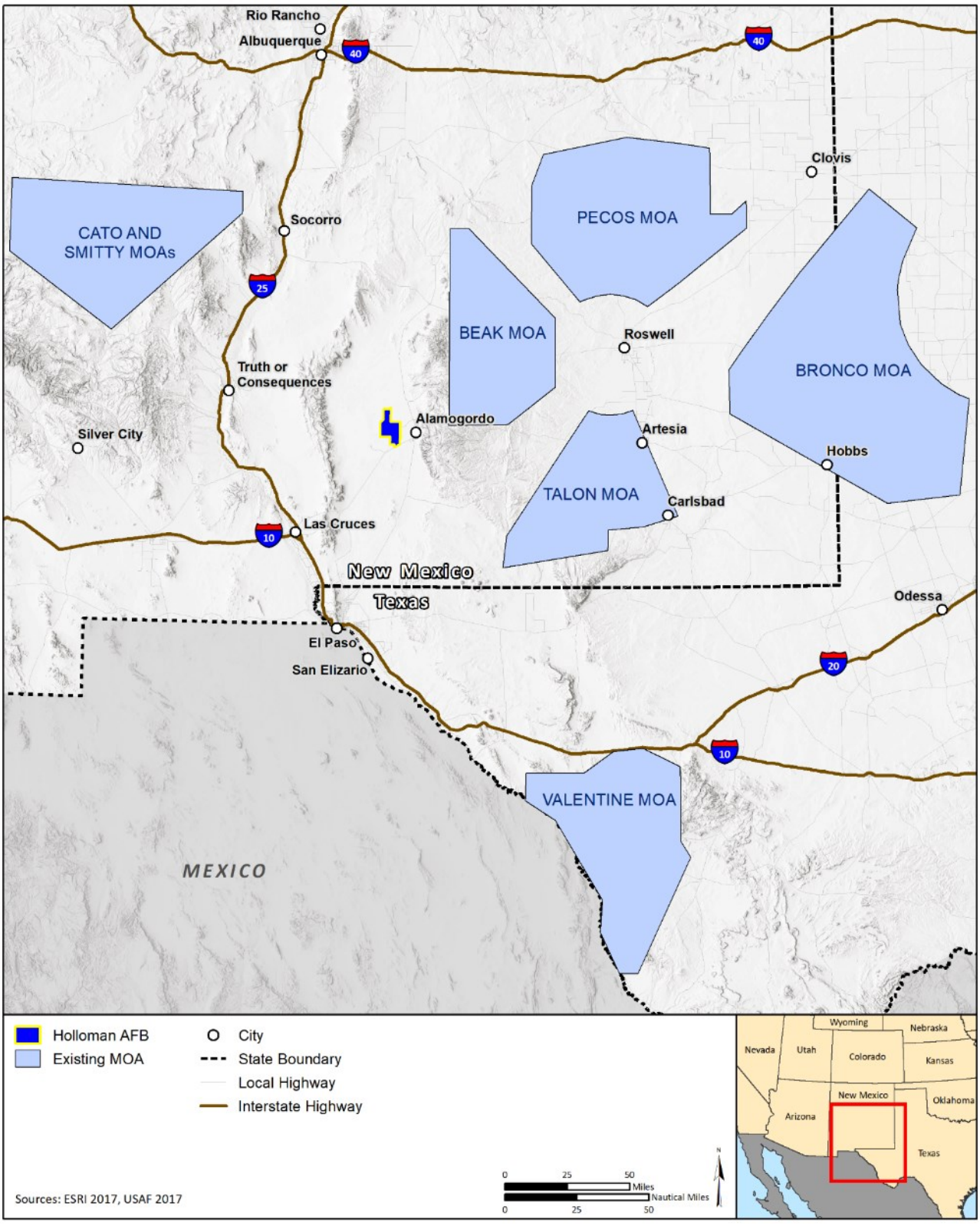
The FAA plans, manages, and controls the structure and use of airspace to provide the safest, most efficient airspace possible for all users of the airspace (military, commercial, and private). The Air Force, in working with the FAA, recognized that proposed airspace modifications should limit or reduce the potential for conflicts with the structure and use of the current airspace system by civil aviation. Avoidance or minimization of potential conflicts with airports, Air Traffic Service (ATS) routes, and other airspace users represents a priority for identifying a reasonable alternative.

2.4 SCREENING OF ALTERNATIVES

Air Force scheduled MOAs in the vicinity of Holloman AFB that are available for F-16 pilot training were evaluated to determine whether airspace modifications could be implemented to meet the selection standards described in **Section 2.3** (Selection Standards), thereby making the airspace optimal for training F-16 pilots out of Holloman AFB. Seven existing MOAs were evaluated: Valentine, Bronco, Talon, Cato, Smitty, Beak, and Pecos MOAs (**Figure 2.4-1**).

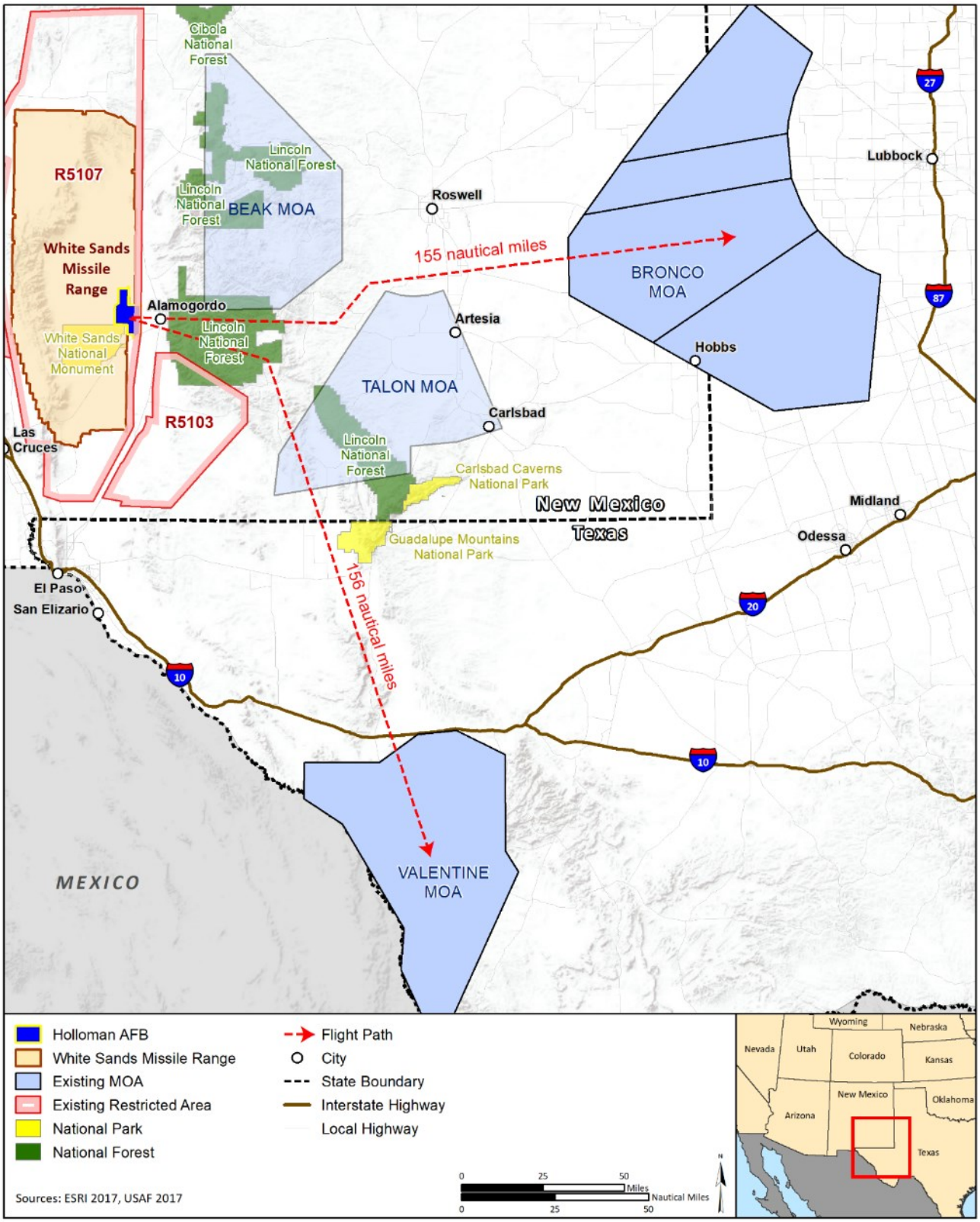
2.4.1 Valentine and Bronco MOAs

Valentine and Bronco MOAs are illustrated on **Figure 2.4-2**. Valentine MOA is located south of Holloman AFB in Texas and covers approximately 2,432 square nm. Holloman AFB schedules the use of Valentine MOA. The floor of this MOA is 15,000 feet MSL and extends up to 18,000 feet MSL. The associated ATCAA extends the training airspace to FL450. The travel distance from Holloman AFB to the center of Valentine MOA is 156 nm.



Legend: AFB-Air Force Base; MOA-Military Operations Area.

Figure 2.4-1. Training Airspace Evaluated



Legend: AFB-Air Force Base; MOA-Military Operations Area.

Figure 2.4-2. Valentine and Bronco MOAs

The Bronco MOA is located east of Holloman AFB and covers approximately 5,115 square nm. Cannon AFB schedules use of Bronco MOA. The MOA is divided into four segments with designated floors of 8,000 to 10,000 feet MSL and a ceiling that extends up to 18,000 feet MSL. With the associated ATCAA, the airspace extends to FL510. The travel distance from Holloman AFB to the center of the Bronco MOA is 155 nm.

The travel distance to Valentine and Bronco MOAs exceeds the 120 nm travel distance standard for optimizing F-16 pilot training sorties. These MOAs are available, but are not practicable for F-16 pilot training given their distance; therefore, these MOAs were not assessed for the remaining selection standards.

2.4.2 Talon MOA

Talon MOA is located to the east of Holloman AFB and covers approximately 2,661 square nm (**Figure 2.4-3**). Travel distance to the center of Talon MOA from Holloman AFB is 70 nm. Talon MOA is charted for use sunrise to sunset, Monday through Friday with activation at other times through the NOTAM process. The MOA is divided into three segments: Talon High East, Talon High West, and Talon Low. Talon Low MOA extends from 300 feet AGL to 12,499 feet MSL. Talon High West and East MOAs partially overlie Talon Low MOA and extend from 12,500 feet MSL up to 18,000 feet MSL. The ATCAA overlies the high MOAs and can be requested from the Albuquerque Center to extend the high airspace to FL500. The horizontal limits of the MOA are approximately 42 nm by 44 nm.

The Talon MOA is scheduled by Holloman AFB and is currently used for F-16 pilot training missions that can be performed within the airspace dimensions (approximately 830 annual sorties). The German Air Force conducted approximately 300 sorties per year in the Talon MOA through 2017 while they were stationed at Holloman AFB.

There is an ATS route beneath Talon East High MOA permitting IFR traffic to flow through this area. There are also ATS routes to the north and west of the MOA. Expansion of this MOA to the south and east may be possible to establish the required dimension and configuration to support additional F-16 pilot training missions beyond those that are currently conducted there. Analysis of the screening standards for Talon MOA is provided in **Table 2.4-1**.

Table 2.4-1. Talon MOA Selection Standard Evaluation

Standard	Evaluation	Meets standard or could be modified to meet?
1. Air Force Scheduled Airspace	Scheduled by Holloman AFB	Yes
2. Minimize Travel Time	Travel distance is 70 nm	Yes
3. Required Size and Configuration	Floor - 300 feet AGL Ceiling - FL500	Yes
	Operational dimension: 42 nm by 44 nm	Yes
4. Limit Impacts to Civil Aviation	• Low altitude ATS routes beneath Talon East High MOA • Low altitude ATS routes to the north and west • Expansion possible to the south and east	Yes

Legend: AFB-Air Force Base; AGL-above ground level; ATS-Air Traffic Service; FL-Flight Level; MOA-Military Operations Area; nm-nautical mile.

2.4.3 Cato and Smitty MOAs

Cato and Smitty MOAs cover approximately 2,656 square nm (**Figure 2.4-4**). The Cato and Smitty MOAs are located west of Holloman AFB and on the western side of WSMR. Holloman AFB pilots scheduling use of these MOAs need to obtain permission from WSMR to fly through R-5107 (making the travel distance to the center of the MOAs approximately 117 nm), or they must fly around the northern boundary making the travel distance 200 nm or greater.

Both the Cato and Smitty MOAs are charted for use from 8:00 a.m. to 10:00 p.m., Monday through Saturday with activation at other times through the NOTAM process. Smitty MOA is charted for use from 500 feet AGL up to 13,499 feet MSL. Cato MOA overlies Smitty MOA and is charted from 13,500 feet MSL up to 18,000 feet MSL. The ATCAA can be requested from the Albuquerque Center to extend the vertical limits of the Cato MOA to FL510. When activated together, the MOAs and ATCAA provide training airspace from 500 feet AGL to FL510.

The Cato and Smitty MOAs are currently scheduled for use through the New Mexico Air National Guard (ANG) at Kirtland AFB. The MOAs formerly supported training for F-16 pilots assigned to the New Mexico ANG, but currently have limited training activity.

There are multiple ATS routes on the northern boundary of the MOAs. An increase in demand for commercial travel between Albuquerque, New Mexico and Phoenix, Arizona and other western destinations has resulted in a substantial increase in the FAA's requirement to use ATS routes that lie to the north of the MOAs. This has effectively reduced the horizontal limits of the ATCAA to 30 nm by 67 nm (official dimensions are 40 nm by 67 nm). Expansion of these MOAs to the southeast would establish the required dimension and configuration for F-16 pilot training. Analysis of the screening standards for the Cato and Smitty MOAs is provided in **Table 2.4-2**.

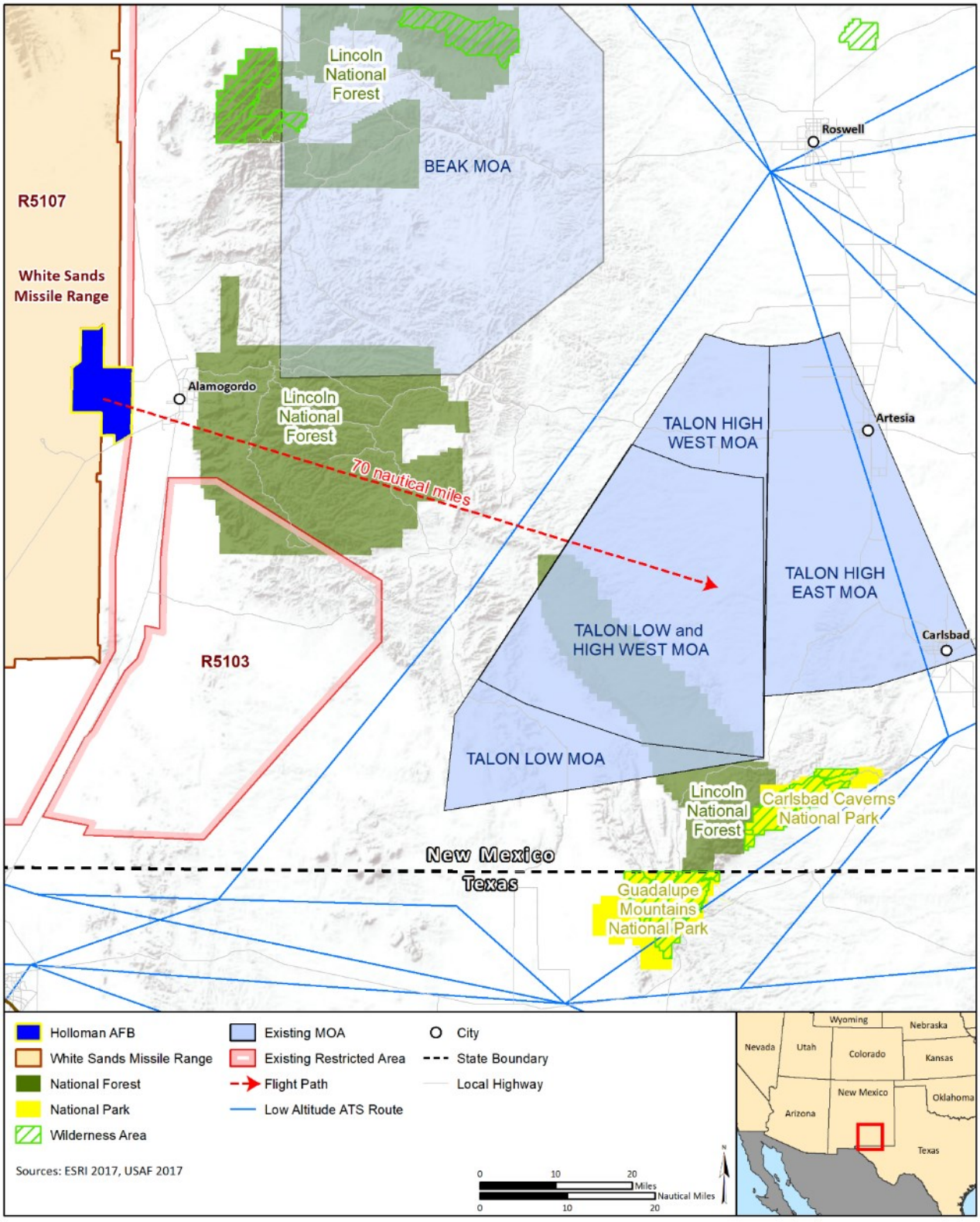
Table 2.4-2. Cato and Smitty MOAs Selection Standard Evaluation

Standard	Evaluation	Meets standard or could be modified to meet?
1. Air Force Scheduled Airspace	Scheduled by New Mexico ANG	Yes
2. Minimize Travel Time	117 nm (traveling across WSMR)	Yes
3. Required Size and Configuration	Floor - 500 feet AGL Ceiling - FL510	Yes
	30 nm by 67 nm (reduced dimensions)	Yes
4. Limit Impacts to Civil Aviation	• Low altitude ATS routes to the north • Expansion possible to the southeast	Yes

Legend: AGL-above ground level; ANG-Air National Guard; ATS-Air Traffic Service; FL-Flight Level; MOA-Military Operations Area; nm-nautical mile; WSMR-White Sands Missile Range.

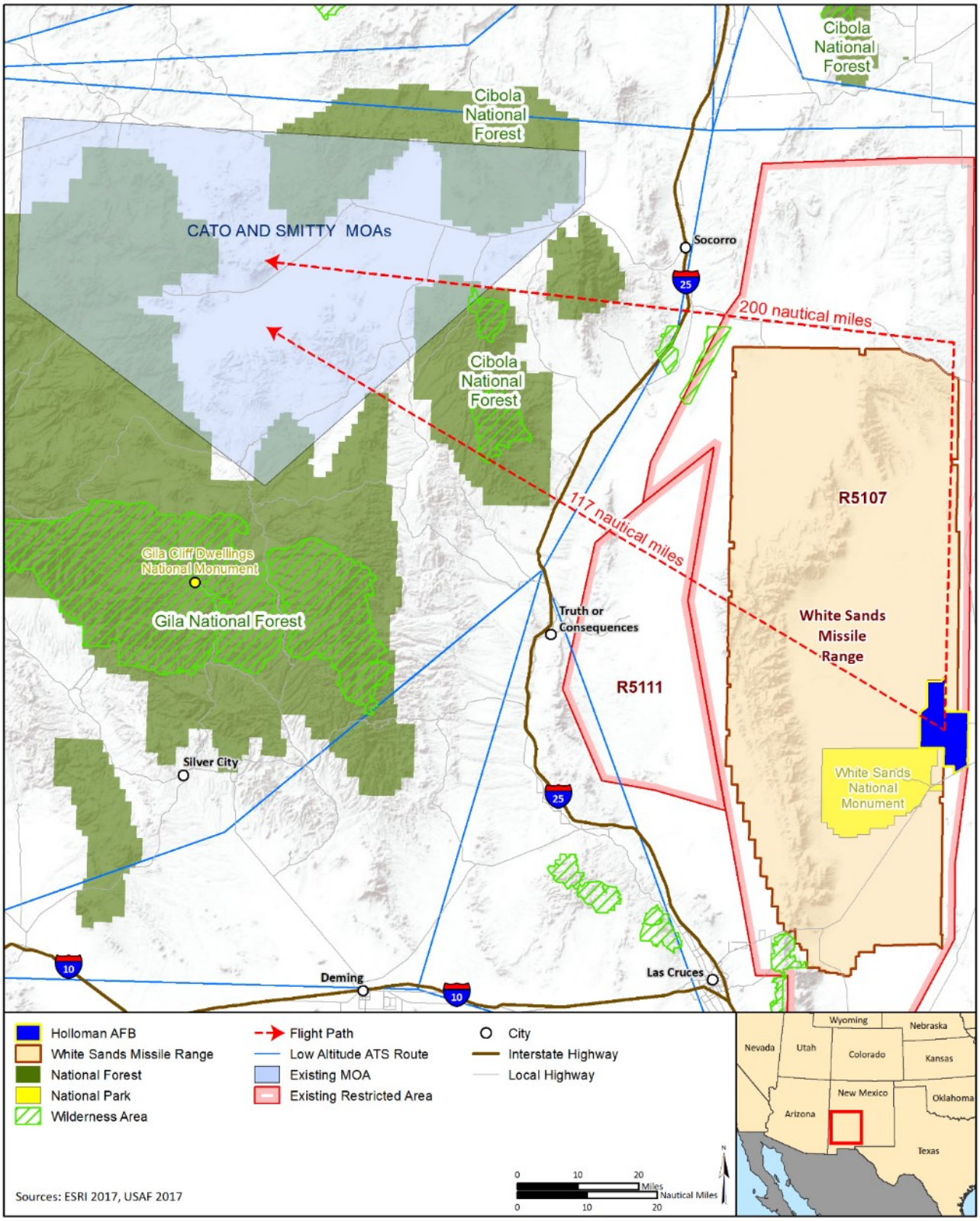
2.4.4 Beak MOA

The Beak MOA is located east of Holloman AFB and covers approximately 1,938 square nm (**Figure 2.4-5**). The travel distance from Holloman AFB to the center of the Beak MOA is 47 nm. The Beak MOA is charted for use from 6:00 a.m. to 6:00 p.m., Monday through Friday with activation at other times through the NOTAM process. The Beak MOA is divided into three segments, Beak A, Beak B, and Beak C, each with altitudes from 12,500 feet MSL up to 18,000 feet MSL. The ATCAA can be requested from the Albuquerque Center to extend the vertical limits of the Beak MOA up to FL500. When activated together, the combined MOA and ATCAA complex provides training airspace from 12,500 feet MSL to FL500. The horizontal limits of the Beak MOA are approximately 34 nm by 57 nm.



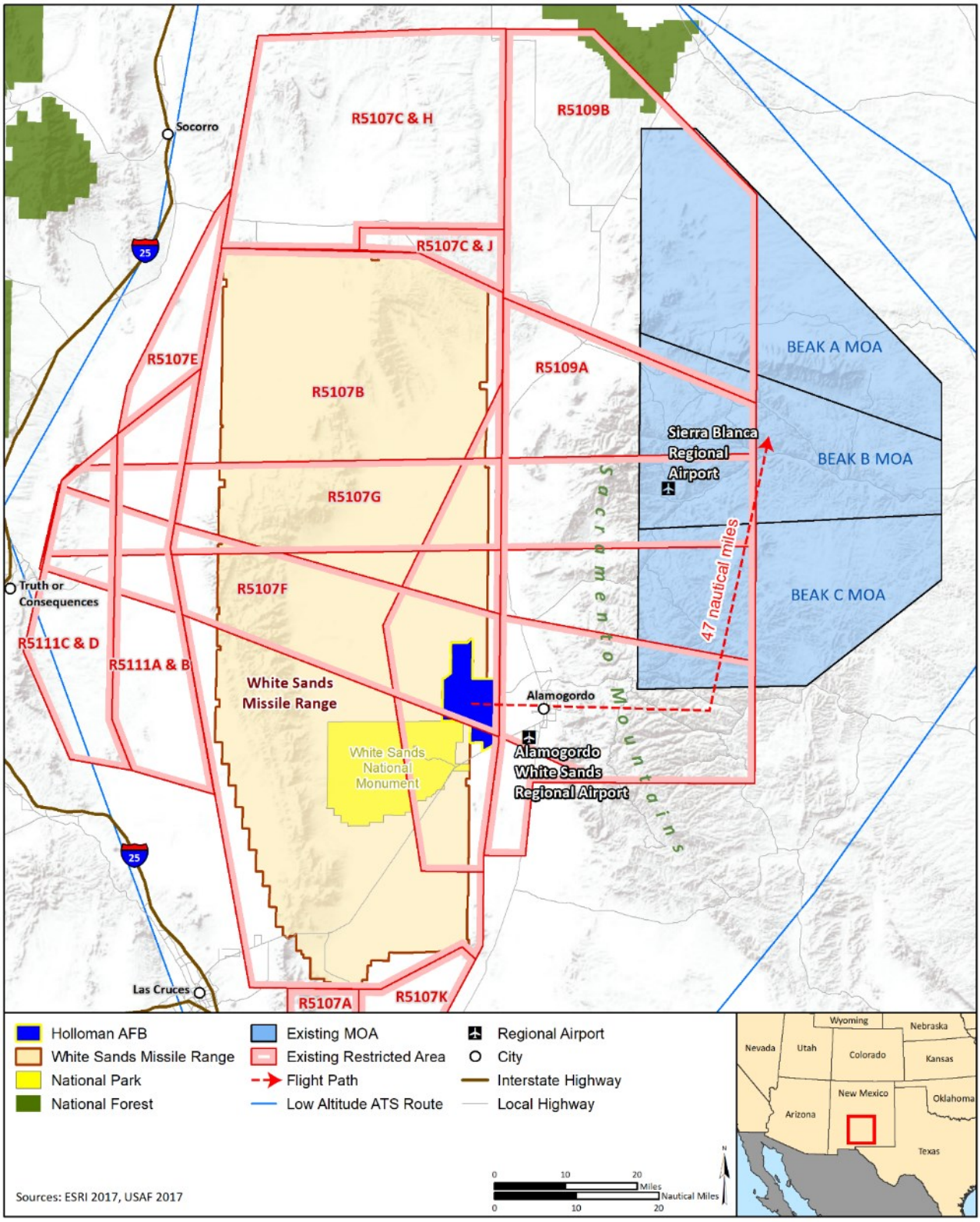
Legend: AFB-Air Force Base; ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 2.4-3. Talon MOA



Legend: AFB-Air Force Base; ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 2.4-4. Cato and Smitty MOAs



Legend: AFB-Air Force Base; ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 2.4-5. Beak MOA

Holloman AFB schedules use of the Beak MOA. The Beak MOA is currently used in conjunction with WSMR for F-16 pilot training exercises when WSMR alone cannot provide the volume or capacity required for multiple simultaneous training sorties. The Beak MOA is currently heavily used to support F-16 pilot training missions that do not require low altitude airspace (approximately 2,500 annual sorties). The Beak MOA also serves as a staging area for large-force exercises (Air Force 2007).

The Beak MOA has low altitude ATS routes to the northeast and southeast. The Alamogordo-White Sands Regional Airport is located to the southwest. The Sierra Blanca Regional Airport is located beneath Beak B in Ruidoso, New Mexico. Several blocks of restricted areas scheduled by WSMR (R-5107G, R-5107F, R-5109A, and R-5109B) overlie the MOA as well and are activated when WSMR is being used for testing which affects the availability of Beak MOA for F-16 pilot training.

The Sacramento Mountain range lies beneath the Beak MOA. The topography in this area quickly elevates from the valley to the mountain peak. The mountain range presents a significant obstacle, similar to a wall, in the potential flight path of an F-16 traveling under VFR procedures at low altitudes. Therefore, lowering the floor of this MOA to allow for low-level training would not be safe or practicable.

Expansions to this MOA would likely impact civil and other military users within this area; therefore, no further modifications are feasible to increase the usability of the MOA for F-16 pilot training. The MOA is already used for F-16 pilot training to the extent possible. Analysis of the screening standards for the Beak MOA is provided in **Table 2.4-3**.

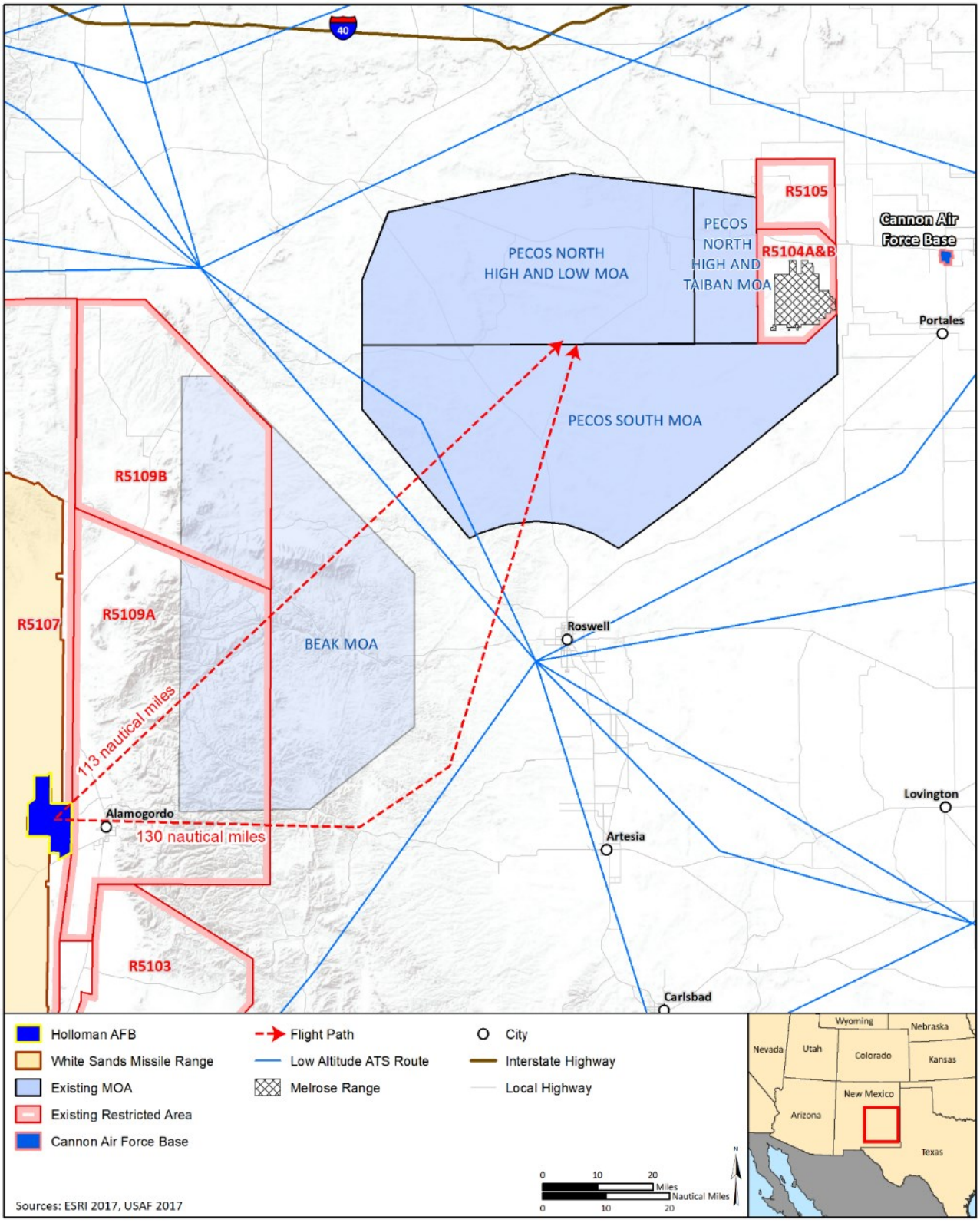
Table 2.4-3. Beak MOA Selection Standard Evaluation

Standard	Evaluation	Meets standard or could be modified to meet?
1. Air Force Scheduled Airspace	Scheduled by Holloman AFB	Yes
2. Minimize Travel Time	47 nm	Yes
3. Required Size and Configuration	Floor - 12,500 feet AGL Ceiling - FL500	No
	34 nm by 57 nm	No
4. Limits Impact to Civil Aviation	• Surrounded by low altitude ATS routes • Regional airports under and adjacent to MOA	No

Legend: AFB-Air Force Base; AGL-above ground level; ATS-Air Traffic Service; FL-Flight Level; MOA-Military Operations Area; nm-nautical mile.

2.4.5 Pecos MOA

The Pecos MOA is located northeast of Holloman AFB and covers approximately 3,300 square nm (**Figure 2.4-6**). Travel distance to the center of Pecos MOA is 113 nm if the aircraft travels through the Beak MOA. If the aircraft travels around the Beak MOA, the travel distance increases to 130 nm. The Pecos MOA is charted for use from 9:00 a.m. to 9:00 p.m., Monday through Friday with activation at other times through the NOTAM process. The Pecos MOA is divided into a north and south segment both having a low and high component with defined altitudes of 500 feet AGL up to 18,000 feet MSL. The ATCAA can be requested from the Albuquerque Center to extend the vertical limits of the Pecos MOA up to FL500. When activated together, the combined MOA and ATCAA provides training airspace from 500 feet AGL to FL500. The Pecos MOA has horizontal limits of 50 nm by 75 nm.



Legend: AFB-Air Force Base; ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 2.4-6. Pecos MOA

Cannon AFB schedules the use of Pecos MOA and the priorities of use are adjusted as needed to support the highest priority mission. Pecos MOA is seldom used by Holloman AFB aircraft due to the distance and scheduling conflicts with other missions. The MOA is available to Holloman AFB for F-16 pilot training missions and is used to the extent possible. The Pecos MOA and ATCAA is used by the 27th Special Operations Wing (Cannon AFB) and the New Mexico ANG for conducting a range of training activities. Pecos MOA is also used in conjunction with Melrose Range, decreasing its availability.

There are low altitude ATS routes located to the north, west, and south of the MOA. Melrose Range, scheduled by Cannon AFB, is located to the east of the MOA and contains restricted areas R-5104 and R-5105. There are no opportunities for expansion without impacting civilian air traffic or other military users. Analysis of the screening standards for the Pecos MOA is provided in **Table 2.4-4**.

Table 2.4-4. Pecos MOA Selection Standard Evaluation

Standard	Evaluation	Meets standard or could be modified to meet?
1. Air Force Scheduled Airspace	Scheduled by Cannon AFB	Yes
2. Minimize Travel Time	113 nm (130 nm to go around Beak MOAs)	Yes
3. Required Size and Configuration	Floor - 500 feet AGL Ceiling - FL500	Yes
	50 nm by 75 nm	No
4. Limits Impact to Civil Aviation	• Surrounded by low altitude ATS routes	No

Legend: AFB-Air Force Base; AGL-above ground level; ATS-Air Traffic Service; FL-Flight Level; MOA-Military Operations Area; nm-nautical mile.

2.5 SUMMARY OF ALTERNATIVES SCREENING ANALYSIS

A summary of the alternatives screening analysis is provided in **Table 2.5-1**. Of the seven MOAs evaluated, only three could support airspace modifications needed to optimize the airspace required to support F-16 pilot training (it should be noted that the Cato and Smitty MOAs are charted as two distinct MOAs; however, they have the same horizontal limits and are operationally treated as one MOA).

Table 2.5-1. Summary of Alternatives Screening Analysis

Standard	Valentine MOA[1]	Bronco MOA[1]	Talon MOA	Cato and Smitty MOAs	Beak MOA	Pecos MOA
1. Air Force scheduled airspace?	Yes	Yes	Yes	Yes	Yes	Yes
2. Maximizes training time and minimizes travel time?	No	No	Yes	Yes	Yes	Yes
3a. Required size and configuration - meets vertical limits or could be expanded to meet?	Not evaluated	Not evaluated	Yes	Yes	No	Yes
3b. Required size and configuration - meets horizontal limits or could be expanded to meet?	Not evaluated	Not evaluated	Yes	Yes	No	No
4. Expansion would have limited impacts to civil aviation?	Not evaluated	Not evaluated	Yes	Yes	No	No
Carry Forward?	**No**	**No**	**Yes**	**Yes**	**No**	**No**

Legend: MOA-Military Operations Area.

Notes: [1] Since the travel distance to Valentine and Bronco MOAs is too far to optimize F-16 pilot training, the vertical and horizontal limits of the MOAs are irrelevant. Therefore, they were not evaluated for the remainder of the selection criteria.

2.6 ALTERNATIVES ELIMINATED

2.6.1 Air Force Scheduled Airspace

Valentine and Bronco MOAs were eliminated from further consideration based on the travel distance standard used during the selection process. The travel distance to these MOAs significantly limits the amount of training time for F-16 pilots. There are no airspace modifications that could optimize these MOAs for F-16 pilot training. These MOAs have had limited to no activity in recent years and could be returned in part or in whole to the NAS.

Beak MOA is within the standard travel distance; however, the size and configuration does not meet the horizontal selection standard. A westward lateral and vertical expansion would close off flights flying under IFR en-route to and from Alamogordo-White Sands Regional Airport and Holloman AFB. An expansion to the northeast or southeast would impact flights traveling on ATS routes providing service to and from Roswell International Airport. In addition, several blocks of restricted areas that are not scheduled by the Air Force overlie the MOA reducing its availability for F-16 pilot training. The underlying terrain does not allow for safe low-level training missions. Beak MOA is already used to the extent possible for F-16 pilot training and would continue to be used. No further airspace modifications are feasible to further optimize the MOA. Therefore, this MOA was eliminated as an alternative.

Pecos MOA is within the standard travel distance; however, the size and configuration of Pecos MOA is not suitable for all F-16 pilot training sorties. Pecos MOA is available to support F-16 pilot training to the extent practical. The surrounding ATS routes and Melrose Range do not permit expanding the airspace dimensions to meet the horizontal requirements to support F-16 pilot training. Expansion would impact civilian aviation; therefore, this MOA was eliminated as an alternative.

2.6.2 Non-Air Force Scheduled Airspace

In addition to screening Air Force scheduled airspace in the vicinity of Holloman AFB (detailed in **Section 2.4,** Screening of Alternatives), the Air Force also considered non-Air Force scheduled airspace for optimizing F-16 pilot training. The following non-Air Force scheduled areas were considered, but eliminated from further evaluation in this EIS.

White Sands Missile Range

WSMR is a U.S. Army military testing range located adjacent to Holloman AFB (see **Section 1.2.3**, White Sands Missile Range). The restricted areas at WSMR are prioritized for RDT&E, but are available for F-16 pilot training when not used for testing activities. The restricted areas are in close proximity to Holloman AFB, have the necessary attributes for F-16 pilot training, and are currently heavily used for F-16 pilot training. To facilitate the scheduling between Holloman AFB and WSMR, the two organizations entered into a Memorandum of Agreement in September 2014. While the Agreement outlines the process to schedule needed airspace, scheduling at WSMR is governed by the Department of Defense Directive (DoDD) 3200.11, *Major Range and Test Facility Base*. As competing demands for testing and the use of restricted areas at WSMR increases, WSMR has less availability to support F-16 pilot training missions conducted by Holloman AFB.

Holloman AFB currently uses WSMR for approximately 5,000 training sorties annually. Use of WSMR for training that needs to occur in a restricted area would continue under the Proposed Action. Training that does not have to be done in a restricted area currently occurs at WSMR to the extent possible due to airspace

availability and would also continue. Since the WSMR airspace is prioritized for RDT&E, the availability of the airspace for F-16 pilot training is unpredictable. The F-16 pilot training syllabus requires pilots to train in a specific series of missions which drives the need for readily available suitable airspace. Holloman AFB would continue to use WSMR for F-16 pilot training to the extent possible, but there are no feasible modifications that would increase the availability of the airspace for Holloman AFB aircraft. The Air Force also does not have the authority to modify the restricted airspace at WSMR. Therefore, WSMR is fully optimized to the extent possible for F-16 pilot training and was eliminated as an alternative.

McGregor Range (Fort Bliss)

McGregor Range (within Fort Bliss) is a U.S. Army military training range located to the south of WSMR and Holloman AFB (see **Section 1.2.4**, Fort Bliss McGregor Range). Restricted areas (R5103 and R5107) support a wide variety of activities, but the primary purposes of these areas are to protect non-participating aircraft from range activities occurring on the ground; promote realistic training; and to segregate non-participating aircraft from unmanned aerial system flight operations. The restricted areas at McGregor Range are often used in conjunction with the restricted areas at WSMR for testing activities. Holloman AFB currently uses McGregor Range for remote piloted aircraft activities and some F-16 pilot training sorties (approximately 600 sorties per year). This use would continue, however, there are no airspace modifications that could further optimize this airspace because this airspace is already used to the maximum extent due to U.S. Army use of this airspace. Therefore, McGregor Range was eliminated as an alternative.

2.7 ALTERNATIVES CARRIED FORWARD

None of the MOAs evaluated currently provide the required dimensions to optimize F-16 pilot training. Thus, the MOAs were also evaluated for their ability to be expanded or reconfigured to meet the required dimensions with limited or no impacts to civilian air traffic or other military users. Three MOAs were determined reasonable for reconfiguration and expansion and have been carried forward for analysis in the EIS.

Talon MOA has been carried forward as a reasonable alternative. While this MOA does not currently meet the horizontal limits associated with the selection standards, it may be expanded with limited impacts to commercial and private traffic. Talon MOA meets all other selection standards.

Cato and Smitty MOAs have been carried forward as a reasonable alternative. Similar to Talon, these MOAs do not currently meet the horizontal limits associated with the selection standards. However, the MOAs may be expanded with limited impacts to commercial and private traffic. Cato and Smitty MOAs meet all other selection standards.

2.8 DETAILED DESCRIPTION OF ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

2.8.1 Alternative 1: Talon MOA

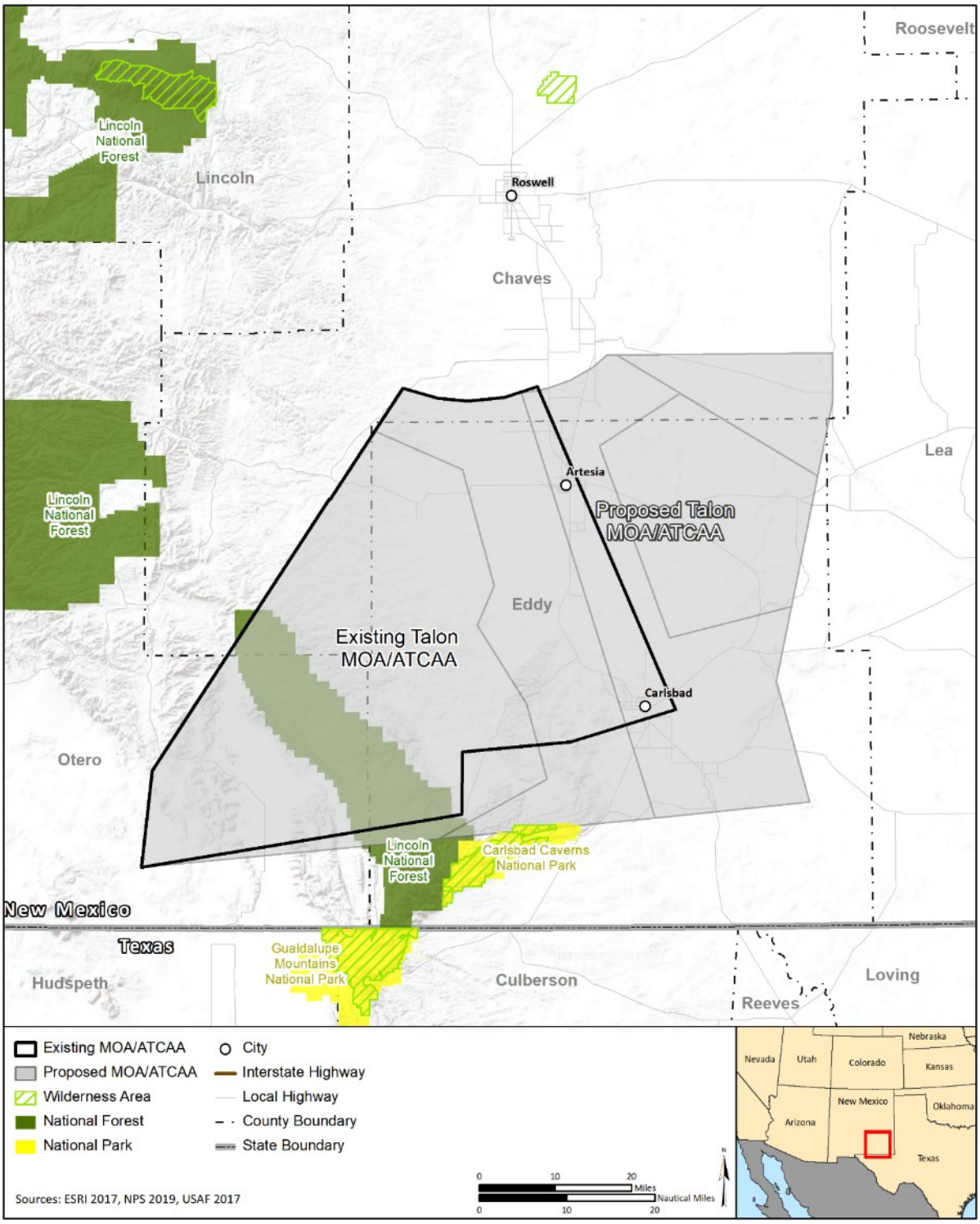
Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace. Details of Alternative 1 are provided in the following sections.

2.8.1.1 Proposed Airspace Modifications

Reconfigure and Expand Talon MOA

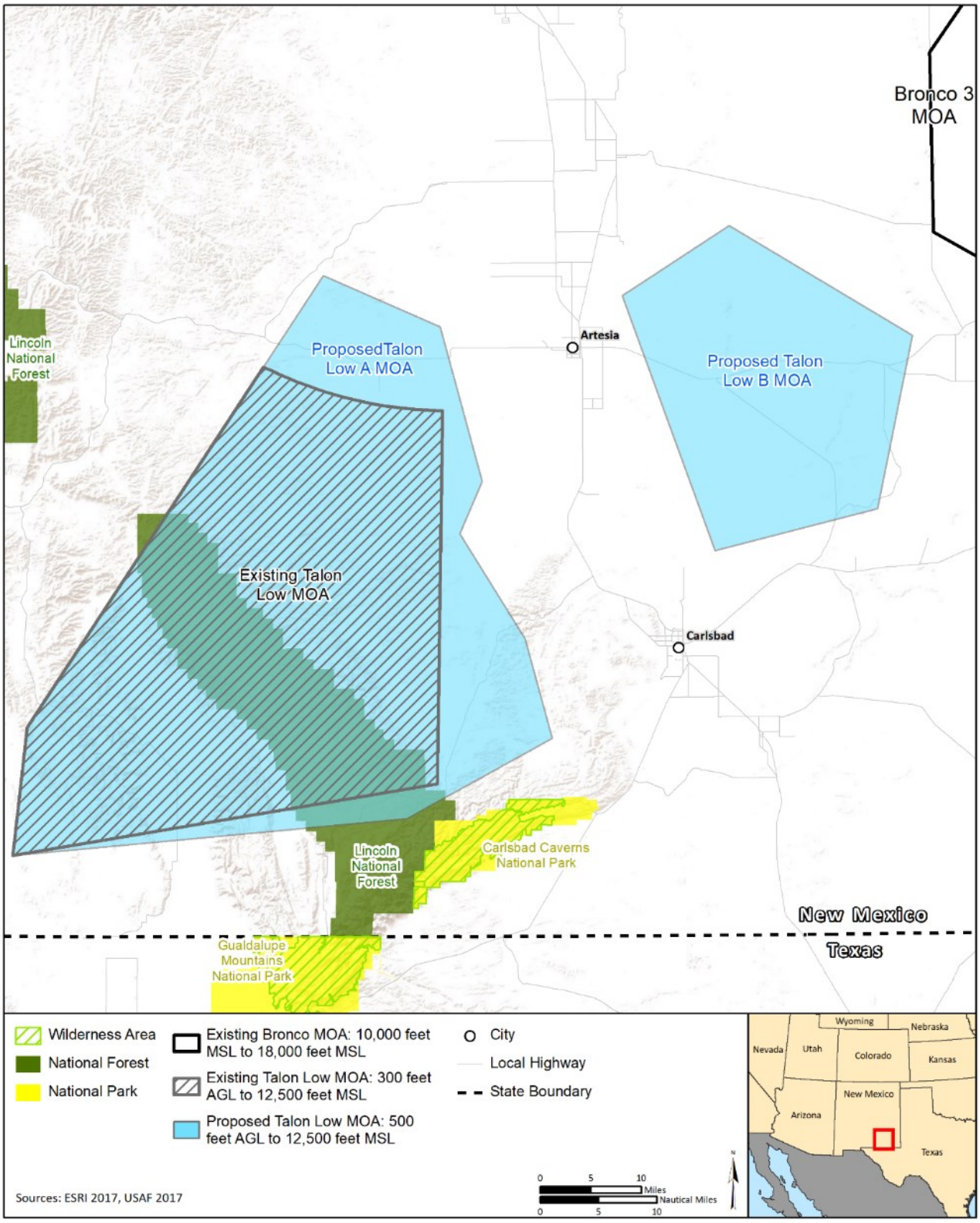
The Talon MOA would be reconfigured and expanded to the south and east as shown in **Figure 2.8-1**. The proposed MOA would be subdivided into two low MOAs (Low A and B) (**Figure 2.8-2**) and three high MOAs (High A, B, and C) (**Figure 2.8-3**). The combined low and high airspace would have a floor of 500 feet AGL and a ceiling up to 18,000 feet MSL. An ATCAA would be assigned above the high MOAs expanding the usable airspace to FL510 when requested and available (**Figure 2.8-4**). The ATCAA would have the same A, B, and C subdivisions as the high MOAs. The eastern edge of the proposed Talon High C MOA would align with the western edge of the existing Bronco 3 MOA. In order to maintain one of the existing approach corridors to Roswell International Airport, Talon High C and Bronco 3 would not be activated at the same time. That is, if Talon High C were activated, Bronco 3 would be deactivated so that the approach to Roswell Internal Airport could be available with minor re-routing.

The reconfigured and expanded MOA would accommodate F-16 pilot training that requires larger blocks of airspace. These new airspace segments and how they differ from the existing Talon MOA are shown in **Table 2.8-1**. The reconfigured and expanded Talon MOA would provide an approximate horizontal dimension of 98 by 50 nm, which would allow for a 30 by 80 nm corridor. In accordance with FAA minimum safe altitude rules (14 CFR 91.119), aircraft must 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; and outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet. The Carlsbad Caverns National Park slightly overlaps the southern edge of the proposed Talon High A MOA. The FAA Aeronautical Information Manual (paragraph 7-4-6) requests for pilots to maintain a minimum altitude of 2,000 feet above the surface of National Parks would be met since the proposed floor of the Talon High A MOA would be 12,500 feet MSL.



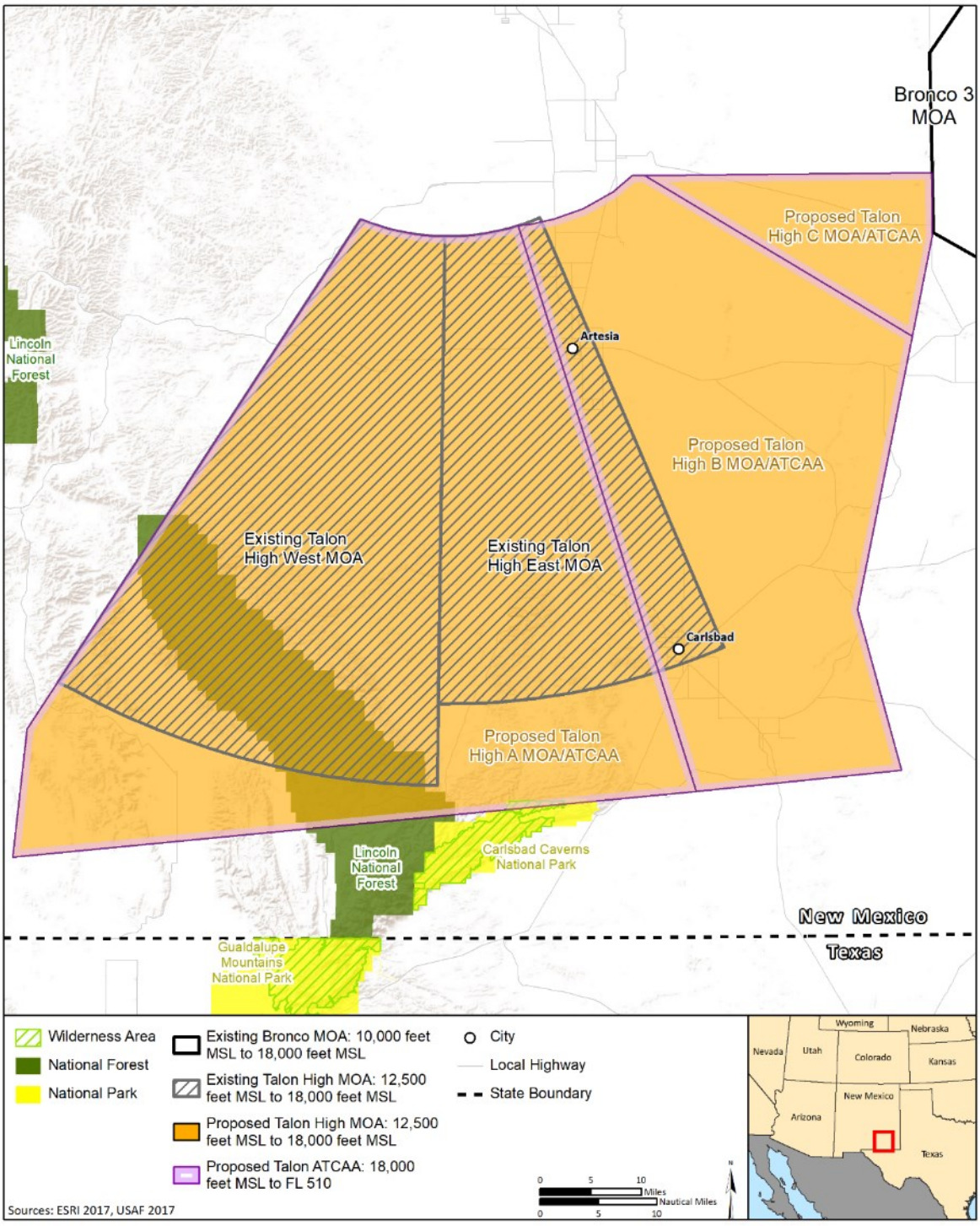
Legend: ATCAA – Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 2.8-1. Alternative 1: Overview of Existing and Proposed Talon MOA



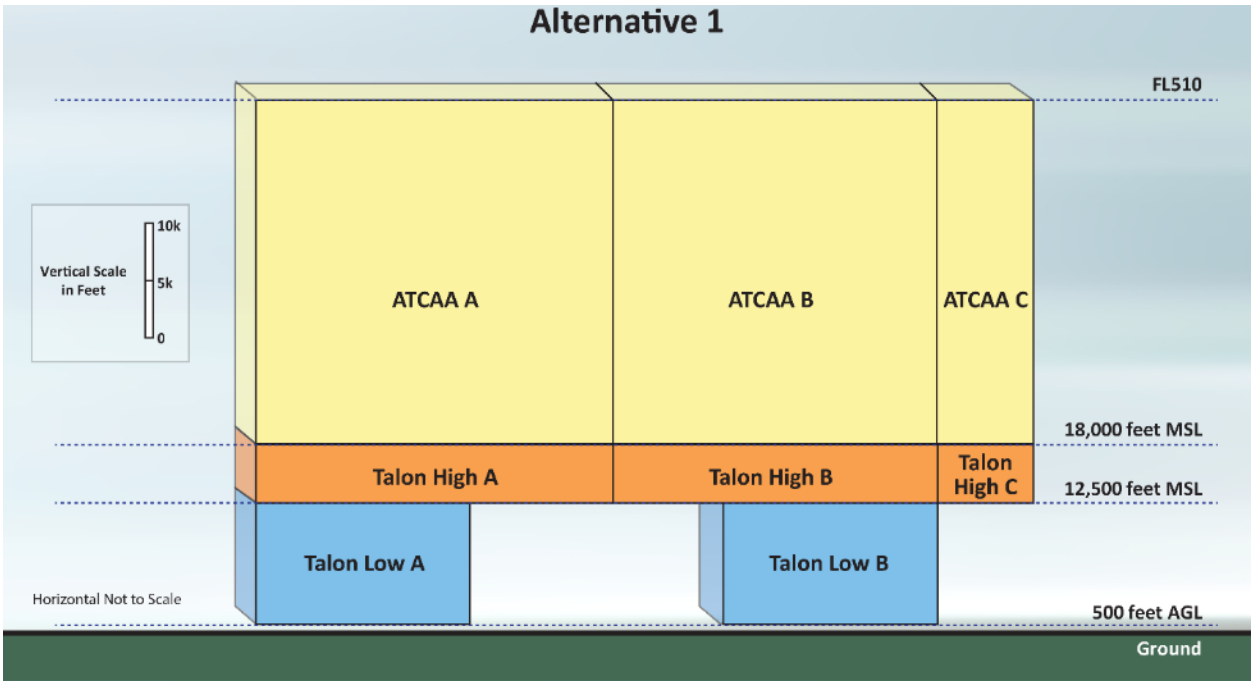
Legend: AGL-above ground level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-2. Alternative 1: Proposed Talon Low MOA



Legend: ATCAA – Air Traffic Control Assigned Airspace; FL – Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-3. Alternative 1: Proposed Talon High MOA and ATCAA

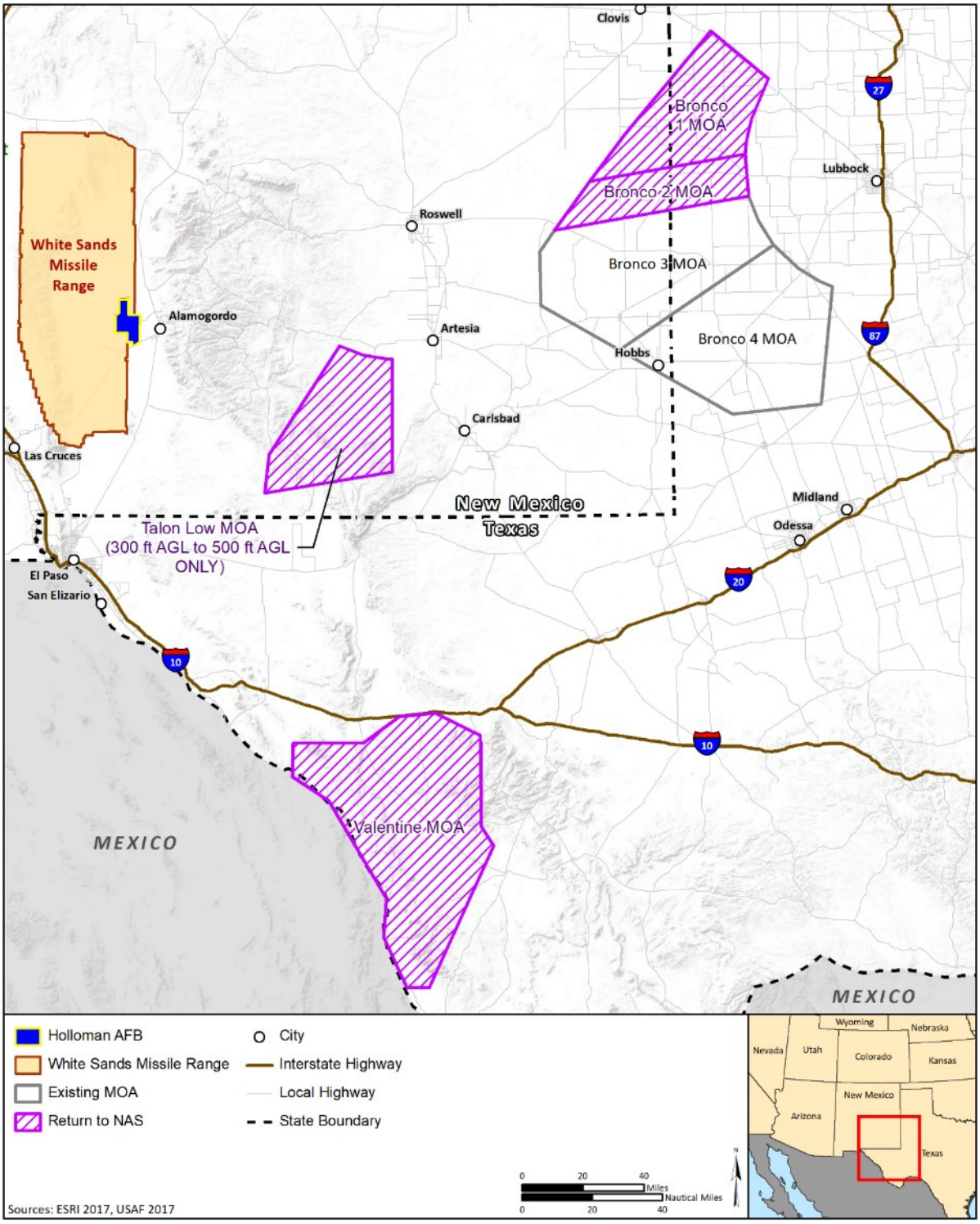


Note: Blue –low MOA; Orange –high MOA; Yellow –ATCAA
Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA – Military Operations Area; MSL-mean sea level.

Figure 2.8-4. Alternative 1: Proposed Airspace Components

Return Airspace to National Airspace System

The floor of the Talon Low MOA would be raised from its current 300 feet AGL to 500 feet AGL. This would allow the Air Force to return the lower 200 feet of the airspace to the NAS. Also, as part of this Proposed Action, the Valentine MOA and Bronco 1 and 2 MOAs would also be returned to the NAS. These MOAs have had little to no usage in recent years and are no longer needed for Air Force training activities. Bronco 3 and 4 MOAs would be retained as they currently support other Air Force training operations. The airspace that would be returned to the NAS is illustrated in **Figure 2.8-5.**



Legend: AFB – Air Force Base; AGL; Above Ground Level; MOA-Military Operations Area; NAS – National Airspace System.

Figure 2.8-5. Alternative 1: Airspace to Return to NAS

Table 2.8-1. Existing and Proposed Talon MOA/ATCAA									
Airspace		**Floor**		**Ceiling**		**Dimensions (nm)**		**Ground Footprint (square nm)**	
Existing	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
Talon Low	Talon Low A	300 feet AGL	500 feet AGL	12,500 feet MSL	12,500 feet MSL	25 by 40	30 by 45	1,027	1,361
None	Talon Low B	NA	500 feet AGL	NA	12,500 feet MSL	NA	18 by 25	NA	446
Talon High West	Talon High A	12,500 feet MSL	12,500 feet MSL	18,000 feet MSL	18,000 feet MSL	20 by 45	39 by 55	973	1,956
Talon High East	Talon High B	12,500 feet MSL	12,500 feet MSL	18,000 feet MSL	18,000 feet MSL	16 by 38	22 by 50	661	1,115
None	Talon High C	NA	12,500 feet MSL	NA	18,000 feet MSL	NA	9 by 19	NA	176
Talon East/ West ATCAA	Talon A, B, and C ATCAA	18,000 feet MSL	18,000 feet MSL	FL600	FL510	25 by 55	50 by 98	1,869	3,249
Total Ground Footprint of MOA:								**1,869**	**3,249**

Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; NA-not applicable; MOA-Military Operations Area; MSL-mean sea level; nm-nautical mile.

2.8.1.2 Proposed Operations

Frequency of airspace use would not be continuous. The proposed airspace would be scheduled for use during the current Holloman AFB operations window of 7:00 a.m. to 10:00 p.m., Monday through Friday, and through the NOTAM process as necessary (currently the Talon MOA is available sunrise to sunset, Monday through Friday and other times through NOTAM). Anticipated F-16 pilot training sorties, including those currently taking place, within the proposed airspace would be approximately 10,000 annually (**Table 2.8-2**). Supersonic operations would occur at or above FL300 (within the ATCAA) and would account for approximately 10 percent of the total sorties. F-16 pilot training from Holloman AFB would constitute the majority of operations within the proposed Talon MOA/ATCAA; however, transient military aircraft (not based at Holloman AFB) could schedule and use the airspace as well.

Transient aircraft use of the proposed airspace is included to ensure that the full cumulative effects are represented in the analysis. Transient aircraft are those that schedule and use the airspace, but are not based at Holloman AFB. Some squadrons operate on a temporary basis in various locations in order to take advantage of training opportunities that may be different than those at their home locations. With the expectation that optimization of the proposed airspace would probably increase the number of transient users, the Air Force estimated that the number of annual transient sorties would be as many as 1,000 per year when considering historical transient activity. One of the typical users of the existing airspace associated with Holloman AFB is the Canadian Air Force (FA-18 aircraft), who participate in local training as a part of bilateral training events and other detachments. Other transient sorties by aircraft such as F-15 and F-16 would also be expected and are included in the overall 1,000 transients.

Table 2.8-2. Alternative 1: Proposed F-16 Sorties				
Airspace	**Altitude**	**Day (90%)**	**Night (10%)**	**Total**
Talon High A and B MOA/ATCAA	12,500 feet MSL to FL510	5,400	600	6,000
Talon High C MOA/ATCAA	12,500 feet MSL to FL510	270	30	300
Talon Low A and B MOA	500 feet AGL to 12,500 feet MSL	3,330	370	3,700
Total F-16 Sorties		**9,000**	**1,000**	**10,000**
Potential Transients				**1,000**
Total Sorties				**11,000**

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

Use of defensive countermeasures would occur throughout the MOA, to include RR188 Chaff and M206 Flares (**Table 2.8-3**). Chaff are not currently authorized for use within Talon MOA. As part of the airspace modification, Holloman AFB would request authorization from the FAA for use of chaff in the Talon MOA in accordance with FAA Order 6050.32B, *Spectrum Management Regulations and Procedures Manual*. Flares are currently used within the Talon MOA. Fire safety restrictions associated with the use of flares under the Proposed Action would be the same as those currently in place (see **Table 2.2-5**).

Each chaff bundle contains approximately 3.35 ounces of chaff. Once deployed, the inert chaff fibers land on the ground as described in **Section 2.2.4**, *Chaff and Flares*. Chaff and flare usage would also result in residual material landing on the ground. The residual material consists of plastic end caps, felt spacers, plastic piston, and mylar tape.

Table 2.8-3. Alternative 1: Proposed Chaff and Flare Use		
	Chaff	**Flare**
Proposed Annual Use	15,360	15,360

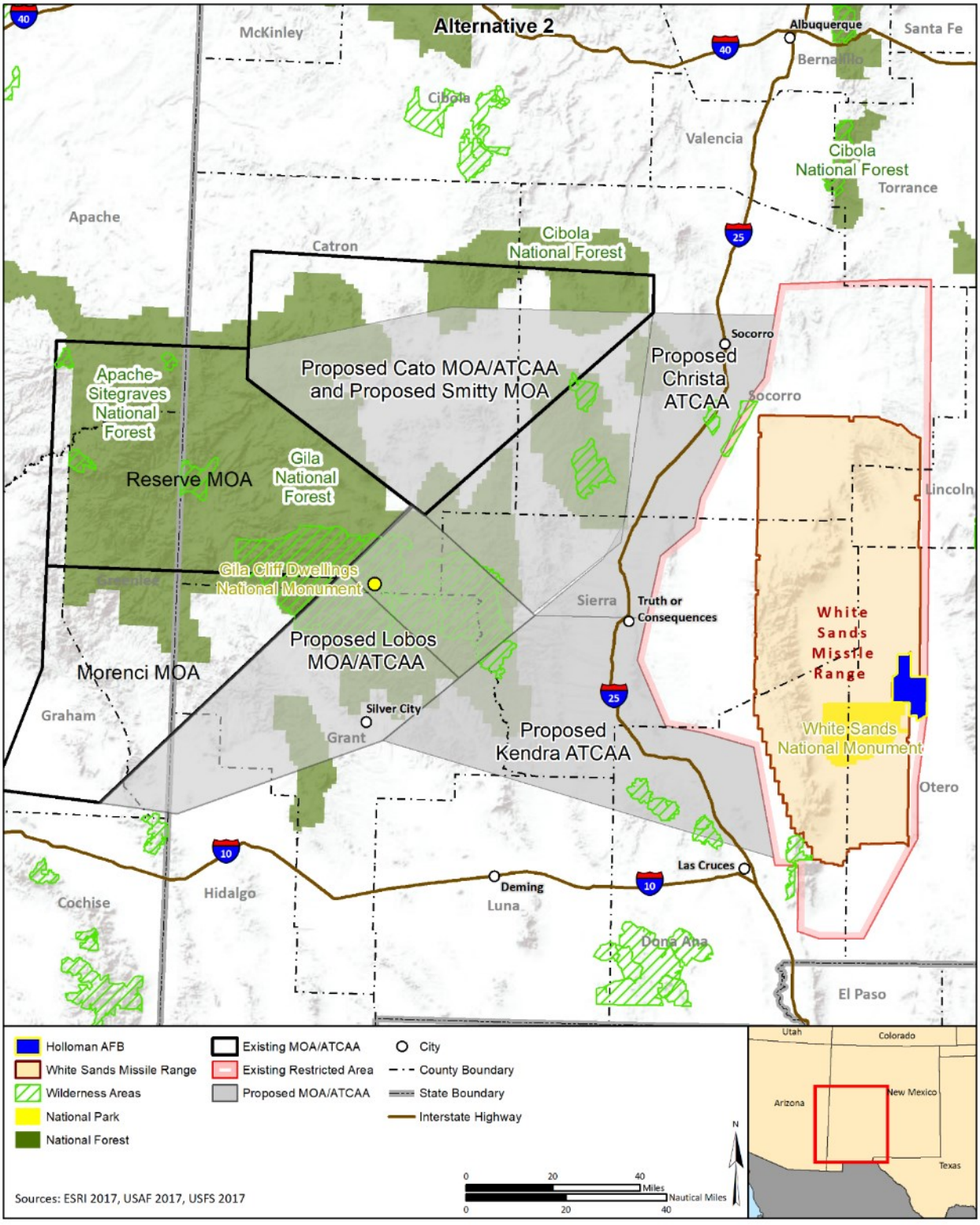
2.8.2 Alternative 2: Cato, Smitty, and Lobos MOAs

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, the Lobos MOA would be established, and the Christa and Kendra ATCAAs would be established (**Figure 2.8-6**). Training operations, to include the use of defensive countermeasures would occur throughout the proposed airspace. Details of Alternative 2 are provided in the following sections.

2.8.2.1 Proposed Airspace Modifications

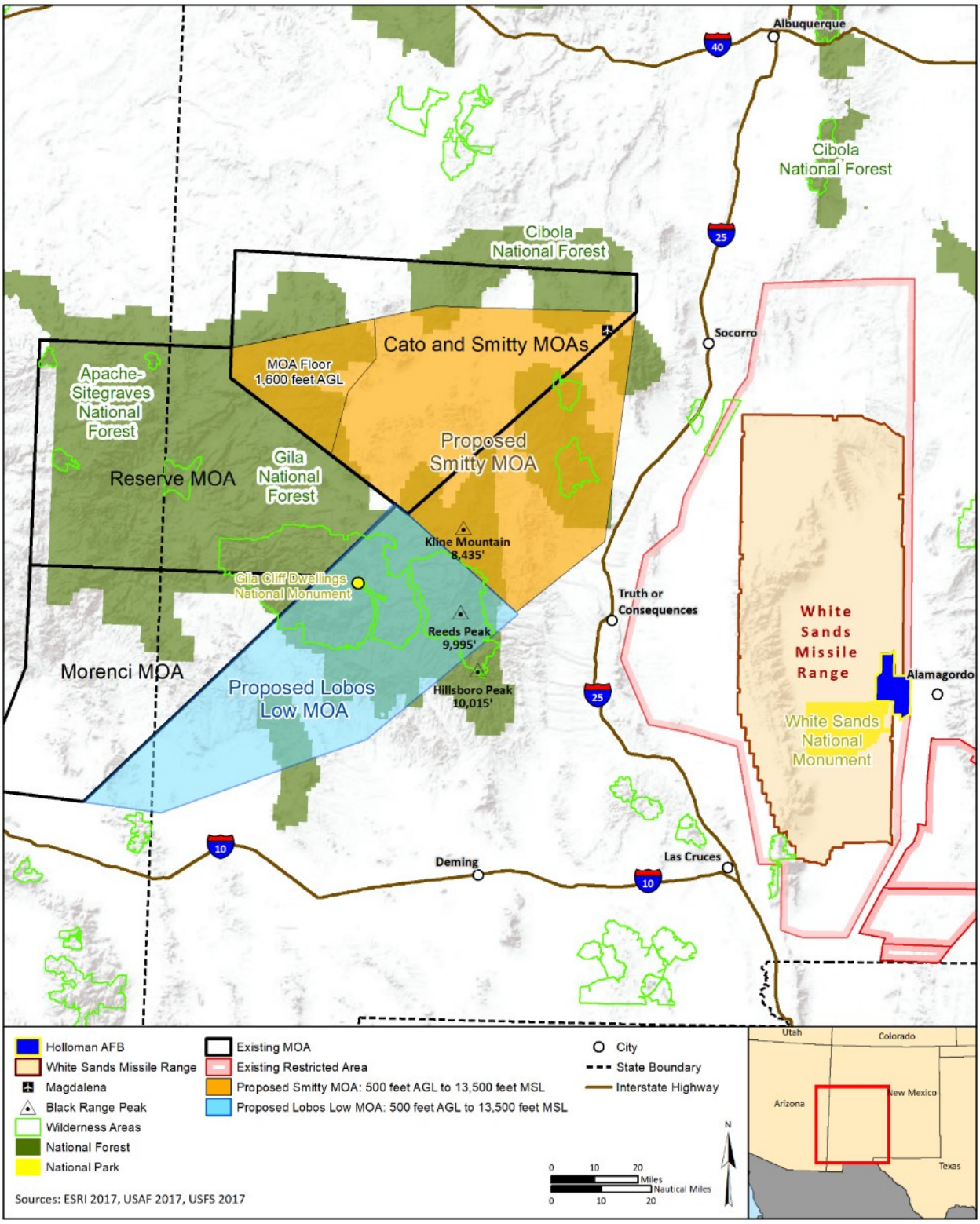
Reconfigure and Expand Cato and Smitty MOAs, Establish Christa ATCAA

The existing Cato and Smitty MOAs, and the associated Cato ATCAA, would be reconfigured and expanded to the southeast. The proposed Smitty MOA would have the same floor and ceiling as it does currently, 500 feet AGL to 13,500 feet MSL (**Figure 2.8-7**). The proposed Cato MOA would also have the same floor and ceiling as it does currently 13,500 feet MSL to 18,000 feet MSL (**Figure 2.8-8**). The proposed Cato ATCAA would be available to extend the vertical airspace to FL510 (**Figure 2.8-8**). **Figure 2.8-9** illustrates how the airspace components vertically relate to each other. The existing and proposed dimensions of the Cato and Smitty MOAs are provided in **Table 2.8-4**.



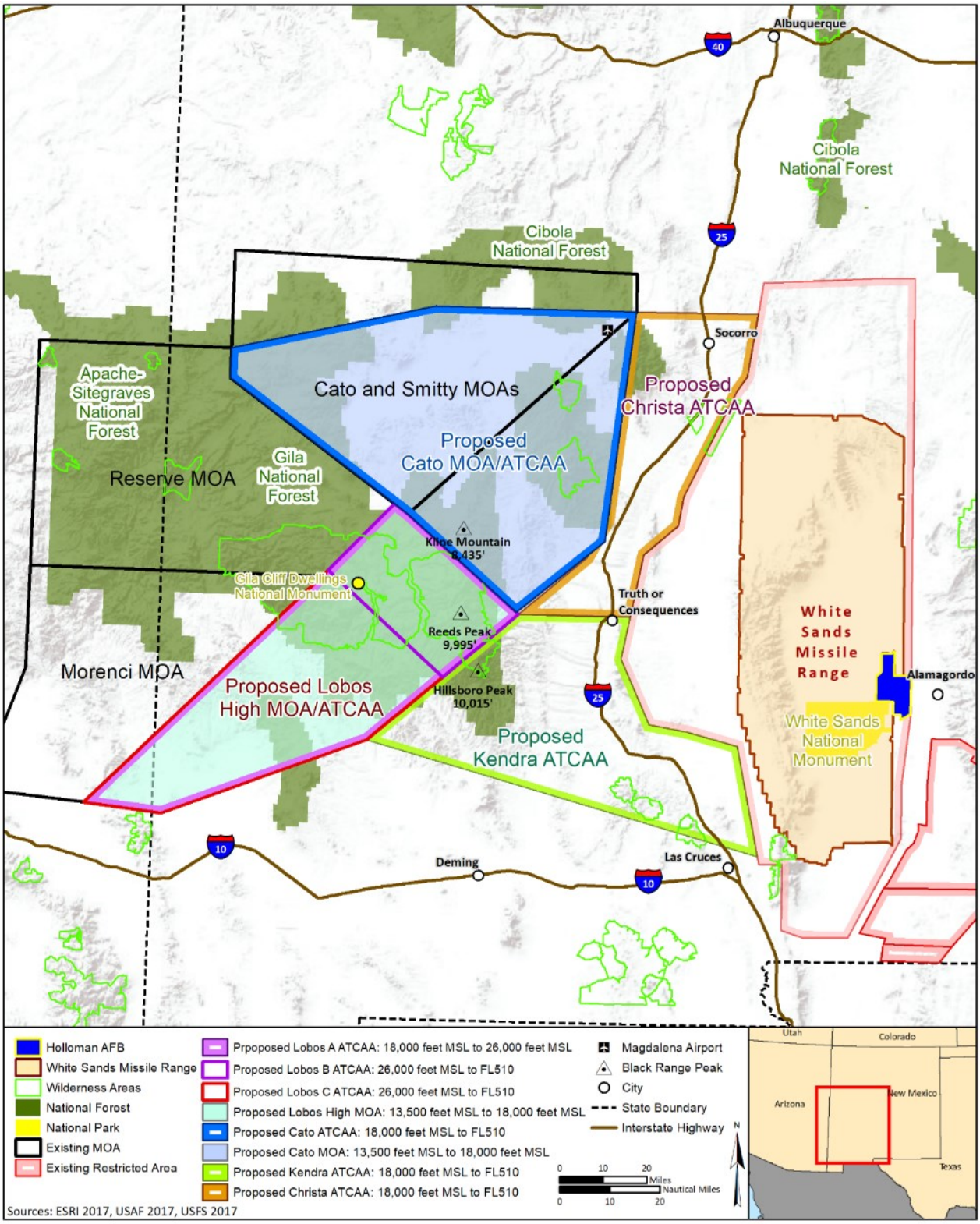
Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 2.8-6. Alternative 2: Overview of Cato, Smitty, Lobos MOAs and Christa and Kendra ATCAAs



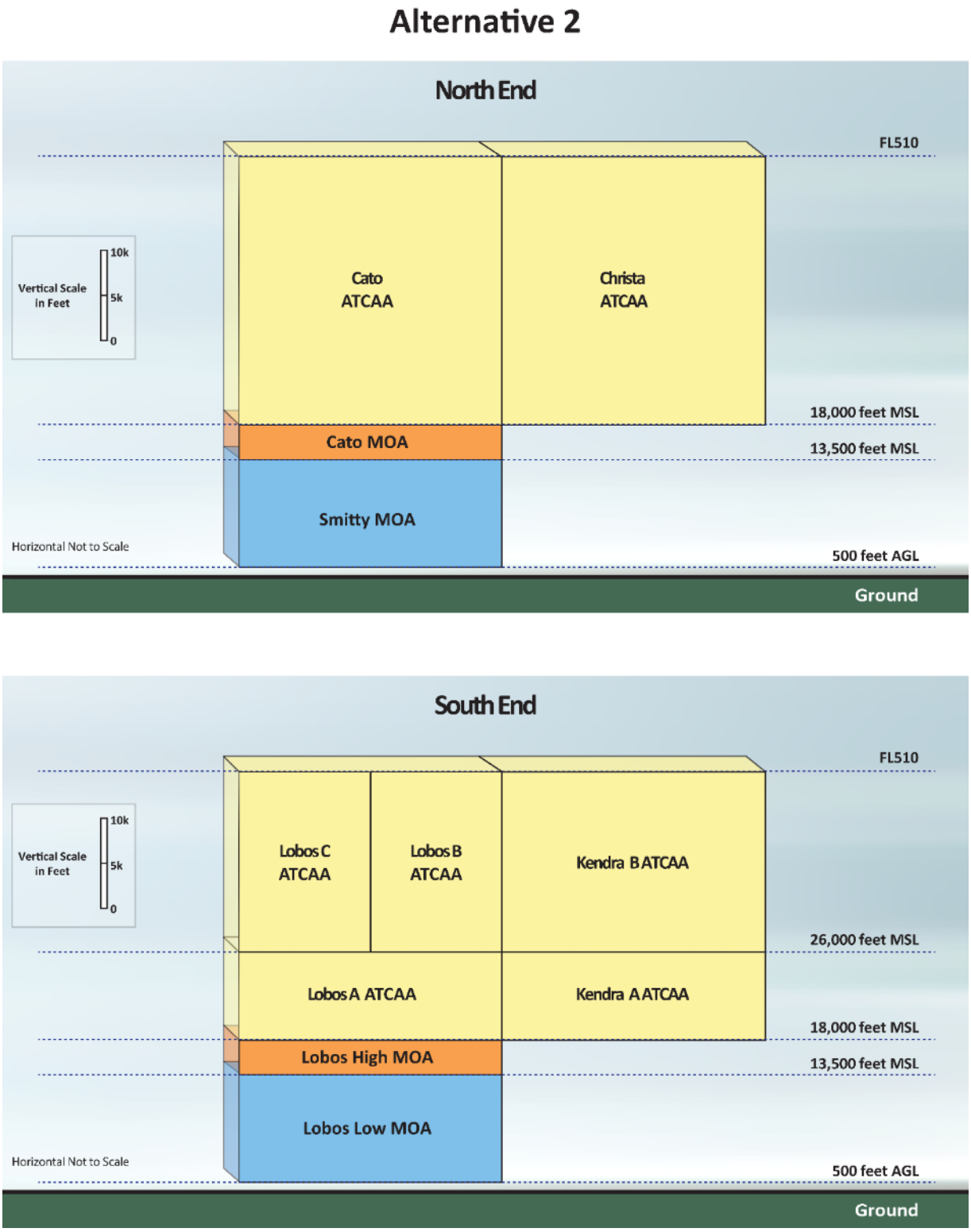
Legend: AFB-Air Force Base; AGL-above ground level; MOA-Military Operations Area; MSL-mean sea level..

Figure 2.8-7. Alternative 2: Proposed Smitty and Lobos Low MOAs



Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-8. Alternative 2: Proposed Cato and Lobos High MOAs/ATCAAs, and Christa and Kendra ATCAAs



Note: Blue –low MOA; Orange –high MOA; Yellow –ATCAA
Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-9. Alternative 2: Proposed Airspace Components

Table 2.8-4. Alternative 2: Existing and Proposed Cato and Smitty MOAs and Christa ATCAA

Airspace		Floor		Ceiling		Dimensions (nm)		Ground Footprint (square nm)	
Existing	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
Smitty MOA	Smitty MOA	500 feet AGL	500 feet AGL	13,500 feet MSL	13,500 feet MSL	40 by 67	45 by 75	2,656	3,192
Cato MOA	Cato MOA	13,500 feet MSL	13,500 feet MSL	18,000 feet MSL	18,000 feet MSL	40 by 67	45 by 75	2,656	3,192
Cato ATCAA	Cato ATCAA	18,000 feet MSL	18,000 feet MSL	FL510	FL510	40 by 67	45 by 75	2,656	3,192
Total Ground Footprint of MOA:								**2,656**	**3,192**
NA	Christa ATCAA	NA	18,000 feet MSL	NA	FL510	NA	24 by 61	NA	1,119
Total Ground Footprint of Christa ATCAA								**NA**	**1,119**

Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level; NA-not applicable; nm-nautical mile.

In accordance with FAA minimum safe altitudes (14 CFR 91.119), aircraft must 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; and outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet. Withington and Apache Kid Wilderness Areas (within the Cibola National Forest) would not be overflown lower than 2,000 feet AGL. There are additional charted restrictions within the existing Smitty MOA that would remain in place with the proposed airspace modification:

- The Magdalena Airport would not be overflown lower than 2,000 feet AGL within a 3 nm radius.
- The floor of the Smitty MOA in the western corner would continue to be 1,600 feet AGL.

The proposed Christa ATCAA would be created to the east of the proposed Cato ATCAA (see **Figure 2.8-8** and **Table 2.8-4**). The proposed Christa ATCAA would be activated temporarily to serve as a bridge between WSMR airspace and the proposed Cato ATCAA. The proposed Christa ATCAA would have a floor of 18,000 feet MSL and a ceiling of FL510. The Air Force and the Army have established a JTTOC that could provide a mechanism to transit WSMR airspace allowing for direct access to the Christa ATCAA.

Establish Lobos MOA and Kendra ATCAA

The proposed Lobos MOA would be 33 nm by 86 nm and would consist of a low MOA (see **Figure 2.8-7**) and a high MOA (see **Figure 2.8-8**) for a combined airspace with a floor of 500 feet AGL and a ceiling up to 18,000 feet MSL (See **Table 2.8-5**). The Black Mountain Range within the Gila National Forest contains a few mountain peaks that are up to 10,000 feet that would limit low-level training in that area. Aldo Leopold and Gila Wilderness Areas (within the Gila National Forest) and the Gila Cliff Dwellings National Monument would not be overflown below 2,000 feet AGL in accordance with FAA Aeronautical Information Manual (paragraph 7-4-6). In accordance with FAA minimum safe altitudes (14 CFR 91.119), aircraft must 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, and outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet.

An ATCAA with a ceiling of FL510 would be available to extend vertical dimensions of the Lobos MOA. This ATCAA would be divided into three components (A, B, and C) (**Figure 2.8-8 and Figure 2.8-9**). The Lobos A ATCAA would have the same horizontal boundaries as the Lobos MOA. The Lobos A ATCAA would have a floor of 18,000 feet MSL and extend up to FL260. The Lobos B ATCAA would overlie the Lobos A ATCAA at the northern end. The Lobos B ATCAA would be reserved for commercial jet traffic along an existing ATS route that transits this area (J-86). The Lobos C ATCAA would overlie the Lobos A ATCAA at the southern end, extending the ceiling to FL510.

The proposed Kendra ATCAA would be established adjacent to the Lobos ATCAA to connect with WSMR airspace (see **Figure 2.8-8**). The Kendra ATCAA would be activated temporarily to serve as a bridge between WSMR airspace and the proposed Lobos ATCAA. The Kendra ATCAA would be divided into two components, A (18,000 feet MSL to FL260) and B (FL270 to FL510) (please note the A and B components have the same horizontal dimensions and are shown on **Figure 2.8-8** as simply "proposed Kendra ATCAA"). The floor and ceiling of the B component would align with the Lobos B ATCAA and be reserved for commercial jet traffic along J-86.

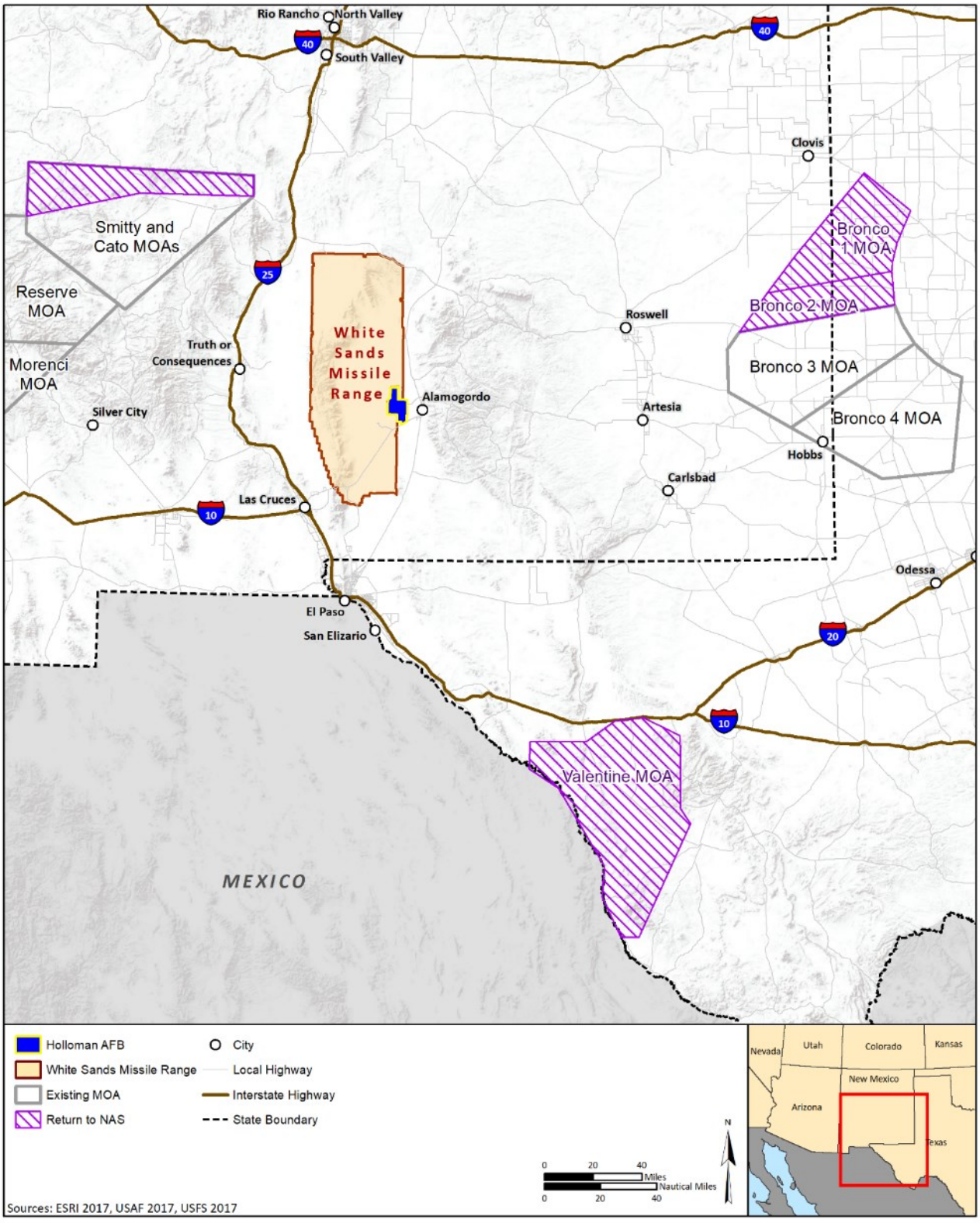
Table 2.8-5. Alternative 2: Proposed Lobos MOA and Kendra ATCAA

Airspace		Floor		Ceiling		Dimensions (nm)		Ground Footprint (square nm)	
Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed	Existing	Proposed
NA	Lobos Low MOA	NA	500 feet AGL	NA	13,500 feet MSL	NA	33 by 86	0	2,085
NA	Lobos High MOA	NA	13,500 feet MSL	NA	18,000 feet MSL	NA	33 by 86	0	2,085
NA	Lobos A ATCAA	NA	18,000 feet MSL	NA	FL260	NA	33 by 86	0	2,085
NA	Lobos B ATCAA	NA	FL270	NA	FL510	NA	19 by 33	0	620
NA	Lobos C ATCAA	NA	FL270	NA	FL510	NA	31 by 67	0	1,465
Total Ground Footprint of MOA:								**0**	**2,085**
NA	Kendra A ATCAA	NA	18,000 feet MSL	NA	FL260	NA	39 by 75	NA	1,824
NA	Kendra B ATCAA	NA	FL270	NA	FL510	NA	39 by 75	NA	1,824
Total Ground Footprint of Kendra ATCAA:								**0**	**1,824**

Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level; NA-not applicable; nm-nautical mile.

Return Airspace to National Airspace System

Reconfiguring the dimensions of the Cato and Smitty MOAs would allow for the northern portion of the MOAs to be returned to the NAS for civilian aircraft use (approximately 900 square nm) (**Figure 2.8-10**). Also, as part of this Proposed Action, the Valentine MOA and Bronco 1 and 2 MOAs would be returned to the NAS. These MOAs have had little to no usage in recent years and are no longer needed for Air Force training activities.



Legend: AFB – Air Force Base; MOA-Military Operations Area; NAS – National Airspace System.

Figure 2.8-10. Alternative 2: Airspace to Return to the NAS

2.8.2.2 Proposed Operations

For operational purposes, the Cato, Smitty, and Lobos MOAs could be used individually or in various combinations of airspace blocks. Therefore, the training exercises could occur anywhere within the proposed airspace areas. Frequency of airspace use within the proposed MOAs would not be continuous. The Cato and Smitty MOAs are currently charted for use from 8:00 a.m. to 10:00 p.m., Monday through Saturday with activation at other times through the NOTAM process. Under this alternative, the airspace would be scheduled for use during the current Holloman AFB operations window, 7:00 a.m. to 10:00 p.m., Monday through Friday, and through the NOTAM process as necessary.

The total F-16 pilot training sorties within the proposed airspace would be approximately 9,100 annually (**Table 2.8-6**). It should be noted that the total proposed sorties for the Cato, Smitty, and Lobos MOAs/ATCAAs is less than 10,000 since the existing F-16 pilot training sorties in Talon MOA (approximately 830) would continue to occur in that MOA. Supersonic operations would occur at or above FL300 (within the ATCAAs) and would account for approximately 10 percent of the total sorties. F-16 pilot training from Holloman AFB would constitute the majority of operations within the proposed Cato, Smitty, and Lobos MOAs/ATCAAs; however, transient military aircraft (not based at Holloman AFB) could schedule and use the airspace as well.

As described in Alternative 1 (**Section 2.8.1.2**, *Proposed Operations*), transient aircraft use of the proposed airspace is included to ensure that the full cumulative effects are represented in the analysis. The anticipated transient aircraft in the proposed Cato, Smitty, and Lobos MOAs would be similar to those described for the proposed Talon MOA and would include up to 1,000 sorties per year of FA-18, F-15, and other F-16 aircraft. In addition, it is estimated that up to 300 sorties per year of F-35A aircraft could use the proposed Lobos High MOA/ATCAA. The F-35A aircraft currently uses adjacent MOAs (Outlaw, Jackal, Morenci, and Reserve MOAs); and, it is anticipated they may use the proposed Lobos High MOA/ATCAA occasionally for some training activities.

Table 2.8-6. Alternative 2: Proposed Sorties

	Altitude	Day (90%)	Night (10%)	Total
Cato and Lobos High MOAs/ATCAA with Christa ATCAA	13,500 feet MSL to FL510[1]	3,600	400	4,000
Lobos High MOA/ATCAA with Kendra ATCAA	13,500 feet MSL to FL510	1,350	150	1,500
Smitty MOA	500 feet AGL to 13,500 feet MSL	2,610	290	2,900
Lobos Low MOA	500 feet AGL to 13,500 feet MSL	630	70	700
Total F-16 Sorties		**8,190**	**910**	**9,100[2]**
Potential Transients				**1,300**
Total Sorties				**10,400**

Note: [1] Sorties within the proposed Lobos ATCAA would be limited to below FL260 to preserve the "B corridor" for J-86 as described in **Section 2.8.2.1** (Alternative 2: Proposed Airspace Modifications).
[2] The total proposed sorties for the Cato, Smitty, and Lobos MOAs/ATCAAs is less than 10,000 since the existing F-16 pilot training sorties in Talon MOA (approximately 830) would continue to occur in that MOA.
Legend: % - percent; AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Use of defensive countermeasures would occur throughout the MOAs, to include RR188 Chaff and M206 Flares (**Table 2.8-7**). Chaff and flare are currently authorized for use within the Cato MOA (Air National Guard Readiness Center 2003). As part of the airspace modification, Holloman AFB would request authorization from the FAA for use of chaff in the proposed Lobos MOA in accordance with FAA Order

6050.32B, *Spectrum Management Regulations and Procedures Manual*. Use of flares would be in accordance with existing fire safety restrictions (see **Table 2.2-5**).

Table 2.8-7. Alternative 2: Proposed Chaff and Flare Use

	Chaff	Flare
Proposed Annual Use	15,360	15,360

2.8.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

Alternative 3 represents a combination of Alternatives 1 and 2 in which the existing Talon, Cato, and Smitty MOAs would be reconfigured and expanded, Lobos MOA would be established, and the Christa and Kendra ATCAAs would be established. Proposed operations would be split among all the MOAs.

This alternative was developed in response to comments received during the scoping process (see **Section 1.6.1.4,** Scoping Comments). Details of Alternative 3 are provided in the following sections.

2.8.3.1 Proposed Airspace Modifications

Modify Existing Airspace and Create New Airspace

The existing Talon MOA and ATCAA would be reconfigured and expanded as described under Alternative 1, with the exception of Talon High C MOA/ATCAA, which would not be established. Without Talon High C MOA/ATCAA, the reconfigured and expanded Talon MOA would not have the dimensions to meet all of the high altitude training requirements proposed under **Section 2.2** (Proposed Action). Therefore, the Cato, Smitty, and Lobos MOAs would also have to be expanded and created to support training.

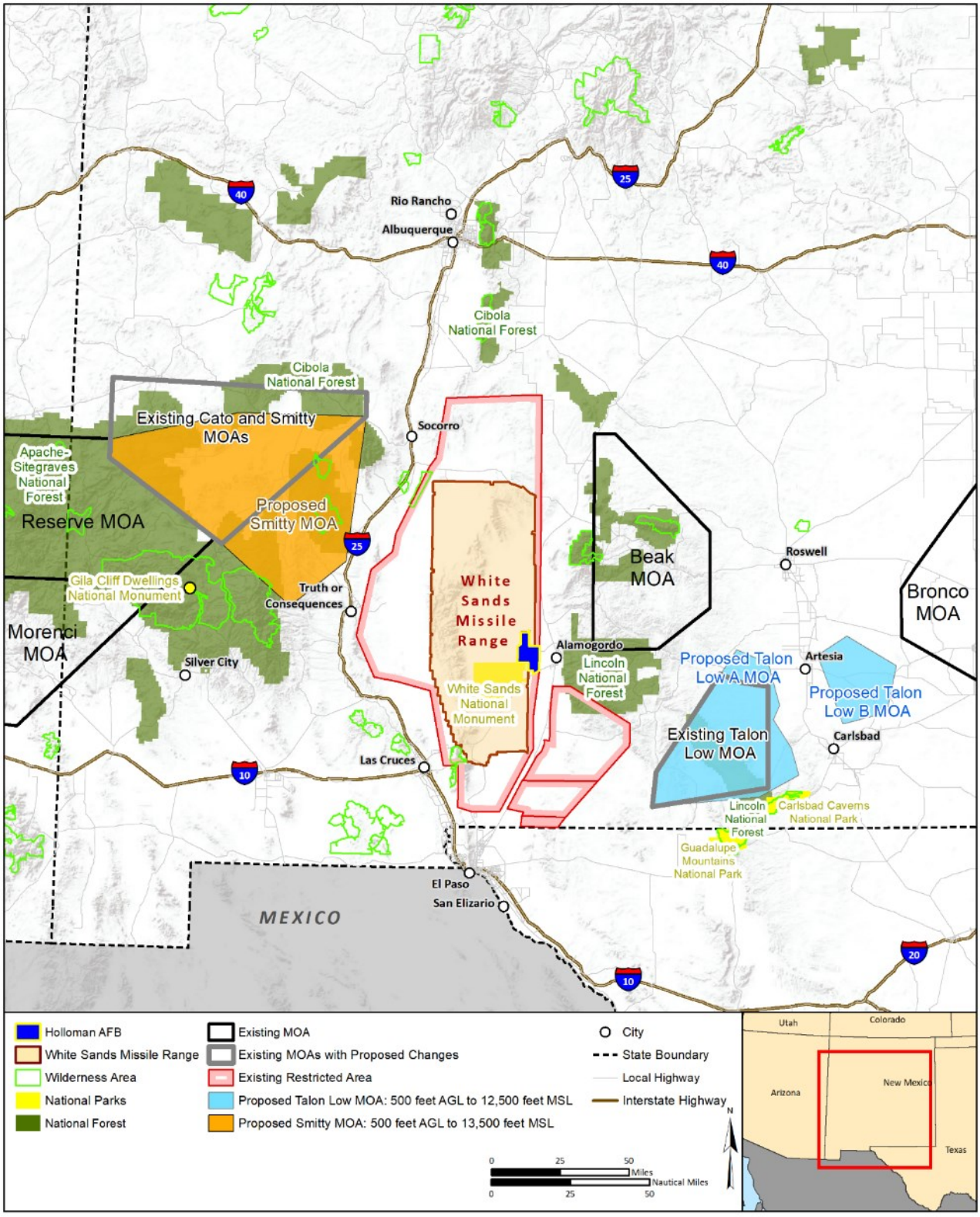
The Cato and Smitty MOAs would be reconfigured and expanded as described under Alternative 2. The Lobos MOA would be created as described under Alternative 2, but without a low MOA component. The floor of Lobos MOA would be 13,500 feet AGL and the ceiling would be up to 18,000 feet MSL. The overlying proposed Cato ATCAA and Lobos ATCAA would be the same as described under Alternative 2. The ATCAAs, in conjunction with the MOAs, would extend the usable airspace for training to FL510 when not needed for other air traffic.

As described under Alternative 2, two ATCAAs (Christa and Kendra ATCAAs) would be established to serve as temporary bridges to connect the proposed Cato ATCAA and Lobos ATCAA to WSMR airspace. **Table 2.8-8** provides a summary of the existing and proposed airspace modifications.

Figure 2.8-11 illustrates the existing and proposed low MOAs associated with Alternative 3. **Figure 2.8-12** illustrates the existing and proposed high MOAs and ATCAAs associated with Alternative 3. **Figure 2.8-13** illustrates how the airspace components vertically relate to each other.

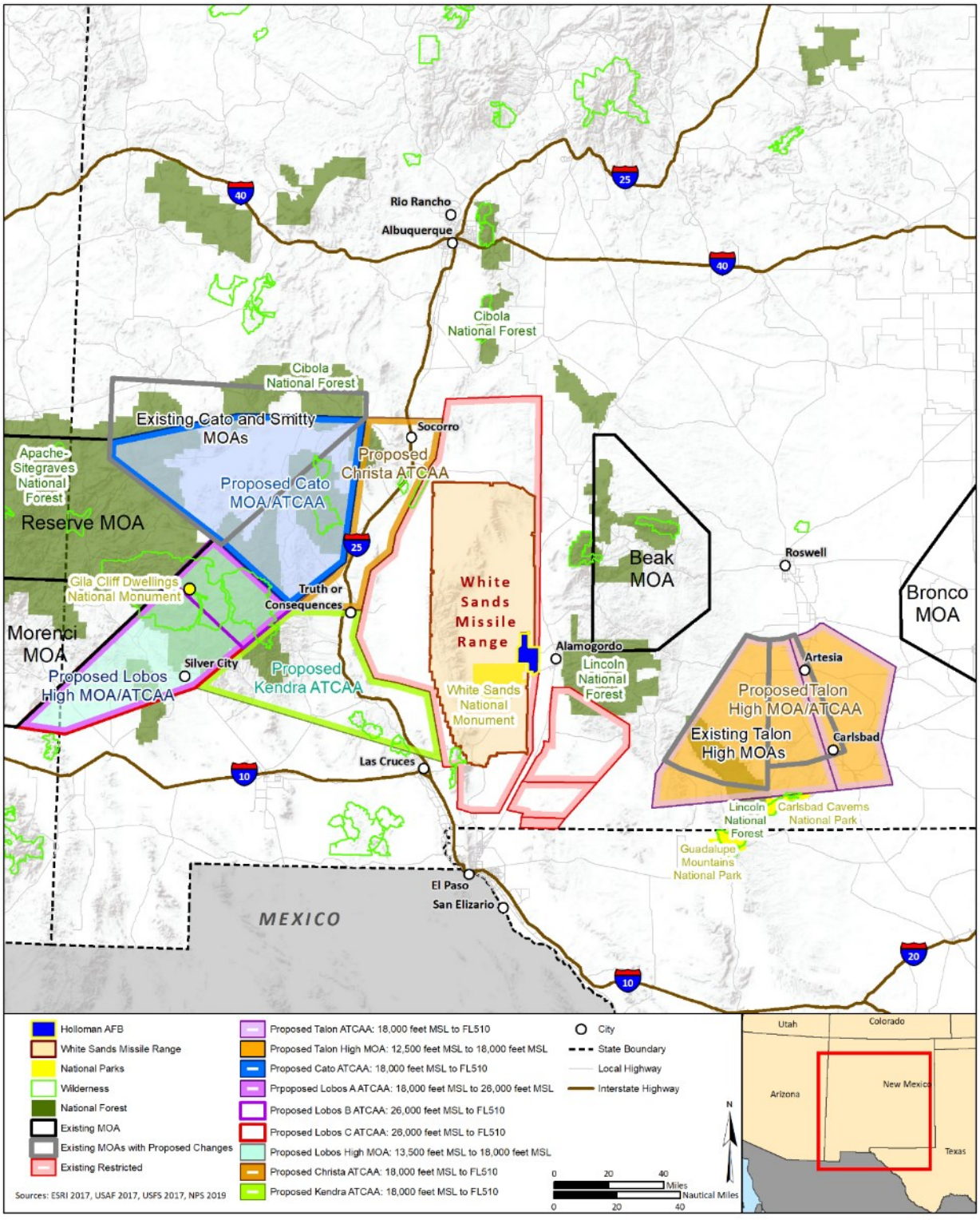
Return Airspace to National Airspace System

The floor of the Talon MOA would be raised from its current 300 feet AGL to 500 feet AGL (as described under Alternative 1). This would allow the Air Force to return the lower 200 feet of the airspace to the NAS. Reconfiguring the dimensions of the Cato and Smitty MOAs would allow for the northern portion of the MOAs to be returned to the NAS for civilian aircraft use (approximately 900 square nm) (as described under Alternative 2). Also, the Valentine MOA and Bronco 1 and 2 MOAs would be returned to the NAS (as described under Alternatives 1 and 2). These MOAs have had little to no usage in recent years and are no longer needed for Air Force training activities. **Figure 2.8-14** illustrates the airspace that would be returned to the NAS under Alternative 3.



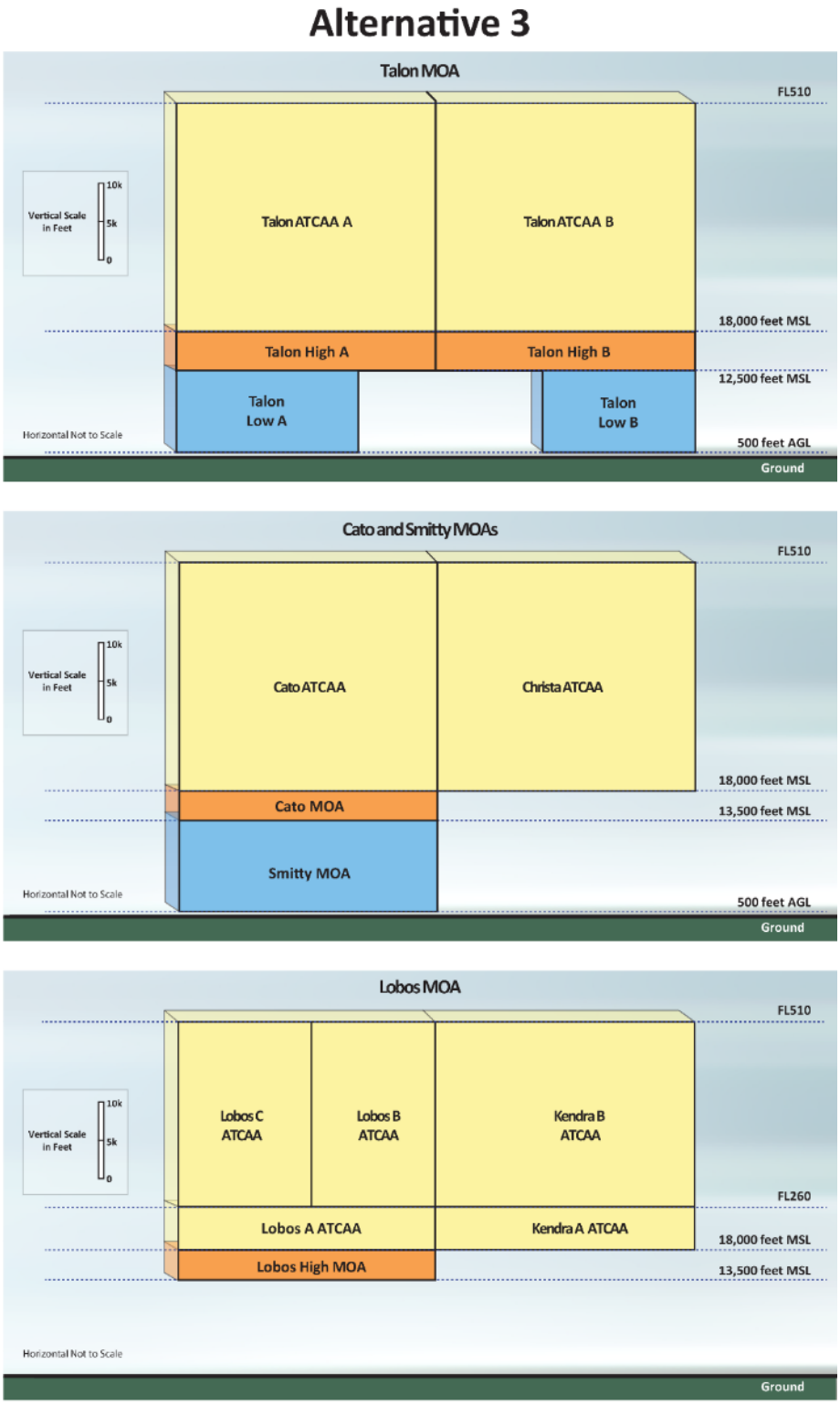
Legend: AFB-Air Force Base; AGL-above ground level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-11. Alternative 3: Proposed Low MOAs



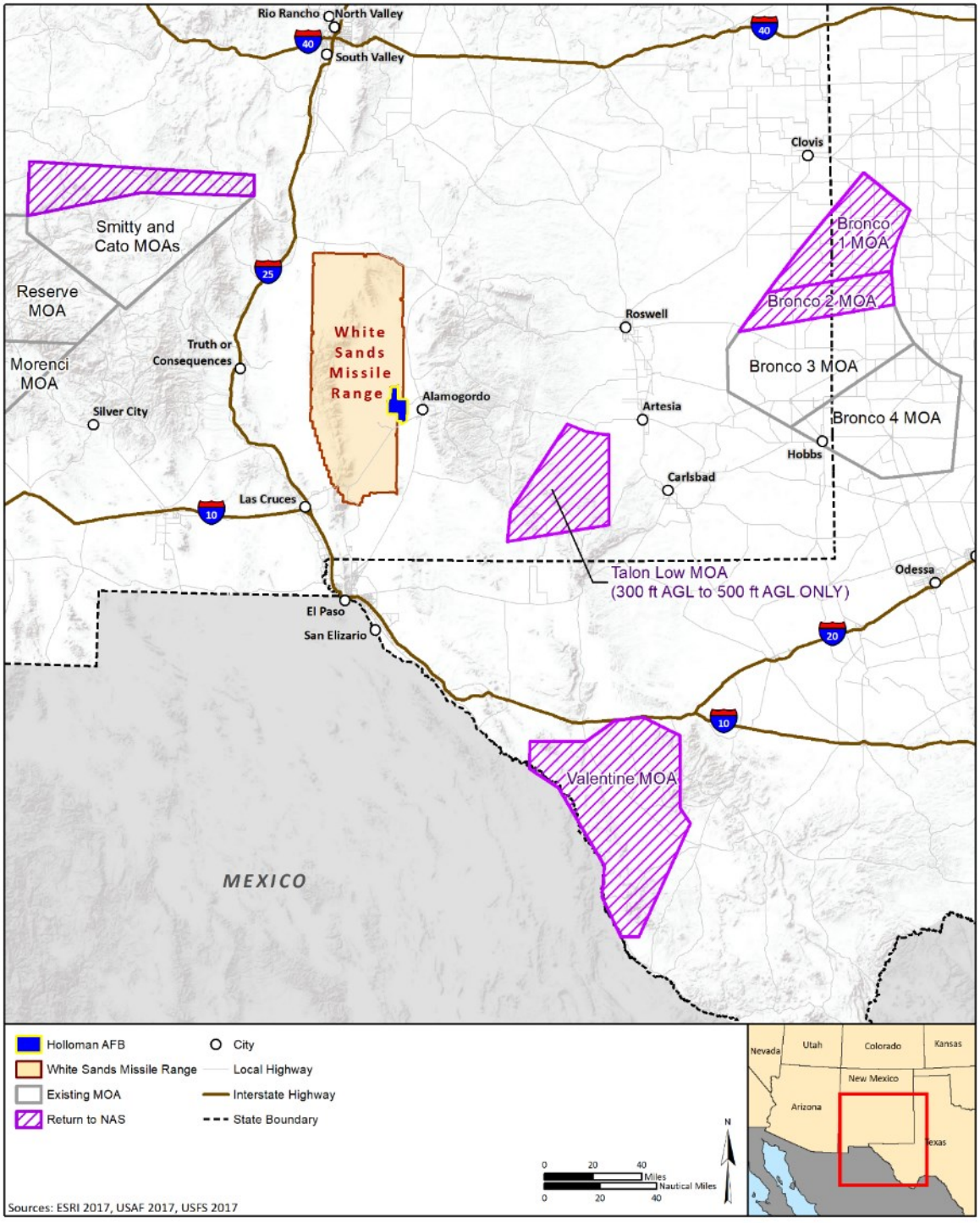
Legend: AFB-Air Force Base; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-12. Alternative 3: Proposed High MOAs and ATCAAs



Note: Blue –low MOA; Orange –high MOA; Yellow –ATCAA
Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Figure 2.8-13. Alternative 3: Proposed Airspace Components



Legend: AFB – Air Force Base; MOA-Military Operations Area; NAS – National Airspace System.

Figure 2.8-14. Alternative 3: Airspace to Return to NAS

Table 2.8-8. Alternative 3: Existing and Proposed Airspace Modifications									
Airspace		**Floor**		**Ceiling**		**Dimensions (nm)**		**Ground Footprint (square nm)**	
Existing	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
Talon Low	Talon Low A	300 feet AGL	500 feet AGL	12,500 feet MSL	12,500 feet MSL	25 by 40	30 by 45	1,027	1,361
None	Talon Low B	NA	500 feet AGL	NA	12,500 feet MSL	NA	18 by 25	NA	446
Talon High West	Talon High A	12,500 feet MSL	12,500 feet MSL	18,000 feet MSL	18,000 feet MSL	20 by 45	39 by 55	973	1,956
Talon High East	Talon High B	12,500 feet MSL	12,500 feet MSL	18,000 feet MSL	18,000 feet MSL	16 by 38	22 by 50	661	1,115
Talon ATCAA	Talon A, B ATCAA	18,000 feet MSL	18,000 feet MSL	FL500	FL510	25 by 55	50 by 84	1,869	3,079
Ground Footprint of Talon MOA:								**1,869**	**3,079**
Smitty MOA	Smitty MOA	500 feet AGL	500 feet AGL	13,500 feet MSL	13,500 feet MSL	40 by 67	45 by 75	2,656	3,192
Cato MOA	Cato MOA	13,500 feet MSL	13,500 feet MSL	18,000 feet MSL	18,000 feet MSL	40 by 67	45 by 75	2,656	3,192
Cato ATCAA	Cato ATCAA	18,000 feet MSL	18,000 feet MSL	FL510	FL510	40 by 67	45 by 75	2,656	3,192
NA	Lobos High MOA	NA	13,500 feet MSL	NA	18,000 feet MSL	NA	33 by 86	0	2,085
NA	Lobos A ATCAA	NA	18,000 feet MSL	NA	FL260	NA	33 by 86	0	2,085
NA	Lobos B ATCAA	NA	FL270	NA	FL510	NA	19 by 33	0	620
NA	Lobos C ATCAA	NA	FL270	NA	FL510	NA	31 by 67	0	1,465
Ground Footprint of Lobos MOA:								**0**	**2,085**
NA	Christa ATCAA	NA	18,000 feet MSL	NA	FL510	NA	24 by 61	0	1,119
NA	Kendra A ATCAA	NA	18,000 feet MSL	NA	FL260	NA	39 by 75	0	1,824
NA	Kendra B ATCAA	NA	FL270	NA	FL510	NA	39 by 75	NA	1,824
Ground Footprint of Christa and Kendra ATCAAs:								**0**	**2,943**

Legend: AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level; NA-not applicable; nm-nautical miles.

2.8.3.2 Proposed Operations

F-16 pilot training sorties would occur within all proposed airspace areas: Talon, Cato, Smitty, and Lobos MOAs and the associated ATCAAs (**Table 2.8-9**). Supersonic operations would occur at or above FL300 (within the ATCAAs) and would account for approximately 10 percent of the total sorties. F-16 pilot training from Holloman AFB would constitute the majority of operations within the proposed airspace;

however, transient military aircraft (not based at Holloman AFB) could schedule and use the airspace as needed. As described in Alternative 1 (**Section 2.8.1.2**, *Proposed Operations*) and Alternative 2 (**Section 2.8.2.2**, *Proposed Operations*), transient aircraft use of the proposed airspace is included to ensure that the full cumulative effects are represented in the analysis. The anticipated transient aircraft in the proposed Talon, Cato, Smitty, and Lobos MOAs would include up to 1,000 sorties per year of FA-18, F-15, and other F-16 aircraft (split between the east and west airspace areas, 700 and 300, respectively). As described for Alternative 2 (**Section 2.8.2.2**, *Proposed Operations*), it is estimated that up to 300 sorties per year of F-35A aircraft could use the proposed Lobos High MOA/ATCAA.

Table 2.8-9. Alternative 3: Proposed Sorties

		Day (90%)	Night (10%)	Total
Talon High A and B MOA/ATCAA	12,500 feet MSL to FL510	3,780	420	4,200
Talon Low A and B MOA	500 feet AGL to 12,500 feet MSL	2,340	260	2,600
Cato and Lobos High MOAs/ATCAA with Christa ATCAA	13,500 feet MSL to FL510[1]	1,440	160	1,600
Lobos High MOA/ATCAA with Kendra ATCAA	13,500 feet MSL to FL510	450	50	500
Smitty MOA	500 feet AGL to 13,500 feet MSL	990	110	1,100
Total F-16 Sorties		**9,000**	**1,000**	**10,000**
Potential Transients (700 in east, 600 in west)				**1,300**
Total Sorties				**11,300**

Note: [1] Sorties within the proposed Lobos ATCAA would be limited to below FL260 to preserve the "B corridor" for J-86.
Legend: %-percent; AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level.

Frequency of airspace use for F-16 pilot training within the proposed airspaces would not be continuous. The airspace would be scheduled for use during the current Holloman AFB operations window, 7:00 a.m. to 10:00 p.m., Monday through Friday, and through the NOTAM process.

Use of defensive countermeasures would occur throughout all the MOAs and ATCAAs, to include RR188 Chaff and M206 Flares (**Table 2.8-10**). Chaff and flare are currently authorized for use within the Cato MOA (Air National Guard Readiness Center 2003). Chaff are not currently authorized for use within Talon MOA. Flares are currently used within the Talon MOA. As part of the airspace modification, Holloman AFB would request authorization from the FAA for use of chaff within the proposed Lobos and Talon MOAs in accordance with FAA Order 6050.32B, *Spectrum Management Regulations and Procedures Manual*. Use of flares within all airspace would be in accordance with existing fire safety restrictions (see **Table 2.2-4**).

Table 2.8-10. Alternative 3: Proposed Annual Chaff and Flare Use

	Chaff	Flare
Cato, Smitty, and Lobos MOAs	4,608	4,608
Talon MOA	10,752	10,752
Total	**15,360**	**15,360**

Legend: MOA-Military Operations Area.

2.8.4 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB in support of F-16 pilot training. Training for F-16 aircrews stationed at Holloman AFB would continue to use restricted areas at WSMR and Fort Bliss, and MOAs in the vicinity of Holloman AFB to the extent practicable (see **Section 1.2.2**). The boundaries of Talon, Cato, and Smitty MOAs would remain unchanged and they would continue to be used as they are currently. No airspace would be returned to the NAS. The current inefficiencies in accomplishing F-16 pilot training would continue. The No Action Alternative does not meet the purpose of and need for the Proposed Action. However, the No Action Alternative is carried forward for analysis consistent with CEQ guidelines to provide a baseline against which to measure the impacts of the Proposed Action and alternatives.

2.8.5 Summary of Alternatives

Table 2.8-11 provides a summary of the alternatives. **Table 2.8-12** provides a summary of the proposed F-16 pilot training sorties.

Table 2.8-11. Summary of Alternatives

	Alternative 1	Alternative 2	Alternative 3	No Action
Talon MOA/ATCAA	Expansion: Low A,B (500 feet AGL to 12,500 feet MSL) High A,B,C (12,500 to 18,000 feet MSL) ATCAA A,B,C (18,000 feet MSL to FL 510)	No change to existing MOA/ATCAA	Expansion: Low A,B (500 feet AGL to 12,500 feet MSL) High A,B (12,500 to 18,000 feet MSL) ATCAA A,B (18,000 feet MSL to FL 510)	No change to existing MOA/ATCAA
Cato and Smitty MOAs/ATCAA	No change to existing MOAs/ATCAA	Expansion: Smitty MOA (500 feet AGL to 13,500 feet MSL) Cato MOA (13,500 to 18,000 feet MSL) Cato ATCAA (18,000 feet MSL to FL510)	Same as Alternative 2	No change to existing MOAs/ATCAA
Lobos MOA/ATCAAs	Would not be established	Establish new: Low MOA (500 feet AGL to 13,500 feet MSL) High MOA (13,500 to 18,000 feet MSL) Lobos ATCAA A (18,000 feet MSL to FL270) Lobos ATCAA B (FL270 to FL510) Lobos ATCAA C (FL270 to FL 510)	Establish new: High MOA (13,500 to 18,000 feet MSL) Lobos ATCAA A (18,000 feet MSL to FL270) Lobos ATCAA B (FL270 to FL510) Lobos ATCAA C (FL270 to FL 510)	Would not be established

Table 2.8-11. Summary of Alternatives (cont.)				
	Alternative 1	**Alternative 2**	**Alternative 3**	**No Action**
Christa and Kendra ATCAAs	Would not be established	Establish new: Christa ATCAA (18,000 feet MSL to FL510) Kendra A and B ATCAA (18,000 feet MSL to FL510)	Same as Alternative 2	Would not be established
Return Airspace to NAS	Return to NAS: lower 200 feet of existing Talon Low MOA, Valentine MOA, and Bronco 1 and 2 MOAs	Return to NAS: Northern portion of Cato and Smitty MOA (900 square miles), Valentine MOA, and Bronco 1 and 2 MOAs	Return to NAS: lower 200 feet of existing Talon Low MOA, northern portion of Cato and Smitty MOA (900 square miles), Valentine MOA, and Bronco 1 and 2 MOAs	No airspace returned to NAS
Chaff and Flare Usage	15,360 chaff and 15,360 flares in Talon MOA/ATCAA	15,360 chaff and 15,360 flares in Cato, Smitty, and Lobos MOAs/ATCAAs	10,752 chaff and 10,752 flares in Talon MOA 4,608 Chaff and 4,608 Flares in Cato, Smitty, and Lobos MOAs/ATCAAs	No change to existing chaff and flare usage in Talon or Cato MOAs/ATCAAs

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

Table 2.8-12. Summary of Proposed F-16 Pilot Training Sorties			
Airspace	**Alternative 1**	**Alternative 2**	**Alternative 3**
Talon High A and B MOA/ATCAA	6,000	830[1]	4,200
Talon High C MOA/ATCAA	300		
Talon Low A and B MOA	3,700		2,600
Cato and Lobos High MOAs/ATCAA with Christa ATCAA		4,000	1,600
Lobos High MOA/ATCAA with Kendra ATCAA		1,500	500
Smitty MOA		2,900	1,100
Lobos Low MOA		700	
Total F-16 Sorties	**10,000**	**9,930**	**10,000**
Potential Transients	**1,000**	**1,300**	**1,300**
Total Sorties	**11,000**	**11,230**	**11,300**

Legend: ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area.
Note: There are currently approximately 830 F-16 sorties in the existing Talon MOA. These sorties would continue under Alternative 2. The existing 830 sorties are included in the proposed F-16 sorties in Talon MOA for Alternatives 1 and 2.

2.9 COMPARISON OF ENVIRONMENTAL IMPACTS

Table 2.9-1 provides a comparison of the potential environmental impacts associated with the Proposed Action and alternatives.

Table 2.9-1. Comparison of Environmental Impacts			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Airspace Operations and Management			
• Civilian aircraft operating under VFR could transit the MOAs. • Some civilian aircraft operating under IFR below 12,500 feet MSL would be required to be re-routed around Talon Low MOAs A/B when they are active. • Some civilian aircraft operating under IFR above 12,500 feet MSL would be either routed around Talon High MOAs A/B/C when they are active, or stay below 12,500 feet MSL for a portion of their route to stay beneath the SUA. • Some civilian aircraft operating under IFR would be re-routed around the Talon ATCAAs when active. • There is no anticipated impact to local public or private airports beneath the proposed Talon MOA.	• Civilian aircraft operating under VFR could transit the MOAs. • Some civilian aircraft operating under IFR would be required to be re-routed around the proposed Smitty, Cato, and Lobos MOAs, and Christa and Kendra ATCAAs when they are active. Most of these deviations would be less than a minute. • The Catron County Airport, which is currently under the existing Smitty MOA, would no longer be under any SUA. • The Adobe Ranch and Chloride airstrips would lie beneath the proposed Smitty MOA boundaries. Aircraft using these airstrips would be VFR and would have to check NOTAMS to be aware of the MOA operating schedules. • The Beaverhead and Me-Own airstrips and the Whiskey Creek Airport would lie beneath the proposed Lobos Low MOA. Aircraft using these airstrips would be VFR and would have to check NOTAMS to be aware of the MOA operating schedules. • The Socorro Municipal and Truth or Consequences Municipal Airports would lie beneath the proposed Christa ATCAA. The ATCAA would begin at 18,000 feet MSL and would not impact the airports when active.	• Alternative 3 results in impacts that are less than any described in Alternatives 1 or 2, since the total operations would be spread across the east area (Talon MOAs/ATCAAs) and the west area (Cato and Smitty MOAs, Lobos MOAs/ATCAA, and the Christa/Kendra ATCAAs). • Talon High A and B MOAs would be used 30 percent less than Alternative 1, and impacts to civil aviation would be reduced proportionally. • The use of Talon Low A MOA would be reduced by 20 percent, and the use of Talon Low B MOA would be reduced by 54 percent, when compared to Alternative 1. The impacts to civil aviation and local airports would be reduced proportionally. • The use of Cato MOA would be reduced by 60 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The use of Smitty MOA would be reduced by 62 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The use of proposed Lobos High MOA would be reduced by 67 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The proposed Lobos Low MOA would not exist under Alternative 3, so all impacts to civil air traffic and local airports due to the establishment of proposed Lobos Low MOA in Alternative 2 would be eliminated.	• No change to existing airspace operations and management.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Airspace Operations and Management (cont.)			
	• The Casas Adobes Airpark would lie beneath the proposed Kendra ATCAA. The ATCAA would begin at 18,000 feet MSL and would not impact the airport when active.	• The use of proposed Christa ATCAA would be reduced by 60 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. • The use of proposed Kendra ATCAA would be reduced by 67 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally.	
Acoustic Environment			
• There would be no adverse impacts to hearing or health, and there would be no land use restrictions related to noise beneath the proposed Talon MOA. • It would be anticipated that there would be a perceptible increase to the subsonic noise levels attributed to aircraft activity to some areas beneath the proposed Talon MOA and ATCAA. • The greatest change in DNL would occur at Loco Hills, where the estimated DNL from aircraft operations would be 56 DNL. It would be near to the 55 DNL threshold set by USEPA for which adverse noise effects would not be expected to occur. The projected DNL would also be well below the 65 DNL threshold for land use restrictions. It would be anticipated that less than 6.48 percent of the population beneath the proposed airspace would be highly annoyed.	• There would be no adverse impacts to hearing or health, and there would be no land use restrictions related to noise beneath the proposed MOAs. • It would be anticipated that there would be a perceptible increase to the subsonic noise levels attributed to aircraft activity to some areas beneath the proposed MOAs and ATCAAs. • The greatest change in DNL would be at Magdalena and Old Horse Springs, which would have values of 50 DNL. All values would be well below the 65 DNL threshold for land use restrictions. 1.66 percent of the population beneath the proposed airspace would be expected to be highly annoyed at the subsonic noise. • Noise levels from supersonic activity at all of the POIs would be less than 42 CDNL which is the lowest CDNL with a relationship to annoyance. The anticipated CDNL would not exceed the threshold identified by USEPA that would be harmful to public health.	• There would be no adverse impacts to hearing or health, and there would be no land use restrictions related to noise beneath the proposed MOAs. • The greatest proposed increase in DNL value would occur at Loco Hills, with a projected 53 DNL. All values would be well below the 65 DNL threshold for land use restrictions. Approximately 3.31 percent of the population beneath the proposed airspace would be expected to be highly annoyed based on the highest DNL value. • Noise levels from supersonic activity at all of the POIs would be less than 42 CDNL which is the lowest CDNL with a relationship to annoyance. • Overpressures from sonic booms would be similar or less than those described for Alternatives 1 or 2 and would not be expected to cause structural damage.	• No change to the acoustic environment. Aircraft noise in the existing training airspace would continue as it does currently.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Acoustic Environment (cont.)			
• Supersonic noise levels at the POIs would be less than the 42 CDNL which is the lowest CDNL with a relationship to annoyance. The anticipated CDNL would not exceed the threshold identified by USEPA that would be harmful to public health. • Overpressures from sonic booms under the Proposed Action would not be expected to cause structural damage.	• Overpressures from sonic booms under the Proposed Action would not be expected to cause structural damage.		
Air Quality			
• The estimated criteria pollutant emissions associated with Alternative 1 would not alter the current attainment status of Chaves, Eddy, or Otero Counties. • Criteria pollutant emissions would increase though the proposed net increases for VOCs, CO, SO_2, PM, and HAPs would be less than the comparative thresholds used as a guide for assessing significance. • An additional 125,518 tons of GHG emissions would be created.	• The estimated criteria pollutant emissions associated with Alternative 2 would not alter the attainment status of Sierra, Catron, Socorro, or Hidalgo Counties in New Mexico or Graham County in Arizona. • Criteria pollutant emissions would increase though the proposed net increases for VOCs, CO, NO_x, PM, and HAPs would be less than the comparative thresholds used as a guide for significance. • The SO_2 net change in emissions, at 3.25 tons per year, does not exceed the 100 ton per year *de minimis* threshold under General Conformity (applies to Grant County, New Mexico and Greenlee County, Arizona). • An additional 102,525 tons of GHG emissions would be created.	• The estimated criteria pollutant emissions associated with Alternative 3 would not alter the attainment status of Chaves, Eddy, Otero, Hidalgo, Sierra, Catron, or Socorro Counties in New Mexico or Graham County in Arizona. • Criteria pollutant emissions would increase though the proposed net increases for VOCs, CO, SO_2, PM, and HAPs would be less than the comparative thresholds used as a guide for assessing significance. • The SO_2 emissions would not exceed the *de minimis* threshold (applicable to Grant County, New Mexico and Greenlee County, Arizona). • An additional 122,997 tons of GHGs would be created.	• No change to the existing air quality.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Natural Resources			
• Based on estimated noise levels, the proposed pilot training in the proposed Talon MOA would be expected to have minor impacts to wildlife inhabiting land beneath the proposed airspace. • Based on toxicological studies on chaff and flare residual materials, impacts to biological resources are not expected. • The possibility of an animal being struck by a dud flare, undeployed clump of chaff, or residual materials would be extremely remote. • The possibility of a wildfire from flare usage impacting wildlife habitat would be remote considering the release altitude under the Proposed Action. Flares would not be released below 2,000 feet AGL and are designed to burn completely within the first 400 feet of descent. The risk of wildfires from flare usage would be mitigated by operational constraints, including the prohibition of flares during periods of "Very High" or "Extreme" National Fire Danger Ratings. During periods of "High" fire danger, aircraft would not use flares below 18,000 feet MSL. • Domestic animal responses to low overflights vary, but typically include startling and eventually habituating to the noise. Low overflights are not expected to occur with any sort of regularity or frequency at any given location.	• The potential impacts to wildlife from aircraft noise and use of chaff and flares would be the same as those described for Alternative 1. • No significant impacts to special-status species expected. The potential impacts associated with the proposed training activities to special-status species would be the same as those described for wildlife. • Consultation with USFWS on impacts to species protected by the Endangered Species Act is ongoing.	• The potential impacts to wildlife from aircraft noise and use of chaff and flares would be the same as those described for Alternative 1. • No significant impacts to special-status species expected. The potential impacts associated with the proposed training activities to special-status species would be the same as those described for wildlife. • Consultation with the USFWS on impacts to species protected by the Endangered Species Act is ongoing.	• No change to the existing natural resources.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Natural Resources (cont.)			
• Horses are likely to be startled by low overflights and possibly bolt from the noise and the safety of the rider or handler would be of concern. Low overflights are not expected to occur with any sort of regularity or frequency at any given location. • No significant impacts to special-status species expected. The potential impacts associated with the proposed training activities to special-status species would be the same as those described for wildlife. • Consultation with the USFWS on impacts to species protected by the Endangered Species Act is ongoing.			
Land Management			
• Nearly 1.6 million acres including Brantley and Avalon Reservoirs, Living Desert Zoo and Gardens, and the towns of Carlsbad, Artesia, La Huerta, Atoka, Happy Valley, and Livingston Wheeler lie beneath the existing Talon Low MOA, the floor of which would be raised from 300 to 500 feet AGL. • The configuration of Talon MOA proposed under Alternative 1 would overlie an additional 1.17 million acres, primarily non-Federal lands, including the town of Loving, and land managed by the BLM in addition to smaller areas of the Lincoln National Forest and the extreme northern boundary of Carlsbad Caverns National Park.	• More than 2.25 million acres of land underlie the existing configuration of the Cato and Smitty MOAs. These lands are primarily non-Federal, including the town of Magdalena, or are managed by the BLM or USFS, including the Cibola, Gila, and Apache-Sitgreaves National Forests. • The proposed configuration of the Cato and Smitty MOAs would overlie an additional 297,442 acres of lands, primarily non-Federal land and larger areas of the Cibola and Gila National Forests, including the Apache Kid and Aldo Leopold Wildernesses. • Approximately 180,000 acres of the Apache-Sitgreaves National Forest that lie under the current configuration of the Cato and Smitty MOAs would not underlie the new configuration, and this airspace would be returned to the NAS.	• The proposed 10,000 annual flights would be divided among the Talon MOA to the east of Holloman AFB and the Cato, Smitty, and Lobos MOAs to the west, resulting generally in dispersal over a larger area and less frequent exposure to overflight noise on lands beneath all airspace. • The configuration of Talon MOA proposed by Alternative 3 would not include Talon High C, resulting in approximately 150,000 fewer acres of BLM and non-Federal land lying beneath the configuration of Talon MOA. • No areas beneath the configuration of Talon, Cato, Smitty, and Lobos MOAs and the Christa and Kendra ATCAAs proposed under Alternative 3 would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels, similar to	• No change to existing land management.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Land Management (cont.)			
• No areas would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels from military aircraft would be experienced beneath the proposed Talon Low A and B MOAs. • The communities of Loco Hills and Loving lie beneath the expanded boundaries of Talon MOA and would experience an increase in noise (56 and 42 DNL, respectively) from proposed aircraft operations within the MOA. While these levels would be perceptible, they are well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term.	• The proposed Lobos MOA would overlie a total of nearly 1.5 million acres of federally-managed land, including nearly 1 million acres of the Gila National Forest that includes the Aldo Leopold and Gila Wildernesses, lands managed by the Las Cruces District and Safford Field Offices of the BLM, and the Gila Cliff Dwellings National Monument. Additionally more than 1.1 million acres of non-Federal land lie beneath the proposed Lobos MOA including the communities of Silver City, Santa Clara, Arenas Valley, and Tyrone. • The proposed Christa and Kendra ATCAAs would overlie a total of more than 1.35 million acres of federally-managed land including nearly more than 230,000 acres of the USFS land that includes the Aldo Leopold Wilderness, lands managed by the Las Cruces District and Socorro Field Offices of the BLM, The Bosque del Apache National Wildlife Refuge, the BOR-managed Elephant Butte and Caballo Reservoirs, and the Jornada Experimental Station. • Approximately 387,000 acres of non-Federal land lie beneath the proposed ATCAAs, including: Hurley, Bayard, Mimbres, Hatch, Doña Ana, Radium Springs, Salem, Placitas, Las Cruces, and Truth or Consequences.	those experienced under Alternatives 1 and 2, would occur. • While these levels would be perceptible, they are well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term.	

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Land Management (cont.)			
	• The floor of these ATCAAs would be 18,000 feet MSL, consequently underlying lands such as the towns of Truth or Consequences and Socorro and managed lands like Bosque del Apache National Wildlife Refuge and Elephant Butte and Caballo Reservoirs would not experience any perceptible increase in noise above background levels. • No areas beneath the configuration of Cato, Smitty, and Lobos MOAs or the Christa and Kendra ATCAAs proposed under Alternative 2 would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels would be experienced beneath the proposed airspace. • While these levels would be perceptible, they would be well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term.		
Recreation			
• The proposed airspace modifications would not alter, prohibit, or otherwise limit the public's access to recreational areas beneath the MOA. • The proposed pilot training would generate noise, which could detract from the public's enjoyment of outdoor recreational areas.	• The impacts to recreation are similar to those described for Alternative 1, however recreational users of the lands under the ATCAAs would not experience an increase in noise from aircraft activity.	• The impacts to recreation are similar to those described for Alternatives 1 and 2, however the potential noise impacts under Alternative 3 would be less than the potential noise impacts in Alternatives 1 and 2, and none of the projected noise levels would be considered incompatible with recreational uses.	• No change to existing recreation resources.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Recreation (cont.)			
• Recreational users of some of the lands under the airspace would experience slight noise increases, but the projected noise would not be considered incompatible with recreational land uses. • Some training activity would occur at night (approximately 10 percent of the operations); therefore, people camping on land beneath the airspace would have the potential to hear aircraft after dark. • Many of the recreational areas beneath the proposed Talon MOA are under the existing Talon MOA and are currently subjected to aircraft training activity. • Sonic booms, if heard, would be a sudden and startling noise that could adversely impact the experience of recreational users.			
Socioeconomics			
Impacts Common to All Action Alternatives: • The Proposed Action would not result in an increase in personnel at Holloman AFB or within the region. Therefore, the population within the ROI would remain unchanged. • Given the low expected DNL values and the distribution of the training activity across such a large area, it would not be expected that the Proposed Action would have any quantifiable impacts to the existing housing values within the ROI. • Noise analysis indicates that the average noise resulting from the Proposed Action would not be at a level that would be considered incompatible with recreational land uses. Though studies show that noise from a number of sources, including aircraft, can affect visitor experience and enjoyment of parks and forests, it is not clear how such experience affects visitation. While it is possible that noise could reduce visitation, potentially reducing contributions to local economies, it is not possible to quantify the economic impact.			• No change to existing socioeconomics.
Environmental Justice			
Impacts Common to All Action Alternatives: • No significant impacts were identified in association with any resource areas that would be anticipated to adversely impact the health or environment of minority or low-income populations living under the areas affected by Alternative 1. Noise levels in the airspace would remain below 65 DNL. Because there would not be significant impacts that would adversely affect minority or low-income populations, there would be no impact to environmental justice.			• No change to environmental justice.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Safety			
Impacts Common to All Action Alternatives: • Ground operations and maintenance procedures conducted by Holloman AFB personnel would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, Technical Orders, and Air Force Occupational Safety and Health standards. There would be no aspects of the Proposed Action that would be expected to create new or unique ground safety issues or create additional risk. • Priority to life-flight status would not change with implementing the Proposed Action. Military training in the affected airspace would be stopped during such an event. • In the unlikely event of a crash within the proposed airspace area, local first responders would likely be first on the scene given the distance from Holloman AFB. Holloman AFB crash response would continue to follow standard procedures and plans. • Land within the proposed MOAs would continue to be managed for fire risk by local owners and agencies that manage that land. F-16 operations currently occur within airspace associated with Holloman AFB and have not presented an increased fire risk. • The type of training proposed would be the same as what is performed currently, and there would be no aspect of the Proposed Action that would increase the chances of Class A mishaps. The Air Force would make every effort to locate, document, and then clean up debris resulting from any accident. • It would be unlikely that F-16s using the proposed MOAs would generate vortices of sufficient strength or duration to reach the ground and pose a safety risk. • The safety risk to people under or immediately adjacent to the MOAs in which chaff and flares would be dispensed would be minimal. • Dud flares may be mishandled if discovered on non-DoD lands by the uninformed public; however, the probability of such an occurrence would be extremely low. • Additional fire restrictions for flare use would be implemented to reduce the risk of fires. Flares would not be used at altitudes less than 18,000 feet MSL under "High" fire conditions and flares would not be used at all under "Very High" or "Extreme" fire conditions. • The overall potential for bird aircraft strikes would not be anticipated to be statistically different with implementation of any of the other alternatives. F-16 aircrews operating in the MOAs would be required to follow applicable procedures outlined in the Holloman AFB BASH Plan. • Vertical obstructions would be noted and avoided as they currently are in existing areas where obstructions intrude into proposed airspace.			• No change to existing safety conditions or procedures.
Cultural Resources			
Impacts Common to All Action Alternatives: • The Proposed Action would result in flights being distributed over a vast area of airspace, most of which would occur above 10,000 feet AGL. Due to the altitude of the overflights, small size of the aircraft, and the high speeds, the aircraft are not expected to be a visual intrusion at archaeological or architectural sites. • Chaff and flares deployed from the aircraft would not pose a visual intrusion. The likelihood of residual chaff and flare material to land at archaeological or architectural sites would be very rare and would not have an adverse effect on these resources. • Sonic booms would occur during supersonic flights, however, no structural damage to NRHP-listed archaeological or architectural resources would be anticipated since the overpressures would not exceed 1 psf. The risk of damaging structures at this level of psf would be very low, one in a billion.			• No change to existing cultural resources.

Table 2.9-1. Comparison of Environmental Impacts (cont.)			
Alternative 1	**Alternative 2**	**Alternative 3**	**No Action Alternative**
Cultural Resources (cont)			
To date, no known traditional cultural properties have been identified through government-to-government consultation, and it would be expected these resources would not be impacted.			
Hazardous Materials			
Impacts Common to All Action Alternatives: • There would be the potential for hazardous materials to be introduced into the environment in the case of an aircraft mishap. However, aircraft mishaps are rare, and in the event that one occurs, the Air Force has SOPs to identify potential hazardous materials and situations, protect responding personnel and the environment from immediate hazards, and to provide guidelines for the ultimate cleanup and disposal of the crash residues. • The components of chaff are not considered toxic and distribution of chaff filaments (primarily aluminum and silica) and residual materials would not affect ground or water quality. • The components and combustion materials of flares are not considered toxic. The amount of magnesium dispersed from flares is too small to result in levels that would be associated with acute exposure.			• No change to existing hazardous materials.

Legend: AFB-Air Force Base; AGL-Above Ground Level; ATCAA-Air Traffic Control Assigned Airspace; BASH-Bird Aircraft Strike Hazard; BLM-Bureau of Land Management; BOR-Bureau of Reclamation; CDNL-C-weighted Day-Night Average Sound Level; CO-Carbon Monoxide; DNL-Day-Night Average Sound Level; DoD-Department of Defense; FAA-Federal Aviation Administration; GHG-Greenhouse Gas; HAP-Hazardous Air Pollutant; IFR-Instrument Flight Rules; MOA-Military Operations Area; MSL-Mean Sea Level; NOTAM-Notice to Airmen; NO_x-Nitrogen Oxides; NRHP-National Register of Historic Places; PM-Particulate Matter; POI-Point of Interest; psf-Pounds per Square Foot; ROI-region of influence; SO_2-Sulfur Dioxide; SOP-Standard Operating Procedure; USFS-U.S. Forest Service; USFWS-U.S. Fish and Wildlife Service; VOC-Volatile Organic Compound; VFR-Visual Flight Rules.

3.0 AFFECTED ENVIRONMENT

3.1 ANALYSIS APPROACH

NEPA requires focused analysis of the areas and resources potentially affected by an action or alternative. It also provides that an EIS should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. This EIS focuses on those resources potentially affected by the Air Force proposal to modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB.

CEQ regulations for NEPA require a discussion of impacts in proportion to their significance and only enough discussion of other than significant issues to show why more study is not warranted. The analysis in this EIS considers the current conditions (i.e., baseline) of the affected environment and compares those to conditions that might occur should the Proposed Action and alternatives be implemented. Baseline conditions provide a benchmark against which an agency measures the effects of a Proposed Action. The differences in the conditions between the baseline and the Proposed Action reflect the magnitude of impacts relative to the various resources analyzed. For the Proposed Action, establishing a baseline within the affected environment meant consideration of the conditions of each resource within the existing use of the airspace in 2018 and 2019 based on the best available information.

3.1.1 Regulatory Framework

The laws, regulations, and Executive Orders (EOs) listed below include, but are not limited to, the regulatory framework that serves as the basis for analysis for the affected resources that follow:

- NEPA (42 USC 4321-4370h)
- CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508)
- Air Force Environmental Impact Analysis Process (32 CFR 989)
- FAA Order 1050.1F, Environmental Impacts: Policies and Procedures
- Clean Air Act (CAA) (42 USC 7401 et seq.)
- National Historic Preservation Act (NHPA) (54 USC 306108 et seq.)
- Endangered Species Act (ESA) (16 USC 1531 et seq.)
- Migratory Bird Treaty Act (MBTA) (16 USC 703-712)
- Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668-668d)
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
- EO 13175, *Consultation and Coordination with Indian Tribal Governments*

3.1.2 Resources Analyzed

Table 3.1-1 presents the results of the process of identifying resources to be analyzed in this EIS. The assessment evaluates airspace operations and management; acoustic environment; air quality; natural resources; land management; recreation resources; socioeconomics; environmental justice; safety; cultural resources; and hazardous materials.

As a Federal agency, the FAA has its own agency-specific NEPA obligations (outlined in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*) with which it must comply prior to approving an airspace action. The resource areas identified in the FAA Order vary slightly from the Air Force

regulations. **Table 3.1-1** presents the Air Force resources and the FAA resources. As a cooperating agency, FAA independently reviewed this EIS prepared by the Air Force and assessed whether it met the agency's standards for adequacy under NEPA. The FAA will adopt the Final EIS document in whole or in part to fulfill its NEPA obligations and sign its own ROD for the proposed airspace action.

Table 3.1-1. Air Force and FAA Resources Analyzed in the Environmental Impact Analysis Process

Air Force			FAA	
Resource	**Carried Forward for Detailed Analysis**		**Resource**	**Carried Forward for Detailed Analysis**
Airspace Operations and Management	Yes		Department of Transportation Act, Section 4(f)	No
Acoustic Environment (Noise)	Yes		Noise and Noise Compatible Land Use	Yes
Air Quality	Yes		Air Quality; Climate	Yes
Natural Resources	Yes		Biological Resources (including fish, wildlife, and plants)	Yes
Land Management	Yes		Land Use	Yes
Recreation Resources	Yes		Farmlands	No
Socioeconomics	Yes		Visual Effects	No
Environmental Justice	Yes		Socioeconomics, Environmental Justice, and Children's Health and Safety Risks	Yes
Safety	Yes		Historical, Architectural, Archaeological, and Cultural Resources	Yes
Cultural Resources	Yes		Hazardous Materials, Solid Waste, and Pollution Prevention	Yes
Hazardous Materials	Yes		Water Resources	No
Water Resources	No		Natural Resources and Energy Supply	No
Earth Resources	No		Coastal Resources	No
Coastal Zone	No			

Legend: FAA-Federal Aviation Administration.

3.1.3 Resources Not Carried Forward for Detailed Analysis

CEQ regulations (40 CFR 1501.7(a)(3)) indicate that the lead agency should identify and eliminate from detailed study the issues that are not relevant or that have been covered by prior environmental review. The discussion of these issues in the EIS should be a brief presentation of why the Proposed Action and alternatives would not have a significant effect on those resources. The following resource areas have been eliminated from detailed analysis: water resources; earth resources; coastal zone and coastal resources; visual effects; farmlands; natural resources and energy supply; and Department of Transportation Act Section 4(f).

Water Resources include surface water, groundwater, wetlands, Wild and Scenic Rivers, and floodplains. The Proposed Action would be limited to the modification or establishment of airspace only and would not include any components that would touch or directly affect the quantity, flows, percolation rate, or accessibility of surface or ground water resources. The Proposed Action and alternatives would not have an impact to Wild and Scenic Rivers as none exist in the areas underlying the proposed new or expanded

airspace. Floodplains are protected by EO 11988, *Floodplain Management*, which requires that each Federal agency "…take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains." No floodplains would be impacted since there are no construction activities associated with this proposal. Consequently, there would be no direct impact to water resources, including wetlands and floodplains as a result of the Proposed Action. Waterbodies beneath the proposed Talon MOA account for only 0.3 percent of the total area (approximately 12,300 acres), while waterbodies beneath the proposed Cato, Smitty, and Lobos MOAs account for only 0.08 percent of the total area (approximately 3,700 acres) (U.S. Geological Survey 2015). An analysis of the potential water quality-related impacts from chaff and flares is provided in **Section 4.12**, *Hazardous Materials*.

There is a possibility that chaff fibers or residual material from chaff and flares could collect on water surfaces; however, the probability of a substantial amount of residues being deposited in any one location, specifically within a small, confined waterbody, would be minuscule due to the large area within which flight operations would occur. To put this into perspective, **Table 3.1-2** provides the amount of chaff potentially distributed beneath the airspace under each alternative. As shown, there would be less than 0.5 grams (0.0187 ounces) of chaff per acre for any of the alternatives. Use of chaff and flares also results in residual material that falls to the ground. **Table 3.1-3** provides the amount of residual material potentially distributed beneath the airspace under each alternative. Since the pieces of residual material would remain intact, a fraction of residual materials per acre as shown in the table is not possible (0.0446 for Alternative 1 and 0.0143 for Alternative 2), therefore, the last line of **Table 3.1-3** provides the approximate acreage for one piece of residual material. Alternative 1 would average one piece of residual material per approximately 22 acres and Alternative 2 would average one piece of residual material per approximately 70 acres. Under Alternative 3, the use of chaff and flare would be distributed across all of the proposed airspace resulting in less residual material per acre than Alternatives 1 or 2; averaging one piece of residual material per 30 acres beneath the proposed Talon MOA and one piece of residual material per 185 acres beneath the proposed Cato, Smitty, and Lobos MOAs.

Table 3.1-2. Potential Chaff Distribution

	Alternative 1	Alternative 2	Alternative 3 (Proposed Talon MOA)	Alternative 3 (Proposed Cato, Smitty, Lobos MOA)	Alternative 3 (Total)
Proposed Usage (annually)	15,360	15,360	10,752	4,608	15,360
Chaff per bundle (ounces)	3.35	3.35	3.35	3.35	3.35
Total Chaff Volume (ounces)	51,456	51,456	36,019	15,437	51,456
Proposed Airspace Area (acre)	2,752,244	8,571,519	2,602,729	6,807,173	9,409,902
Chaff per Acre (ounces)	**0.0187**	**0.0060**	**0.0138**	**0.0023**	**0.0161**
Chaff per Acre (grams)	**0.50**	**0.17**	**0.39**	**0.07**	**0.46**

Legend: MOA-Military Operations Area.

Table 3.1-3. Potential Chaff and Flare Residual Material				
	Proposed Usage (annually)	**Pieces of Residual Material per Unit***	**Alternative 1 Total Pieces of Residual Material (annually)**	**Alternative 2 Total Piece of Residual Material (annually)**
Chaff	15,360	3	46,080	46,080
Flare	15,360	5	76,800	76,800
Total Residual Materials (annually)			***122,880***	***122,880***
Proposed Airspace Area (acres)			2,752,244	8,571,519
Pieces of Residual Material per Acre (annually)			**0.0446**	**0.0143**
1 Piece of Residual Material per X acre			**22.40**	**69.76**

Notes: *Residual material includes plastic end caps, felt spacers, tape, and plastic piston

Earth Resources include geology, topography, and soils. The Proposed Action and alternatives would expand or create new airspace to support military training operations. There are no activities proposed that would impact the geology or topography in the affected environment. Military aircraft would dispense chaff and flares during training exercises. Residual materials of chaff and flare could collect on the soil surface; however, the probability of such residual materials being deposited in any one location would be minuscule due to the dispersal of chaff and flares (see **Tables 3.1-2 and 3.1-3)**. Therefore, impacts to soils would be insignificant. The effect of potential fires due to the rare occurrence of still ignited flares reaching the ground are analyzed in **Section 3.10** and **4.10**, *Safety*. There have been no reported flare caused fires under the existing MOAs or ATCAAs as a result of Holloman AFB pilot training. The toxicity of chaff and flare and the potential impact to the environment is provided in **Section 3.12 and 4.12**, *Hazardous Materials*.

Coastal Zone and Coastal Resources include designated coastal land and the natural resources dependent on that land. The Coastal Zone Management Act of 1972 was established to plan comprehensively for and manage development of the Nation's coastal land and water resources. Federal actions that are likely to affect any land or water use or natural resource of the coastal zone must be consistent with the enforceable policies of the State's Coastal Zone Management Plan. There are no coastal zones within or near the ROI for this Proposed Action. Therefore, the Proposed Action and alternatives would not have any impact to coastal zone management.

Visual Effects are required in FAA NEPA Desk Reference (FAA 2015) to determine the extent to which a Proposed Action and alternatives would produce light emissions that would create annoyance or interfere with activities or contrast with or detract from the visual character of the existing environment. Training would be dispersed throughout the proposed airspace and occur at various altitudes with most of the training occurring above 10,000 feet AGL. Approximately ten percent of training operations would occur after dark. Safety lights on the F-16 aircraft would not be any different than common commercial aircraft in the area. Flares, if used in the proposed training airspace after dark, would be a temporary source of light emissions (flares burn for approximately 3 to 5 seconds). Assuming ten percent of the annual flare usage would occur after dark, this would result in approximately 1,536 flares annually that would burn cumulatively for 7,680 seconds (128 minutes) throughout a year. Flares are currently used within the Talon, Cato, and Smitty MOAs so there would be no change to the current light emissions associated with flare usage. However, flares are not currently used in the proposed Lobos MOA. Aircraft operations and the use of flares in the training airspace would be dispersed through the horizontal limits of the airspace. As such, no one location

would receive a consistent distribution of flares and flare usage would not create a consistent source of light. **Figure 3.1-1** illustrates the visual perspective of an F-16 at various altitudes. As shown, operations at any altitude would not create a significant visual intrusion, especially at the higher altitudes. The graphic shows the percentage of an observer's field of view obstructed by an F-16 silhouette, which would be less than half a percent (0.37588 percent) for even the lowest of the proposed overflights. At 30,000 feet the F-16 is nearly undetectable. Implementation of the Proposed Action or alternatives would not be expected to adversely affect this resource; therefore, no further analysis is warranted.

Farmlands are defined in the FAA NEPA Desk Reference as those agricultural areas considered important and protected by Federal, state, and local regulations (FAA 2015). The Farmland Protection Policy Act regulates Federal actions with the potential to convert farmland to non-agricultural uses. The proposal would not involve any ground disturbance or conversion of farmland to non-agricultural uses, therefore, farmlands were not considered further in this EIS.

Natural Resources and Energy Supply impacts are required under FAA NEPA guidance to determine a proposal's consumption of natural resources (such as water, asphalt, aggregate, wood, etc.) and use of energy supplies (such as coal for electricity, natural gas for heating, etc.). Consumption of natural resources and use of energy supplies would result from construction, operation, and maintenance activities associated with a Proposed Action. The proposal evaluated in this EIS does not include the construction of any facilities. Maintenance and general operation of the existing F-16 aircraft at Holloman AFB would remain unchanged with this proposal; therefore, natural resources and energy supply were not evaluated further in this EIS.

Section 4(f) of the U.S. Department of Transportation Act of 1966 (49 USC 303) protects significant publicly owned parks, recreational areas, wildlife and waterfowl refuges, and public and private historic sites. Section 4(f) provides that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance, only if there is no feasible and prudent alternative to using that land and the program or project includes all possible planning to minimize harm resulting from the use. Section 4(f) applies only to agencies within the U.S. Department of Transportation. The proposal would not require the use or modification of any publicly owned land. In addition, SUA actions are exempt from the requirements of Section 4(f) (FAA 2015).

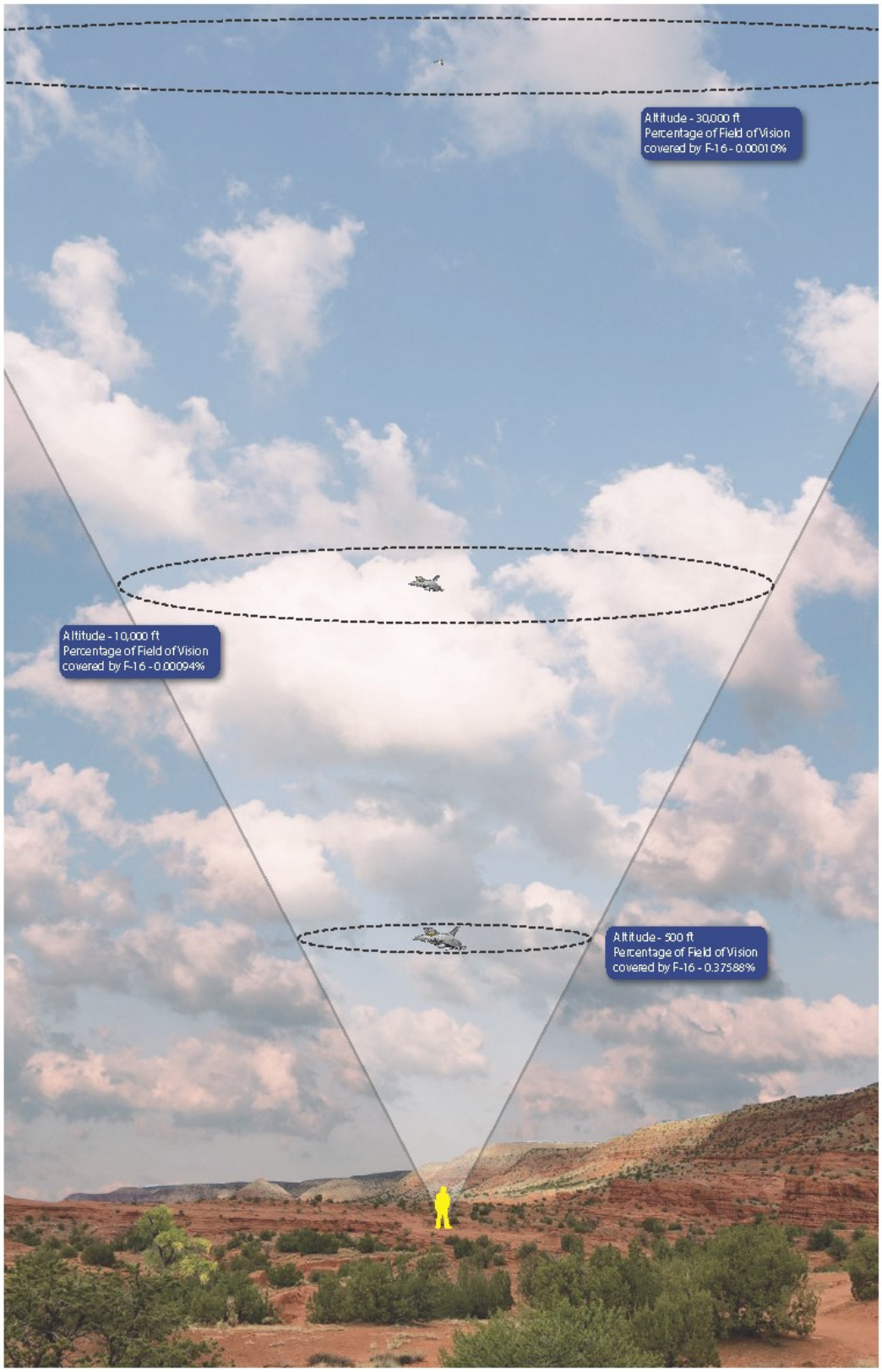


Figure 3.1-1. Visual Intrusion of Proposed Overflights

3.2 AIRSPACE MANAGEMENT AND OPERATIONS

3.2.1 Resource Definition

Airspace management 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.

3.2.1.1 Regulatory Framework

In the 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 USC 40103[b]). The FAA considers multiple and sometimes competing demands for airspace in relation to airport operations, 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 DoDD 5030.19, *DoD Responsibilities on Federal Aviation,* and FAA regulations. SUA identified for military and other governmental activities is charted and published by the National Aeronautical Charting Office in accordance with FAA Order JO 7400.2M, *Procedures for Handling Airspace Matters* (FAA 2019a). Descriptions of approved SUA, except temporary areas and controlled firing areas, are compiled and published once a year in FAA JO 7400.10A, *SUA* (current version effective February 16, 2019). Airspace designated for military use is released to the FAA when the airspace is not needed for military requirements (DoD 2017).

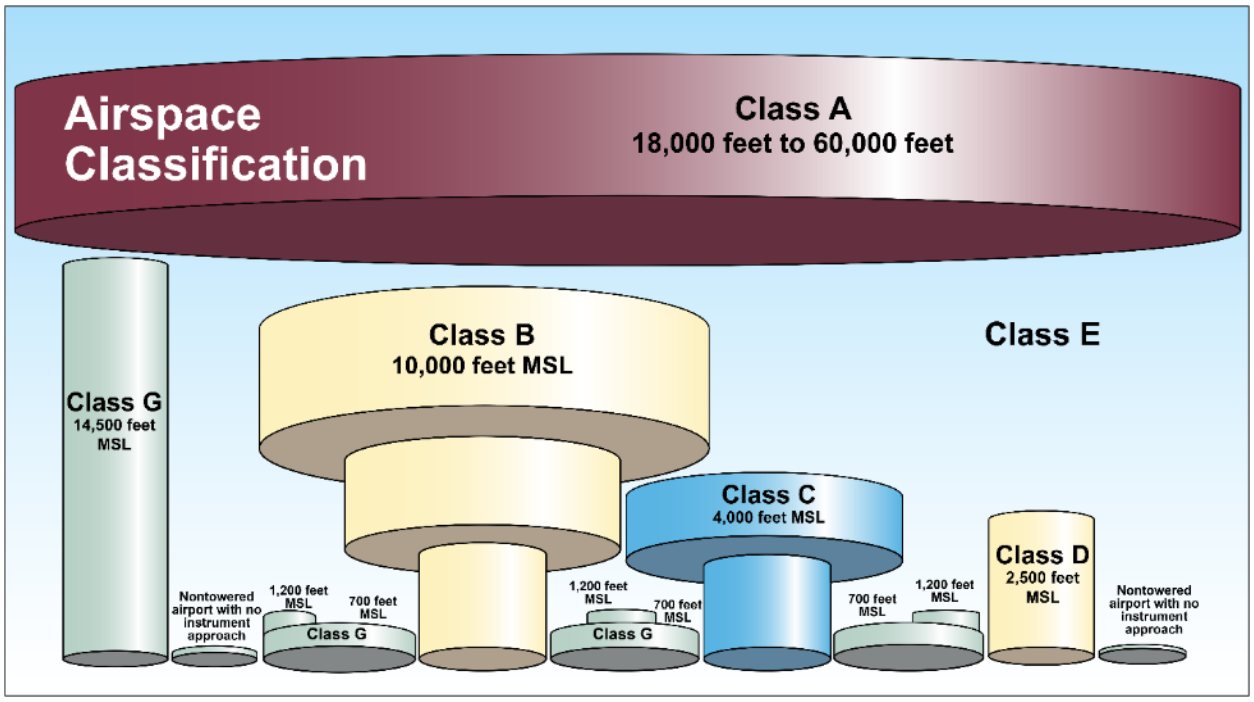
Procedures governing the use of training areas and airspace operated and controlled by the Air Force are included in Air Force Policy Directive 13-2 *Air Traffic, Airfield, Airspace and Range Management* and its implementing regulations. The Air Force manages airspace in accordance with processes and procedures detailed in AFI 13-201, *Airspace Management*. AFI 13-201 also provides the guidance and procedures used to develop and process SUA actions. It governs planning, acquisition, use, and management of the airspace required to support the flight training necessary to ensure pilot proficiency (Air Force 2012).

3.2.1.2 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 3.2-1**). 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 3.2-1**).

Controlled airspace is airspace of defined dimensions within which air traffic control service is provided (FAA 2019a). 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 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.



Source: FAA 2018a.
Legend: MSL-mean sea level.

Figure 3.2-1. Cross Section of Airspace Classes and Relationships

Table 3.2-1. 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]
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

Source: FAA 2017.
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.

3.2.2 Affected Environment

3.2.2.1 Talon MOA

Figures 3.2-2 and 3.2-3 identify the ROI for airspace management and operations. The figures are divided into airspace management components below 18,000 feet MSL (**Figure 3.2-2**) and those above 18,000 feet MSL (**Figure 3.2-3**). The airspace management components include existing and proposed SUA, ATCAAs, military training routes (MTRs) (not visible on the figure), airports, and low and high ATS routes. **Appendix D1** (Airports in region of influence) provides detailed information (description, based aircraft, and annual operations) on each airport in the ROI. This EIS uses data from the FAA's Performance Data Analysis and Reporting System (PDARS). The PDARS continuously collects flight plan and radar track data from systems located at Air Route Traffic Control Centers, Terminal Radar Approach Control Facilities, and air traffic control towers. **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) provides a compilation of the PDARS data for all aircraft operations in the ROI that is referenced in this section.

Existing Special Use Airspace

Table 3.2-2 provides a description of the existing SUA within the ROI. To the extent practicable, SUA within the ROI was originally designed to minimize impacts to civilian air traffic by avoiding ATS routes and public airports.

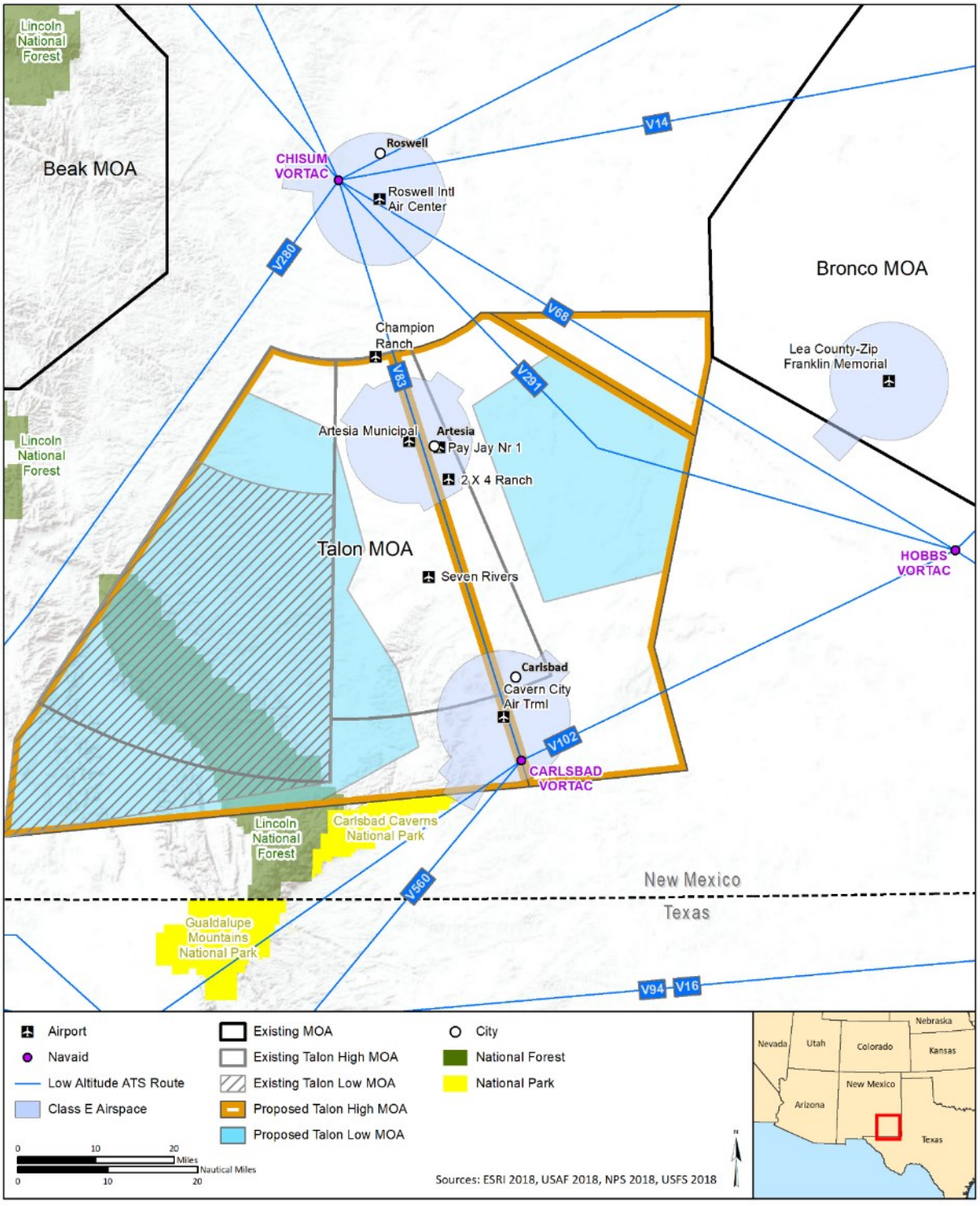
Table 3.2-2. SUA within the ROI for Talon MOA

Airspace	Altitude		Published Hours of Use		Published Days of Use
	Minimum	Maximum	From	To	
Talon High East MOA	12,500 feet MSL	FL180	Sunrise	Sunset	Monday-Friday[1]
Talon High West MOA	12,500 feet MSL	FL180	Sunrise	Sunset	Monday-Friday[1]
Talon Low MOA	300 feet AGL	12,499 feet MSL	Sunrise	Sunset	Monday-Friday[1]
Bronco MOA	10,000 feet MSL	FL180	7:00 a.m.	8:00 p.m.	Monday-Friday[1]
Beak MOA	12,500 feet MSL	FL180	6:00 a.m.	6:00 p.m.	Monday-Friday[1]

Source: FAA 2019b.
Note: [1] Other times by NOTAM.
Legend: AGL-above ground level; FL-Flight Level; MOA-Military Operations Area; MSL-mean sea level; NOTAM-Notice to Airmen; ROI-region of influence; SUA-special use airspace.

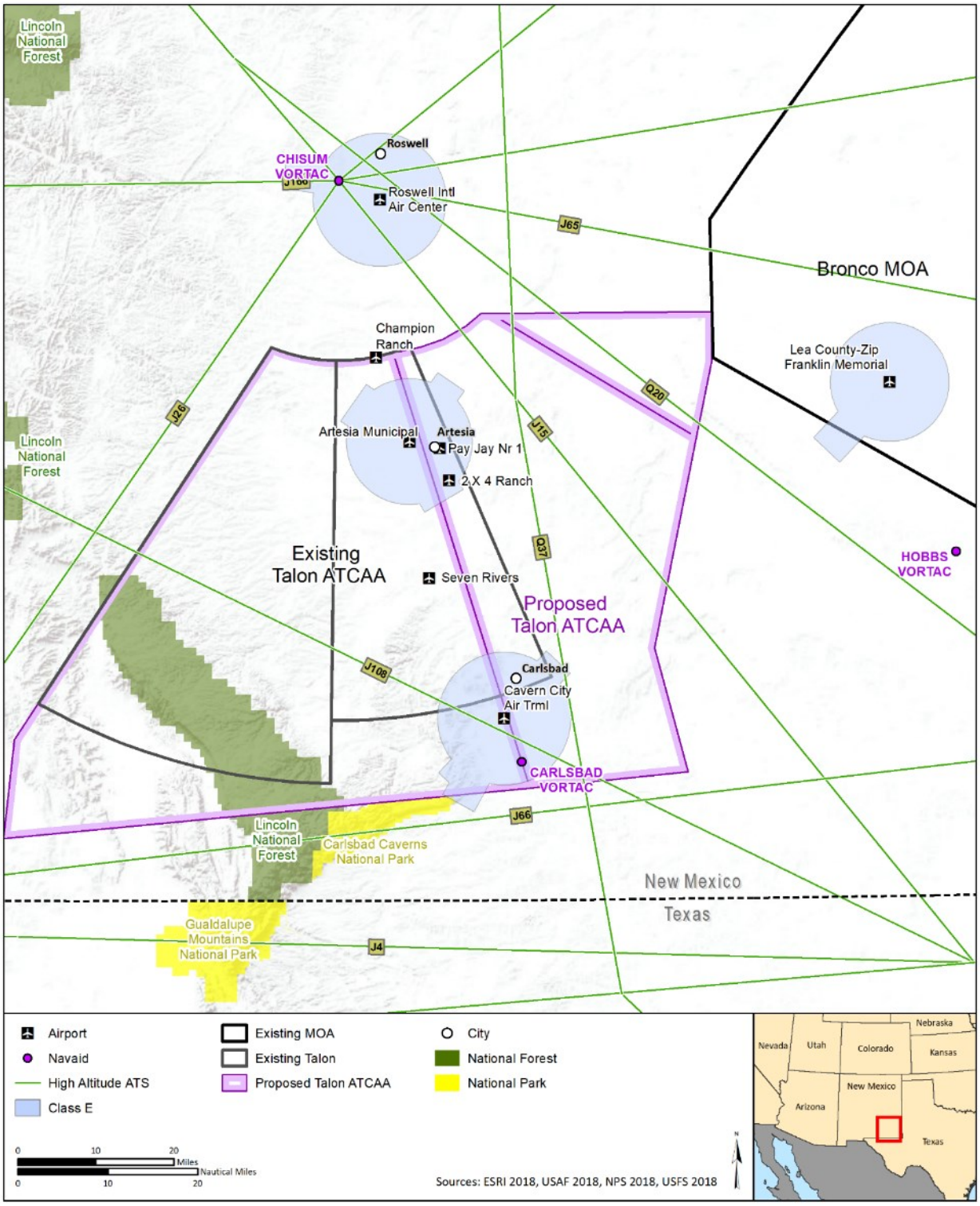
The Talon MOAs are scheduled and managed by Holloman AFB and the controlling agency is Albuquerque Center. Entry into and departure from the Talon High airspace requires clearance from Albuquerque Center and departures from the Talon Low airspace is VFR or via continuance on a filed instrument route (i.e., IR-192/194, 134/195). Scheduling of the Talon Low MOA requires scheduling of at least the Talon High West MOA/ATCAA and/or IR-134/192, 134/195 (Air Force 2014).

The Bronco MOA lies to the east of the existing Talon MOA. Under Alternative 1, the proposed Talon High C MOA would adjoin the western edge of one of the segments of the Bronco MOA (Bronco 3). The Bronco 3 MOA is scheduled and managed by Cannon AFB, New Mexico and the controlling agency is the Fort Worth Air Route Traffic Control Center (Fort Worth Center). As described in **Section 2.8.1.1**, *Proposed Airspace Modifications*, the Bronco 3 and Talon High C MOAs would not be activated at the same time.



Legend: ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 3.2-2. Airspace Components in Talon MOA ROI Below 18,000 feet MSL



Legend: ATS-Air Traffic Service; ATCAA – Air Traffic Control Assigned Airspace.

Figure 3.2-3. Airspace Components in Talon MOA ROI above 18,000 feet MSL

The Beak MOA lies to the west of the existing Talon MOA. The space between these two MOAs forms a corridor that contains ATS routes that lead to Roswell International Air Center. The western edge of the Talon MOA would not be changed under this Proposed Action; therefore, flight operations using this corridor would not be affected by the Proposed Action.

Table 3.2-3 presents the estimated annual flight counts based on PDARS data for civilian aircraft operating within the area of the proposed Talon MOA. Any PDARS record of an aircraft flight track penetrating this airspace is counted as 1 "count". Military aircraft (to include those from Holloman AFB and other bases) also use airspace within the Talon MOA ROI. Operational data for military aircraft is not presented since military use of the airspace is coordinated and scheduled by the Air Force and would not be affected by the Proposed Action.

Table 3.2-3. Estimated Civilian Flight Counts for SUA within Talon MOA ROI, FY17

Airspace	Estimated Annual Counts1
Talon High East MOA	1,416
Talon High West MOA	1,083
Talon Low MOA	1,674
Bronco 3 MOA	4,965
Area between Talon and Bronco MOAs (Proposed expansion of Talon MOA)	7,005

Source: Air Force 2017.
Notes: [1] PDARS data was collected for four months equally spaced throughout the year. The 4 months' worth of data was extrapolated to provide an annual estimate.
Legend: FY-fiscal year; MOA-Military Operations Area; ROI-region of influence SUA-special use airspace.

Air Traffic Control Assigned Airspace

Holloman AFB frequently uses ATCAAs to extend the vertical limits of their MOAs above FL180. ATCAAs in the ROI are controlled and assigned by the Albuquerque Center with the exception of the ATCAA associated with Bronco 3 MOA that is controlled and assigned by the Fort Worth Center. **Table 3.2-4** identifies the ATCAAs within the Talon MOA ROI.

Table 3.2-5 presents the estimated annual flight counts based on PDARS data for civilian aircraft operating in the ATCAAs within the Talon MOA ROI: Talon High East, Talon High West, and Bronco 3 ATCAAs. Any PDARS record of an aircraft flight track penetrating this airspace is counted as 1 "count" here. It should be noted that the flight operations through the ATCAAs should not be combined as many of the flights would have flown through multiple areas.

Table 3.2-4. Existing ATCAAs within Talon MOA ROI

Airspace	Altitudes		Associated MOA
	Minimum	Maximum[1]	
Talon High East ATCAA	FL180	FL290 (coordination to FL600 can be accomplished real time)	Talon East High
Talon High West ATCAA	FL180	FL290 (coordination to FL600 can be accomplished real time)	Talon West High
Bronco 3 ATCAA	FL180	FL510	Bronco 3

Source: Air Force 2014, 2016.
Note: [1.] Or as assigned by Air Traffic Control.
Legend: ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operations Area; ROI-region of influence.

Table 3.2-5. Estimated Civilian Flight Counts for ATCAAs within Talon MOA ROI, FY17	
Airspace	**Estimated Annual Counts1**
Talon High East ATCAA	19,443
Talon High West ATCAA	27,042
Bronco 3 ATCAA	43,995
Area between Talon High East ATCAA and Bronco 3 ATCAA (Proposed expansion of Talon ATCAA)	22,767

Source: Air Force 2017.
Notes: [1] PDARS data was collected for four months equally spaced throughout the year. The 4 months' worth of data was extrapolated to provide an annual estimate.
Legend: ATCAA-Air Traffic Control Assigned Airspace; FY-fiscal year; MOA-Military Operations Area; ROI-region of influence SUA-special use airspace.

Military Training and Air Refueling Routes

The existing MTRs that intersect the Talon MOA ROI are described in **Table 3.2-6** (there are no air refueling routes within the ROI). MTRs are used for training at high speeds and at low altitudes. All of the MTRs located in the Talon MOA ROI are managed and scheduled by Holloman AFB. Proposed modifications to and operations within the Talon MOA would not affect use of the MTRs. Scheduling and existing rules of use would ensure separation of aircraft, and therefore, MTRs are dismissed from detailed analysis.

Table 3.2-6. MTRs within Talon MOA ROI			
MTR	**Times of Use**	**Associated Airspace**	**Using Agency**
IR-192/194	Sunrise – 11:00 p.m.	Talon Low and Talon High East MOAs	49 OSS, Holloman AFB
IR-134/195	Sunrise – 11:00 p.m.	Talon Low and Talon High West MOAs	49 OSS, Holloman AFB

Source: DoD 2018.
Legend: AFB-Air Force Base; MOA-Military Operations Area; MTR-Military Training Routes; OSS-Operational Support Squadron; ROI-region of influence.

Airports

Airports within the vicinity of the Talon MOA ROI are shown on **Figure 3.2-2**. **Appendix D1** (Airports in Region of Influence) provides detailed information (description, based aircraft, and annual operations) on each airport in the ROI. There are four public airports and four private airports in the vicinity of the Talon MOA ROI.

The four public airports include: Artesia Municipal Airport, Cavern City Air Terminal Airport, Lea County-Zip Franklin Memorial Airport, and Roswell International Air Center Airport. The Cavern City Air Terminal Airport and the Roswell International Air Center Airport are not currently located beneath SUA. Cavern City Air Terminal Airport would be beneath the shared border of the proposed Talon High A and B MOAs. This airport reported 6,862 operations in FY16 and has 27 based aircraft (SkyVector 2019). Roswell International Air Center Airport is not located beneath existing or proposed SUA, but some of the approach corridors for this airport would be beneath the proposed Talon MOA. This airport reported 25,546 operations in FY16 and has 43 based aircraft (SkyVector 2019). The other two public airports (Artesia Municipal Airport and Lea County-Zip Franklin Memorial Airport) are located beneath existing SUA. The Artesia Municipal Airport, located beneath the existing and proposed Talon MOA, reported 14,050 operations in FY16 and has 30 based aircraft (SkyVector 2019). The Lea County-Zip Franklin Memorial

Airport, located beneath the existing Bronco MOA, reported 2,200 operations in FY16 and has 12 based aircraft (SkyVector 2019).

The four private airports are all located beneath the existing and proposed Talon MOA (see **Appendix D1,** Airports in region of influence, for operations). Aircraft operating from private airports typically fly using VFR and at lower altitudes.

ATS Routes

ATS routes are designated for the en-route phase of flight, or that segment of flight from the termination point of the departure airport's procedures to the origination point of the landing airport's arrival procedure. These flights are under the control of an air route traffic control center, such as the Albuquerque Center. **Table 3.2-7** identifies the ATS routes in the Talon MOA ROI. Route V-83, V-291, V-68, and V-102 are designated for low altitude IFR flight between 1,200 feet AGL and 18,000 feet MSL and originate and/or terminate at multiple airports close to or within the Talon MOA ROI (see **Figure 3.2-2**). Routes J-15, J-108, Q-37, and Q-20 are associated with commercial carriers traversing the Talon ATCAA on long distance flights (see **Figure 3.2-3**).

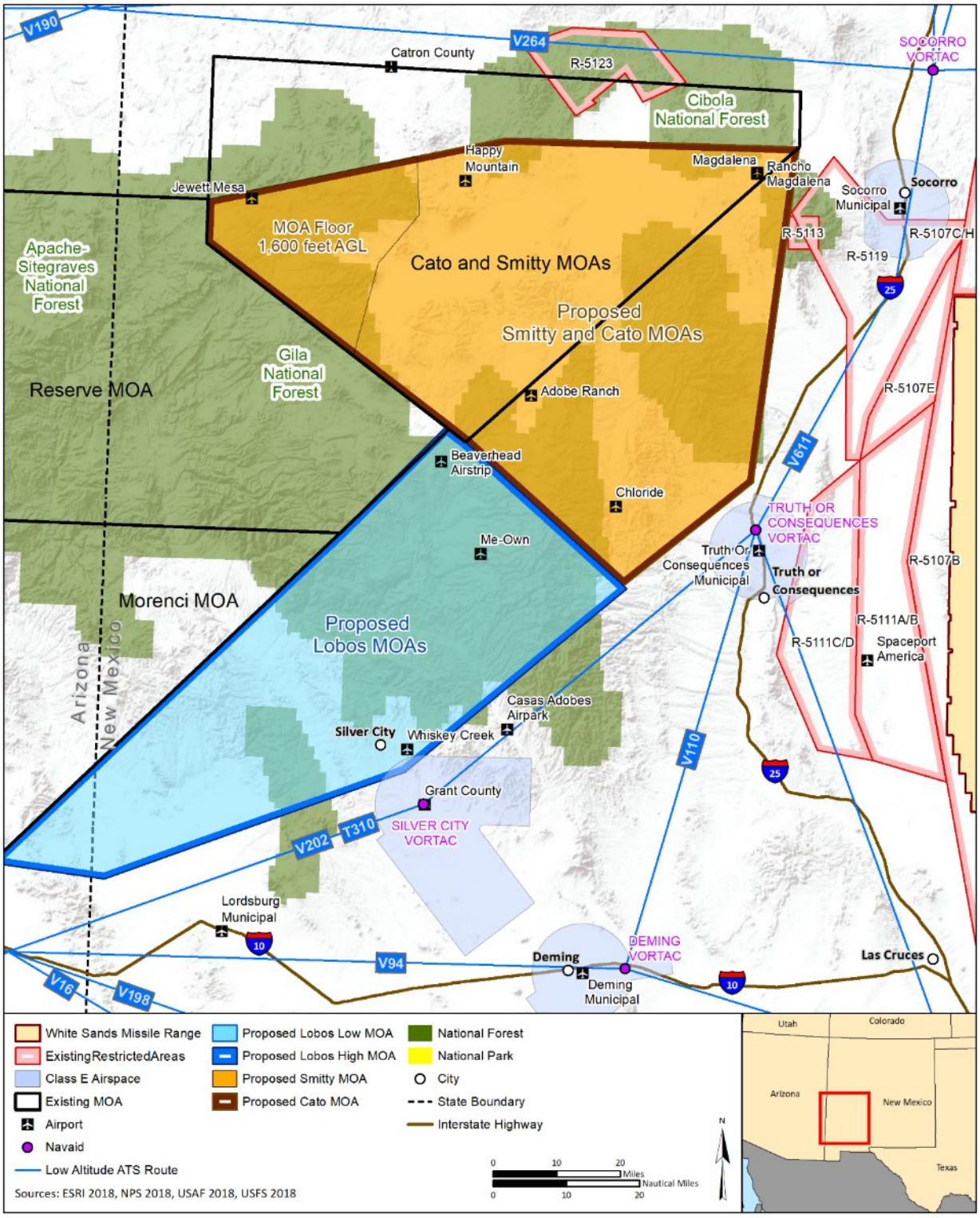
Table 3.2-7. ATS Routes in the Talon MOA ROI

Route[1]	Associated Existing Airspace	Associated Proposed Airspace	Route Origination/Termination
V-83	Talon High West MOA	Talon High A MOA and Talon High B MOA	From Carlsbad, New Mexico to Black Forest, Colorado
V-291	None	Talon Low B MOA and Talon High B MOA	From Hobbs, New Mexico to Peach Springs, Arizona
V-68	None	Talon High C MOA	From Montrose, Colorado to Hobby, Texas
V-102	None	Talon High A and B MOA	From Salt Flat, Texas to Wichita Falls, Texas
J-15	None	Talon High B ATCAA	From Humble, Texas to Battle Ground, Washington
J-108 (MEA 24,000 feet MSL)	Talon High West/East ATCAA	Talon High A and B ATCAA	From Winslow, Arizona to Wink, Texas
Q-37 (MEA 25,000 feet MSL)	None	Talon High B ATCAA	From Fort Stockton-Pecos, Texas to Pueblo, Colorado
Q-20 (MEA 24,000 feet MSL)	None	Talon High C ATCAA	From Corona, New Mexico to Junction, Texas

Source: FAA 2018a.
Notes: [1] MEAs do not apply to every published ATS route.
Legend: ATCAA-Air Traffic Control Assigned Airspace; ATS-Air Traffic Service; MEA- Minimum En-route Altitude; MOA-Military Operations Area; MSL-mean sea level; ROI-region of influence.

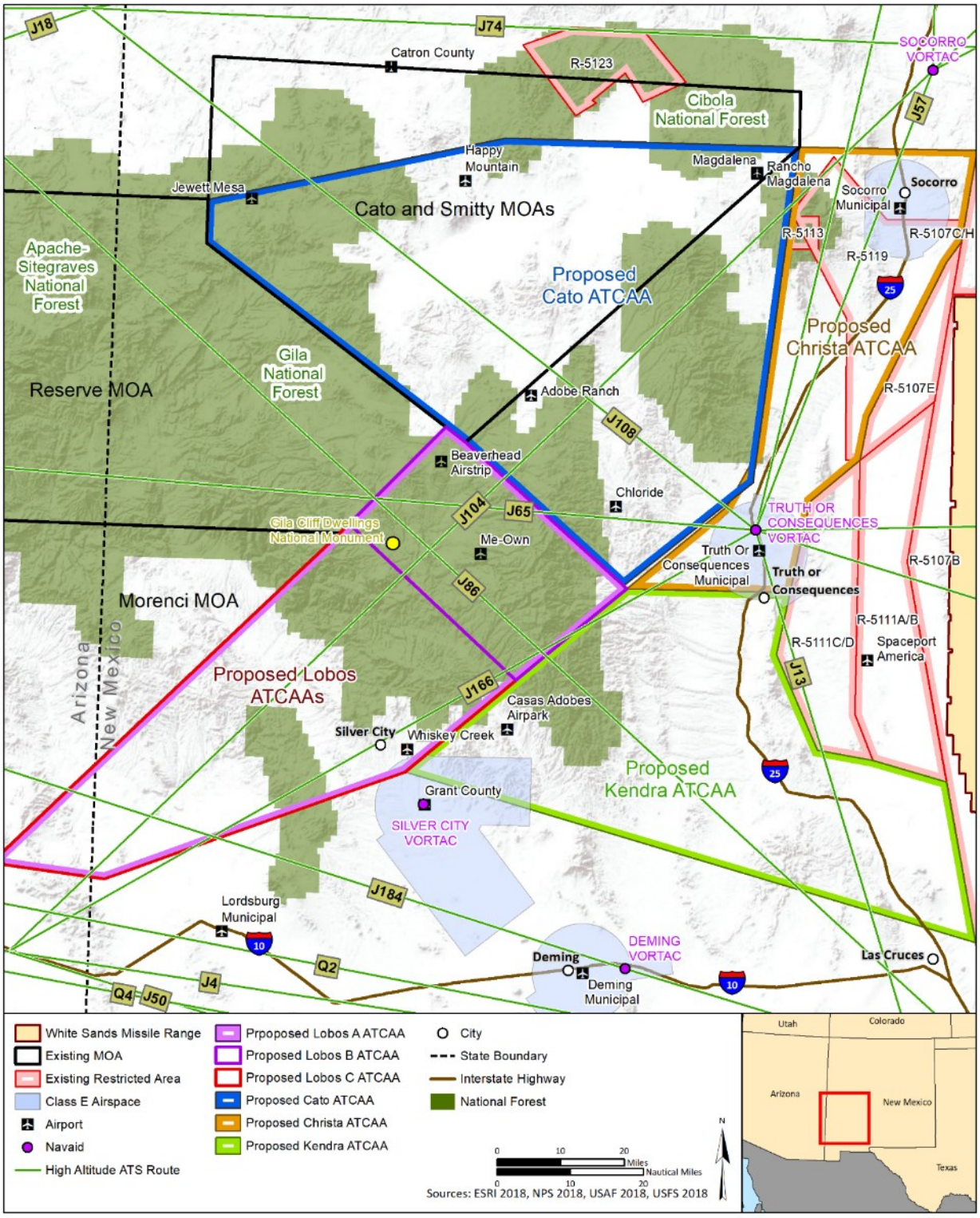
3.2.2.2 Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs

Figure 3.2-4 and 3.2-5 depict the ROI for airspace management and operations. The figures are divided into airspace components below 18,000 feet MSL (**Figure 3.2-4**) and those above 18,000 feet MSL (**Figure 3.2-5**).



Legend: ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 3.2-4. Airspace Components the Cato, Smitty, and Lobos MOAs ROI below 18,000 feet MSL



Legend: ATS-Air Traffic Service; ATCAA – Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 3.2-5. Airspace Components the Cato, Lobos, Christa and Kendra ATCAAs ROI above 18,000 feet MSL

It includes existing and proposed SUA, ATCAAs, MTRs (not visible on the figure), airports, and low and high ATS routes. **Appendix D1** (Airports in region of influence) provides detailed information (description, based aircraft, and annual operations) on each airport in the ROI. **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) provides PDARS data for all aircraft operations in the ROI.

Existing Special Use Airspace

Table 3.2-8 provides a description of the existing SUA within the ROI and includes MOAs and Restricted Areas. To the extent practicable, SUA within the ROI was originally designed to minimize impacts to civilian air traffic by avoiding ATS routes and public airports.

Table 3.2-8. SUA within the ROI for Smitty, Cato, and Lobos MOAs and Christa and Kendra ATCAAs

Airspace	Altitudes		Published Hours of Use		Published Days of Use
	Minimum	Maximum	From	To	
Cato MOA	13,500 feet MSL	FL180	8:00 a.m.	10:00 p.m.	Monday-Saturday[1]
Smitty MOA	500 feet AGL	13,500 feet MSL	8:00 a.m.	10:00 p.m.	Daily
Morenci MOA	1,500 feet AGL	FL180	6:00 a.m.	11:00 p.m.	Monday-Friday[1]
Reserve MOA	5,000 feet AGL	FL180	By NOTAM		By NOTAM
R-5107A	Surface	Unlimited	Continuous		Continuous
R-5107B	Surface	Unlimited	Continuous		Continuous
R-5107C	9,000 feet MSL	Unlimited	Continuous		Monday-Friday[1]
R-5107D	Surface	22,000 feet MSL	Continuous		Continuous
R-5107E	Surface	Unlimited	By NOTAM[1]		By NOTAM[1]
R-5107F	FL240	FL450	12:01 a.m.	11:59 p.m.	Monday-Friday[2]
R-5107G	FL240	FL450	12:01 a.m.	11:59 p.m.	Monday-Friday[2]
R-5107 H	Surface	9,000 feet MSL	By NOTAM[1]		By NOTAM
R-5107 J	Surface	9,000 feet MSL	Continuous		Monday-Friday[2]
R-5107K	Surface	Unlimited	7:00 a.m.	8:00 p.m.	Monday-Friday[2]
R-5109A	24,000 feet MSL	Unlimited	Intermittent		By NOTAM[2]
R-5109B	24,000 feet MSL	Unlimited	Intermittent		By NOTAM[2]
R-5111A	13,000 feet MSL	Unlimited	By NOTAM[1]		By NOTAM[1]
R-5111B	Surface	13,000 feet MSL	By NOTAM[1]		By NOTAM[1]
R-5111C	13,000 feet MSL	Unlimited	By NOTAM[1]		By NOTAM[1]
R-5111D	Surface	13,000 feet MSL	By NOTAM[1]		By NOTAM[1]
R-5113	Surface	45,000 feet MSL	9:00 a.m.	7:00 p.m.	Daily[3]
R-5123	Surface	Unlimited	By NOTAM[4]		By NOTAM[4]
R-5119	FL350	Unlimited	By NOTAM[4]		By NOTAM[4]

Sources: FAA 2019b, 2018b.

Notes: [1]Other times by NOTAM issued at least 12 hours in advance;[2]Other times by NOTAM (normally, at least 4 hours in advance);[3] Jun 1 through September 30, annually; [4]Intermittent by NOTAM 24 hours in advance.

Legend: ATCAA-Air Traffic Control Assigned Airspace; AGL-above ground level; FL-flight level; MOAs-Military Operations Areas; MSL-mean sea level; NOTAM-Notice to Airmen; ROI-region of influence; SUA-special use airspace.

The Smitty and Cato MOAs are scheduled and managed by the Air National Guard's 150th Special Operations Wing located at Kirtland AFB, New Mexico. The controlling agency is the Albuquerque Center.

The Morenci and Reserve MOAs are adjacent to the proposed Cato, Smitty, and Lobos MOAs. The Morenci and Reserve MOAs are scheduled and managed by the 162nd Fighter Wing located in Tucson, Arizona. The controlling agency is the Albuquerque Center.

Under the Proposed Action, Holloman AFB aircraft would need to fly through or around the restricted areas associated with WSMR: R-5107A-K, R-5109A/B, and R-5111A-D. In addition, the proposed expanded Cato and Smitty MOAs would abut R-5113, and R-5123 overlaps with the portion of the Cato and Smitty MOAs proposed for return to the NAS. With the exception of R-5107A, R-5107K, and R-5113, the using agency for the restricted areas is the Commanding General of WSMR. The using agency for R-5107A is the Commanding General of Fort Bliss; for R-5107K the using agency is the Commanding General of the U.S. Army Air Defense Artillery Center and Fort Bliss Center. For R-5113, the using agency is the Air Force Research Laboratory. The controlling agency for all restricted areas is the Albuquerque Center.

Table 3.2-9 presents the estimated annual flight counts based on PDARS data for civilian aircraft operating within the area of the ROI. Any PDARS record of an aircraft flight track penetrating this airspace is counted as 1 "count". Military aircraft also use airspace within the ROI. Operational data for military aircraft is not presented since military use of the airspace is coordinated and scheduled by the Air Force and would not be affected by the Proposed Action. Because an individual aircraft can fly through multiple SUA areas, the numbers cannot be combined into a single total number of aircraft. It should be noted that the restricted areas are activated and used in support of both ground training maneuvers and flight training.

Table 3.2-9. Estimated Civilian Flight Counts for SUA within Cato, Smitty, and Lobos MOAs ROI, FY17

Airspace	Estimated Annual Counts
Cato MOA	729
Smitty MOA	492
Reserve MOA	534
Morenci MOA	2,382
Combined R-5103/R-5107/R5109/R5111	253,164
Area for Proposed Lobos MOA	22,587

Legend: ATCAA-Air Traffic Control Assigned Airspace; FY-Fiscal Year; MOA-Military Operations Area; ROI-region of influence; SUA-special use airspace.

Air Traffic Control Assigned Airspace

ATCAAs in the ROI are controlled and assigned by the Albuquerque Center and described in **Table 3.2-10**.

Table 3.2-10. Existing ATCAAs within Cato, Smitty, and Lobos MOAs ROI

Airspace	Altitudes		Associated MOA
	Minimum	Maximum	
Cato East ATCAA	FL180	FL510	Cato MOA
Cato West ATCAA	FL180	FL510	Cato MOA
Morenci ATCAA	FL180	FL290 (coordination to FL600 can be accomplished real time)	Morenci MOA
Reserve A ATCAA	FL180	FL510	Reserve A MOA
Reserve B ATCAA[1]	FL180	FL510	Reserve B MOA
Reserve C ATCAA[1]	FL180	FL510	Reserve C MOA

Source: DoD 2018.
Note: [1]Rustler ATCAA is a combination of Reserve B and C ATCAAs.
Legend: ATCAA-Air Traffic Control Assigned Airspace; FL-Flight Level; MOA-Military Operation Area.

Table 3.2-11 presents the estimated annual flight counts based on PDARS data for civilian aircraft operating within the ROI. Any PDARS record of an aircraft flight track penetrating this airspace is counted as 1 "count". Military aircraft also use airspace within the ROI. Operational data for military aircraft is not presented since military use of the airspace is coordinated and scheduled by the Air Force and would not be affected by the Proposed Action.

Table 3.2-11. Estimated Civilian Flight Counts within ATCAAs ROI, FY17

Airspace	Estimated Annual Counts1
Cato East ATCAA	57,327
Cato West ATCAA	52,251
Morenci ATCAA	124,722
Reserve A ATCAA	38,769
Reserve B and C ATCAAs	54,162
Area for Proposed Lobos, Christa, and Kendra ATCAAs	169,350

Source: Air Force 2017.
Legend: ATCAA-Air Traffic Control Assigned Airspace; FY-Fiscal Year; ROI-region of influence.

Military Training and Air Refueling Routes

There are two MTRs (VR-176 and VR-263) that intersect the proposed Lobos MOA (**Table 3.2-12**). In addition, AR-613 is located partially within the Reserve B and C ATCAAs (adjacent to the Proposed Action airspace). There are no changes proposed to any of the military training or air refueling routes located within the ROI, and they are therefore dismissed from detailed analysis.

Table 3.2-12. Military Training Routes

MTR	Times of Use	Associated Airspace	Using Agency
VR-176	8:00 a.m.– 5:00 p.m.	Lobos MOA	49 OSS, Holloman AFB
VR-263	Continuous	Lobos MOA	162 OSS, Arizona ANG, Tucson
AR-613	Unlimited[1]	Morenci and Reserve ATCAAs	162 OSS, Arizona ANG, Tucson

Source: DoD 2018.
Notes: [1] Air traffic control assigned.
Legend: AFB-Air Force Base; ANG-Air National Guard; ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area; MTR-Military Training Routes; OSS-Operational Support Squadron.

Airports

Airports in the vicinity of the ROI were shown on **Figure 3.2-3**. **Appendix D1** (Airports in region of influence) provides detailed information (description, based aircraft, and annual operations) on each airport in the ROI. There are eight public airports: Grant County, Lordsburg, Deming Municipal, Truth or Consequences, Socorro Municipal, Catron County Heliport, Jewett Mesa, and Magdalena Airport. Two additional airports (Beaverhead Airstrip and Me-Own Airport) are classified as public since they are owned by the USFS but they are only available for private use. Grant County, Truth or Consequences Municipal, and Socorro Municipal are not currently located under SUA. All of these would be located beneath the proposed Christa and Kendra ATCAAs where military aircraft activity would be limited to higher altitudes (over FL180). Catron County airport is located in the area proposed to be released to NAS. There are seven private airports within the ROI. Aircraft operating from private airports typically fly using VFR at lower altitudes.

ATS Routes

Table 3.2-13 identifies the ATS Routes associated with the reconfiguration of the Cato and Smitty MOA, proposed Lobos MOA, and the Christa and Kendra ATCAAs. It should be noted that routes T-310, V-110, V-202, V-611 are located beneath the proposed area for the Christa and Kendra ATCAAs. Military aircraft operating within the proposed ATCAAs would only have the potential to affect routes J-13 and J-57.

Table 3.2-13. ATS Routes in the ROI for the Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs

Route[1]	Associated Existing Airspace	Associated Proposed Airspace	Route Origination/Termination	Notes
T-310	None	Christa and Kendra ATCAAs[2]	Tucson, Arizona to Truth or Consequences, New Mexico	Below ATCAA
V-110	None	Kendra ATCAAs[2]	Deming, New Mexico to Truth or Consequences, New Mexico	Below ATCAA
V-202	None	Christa and Kendra ATCAAs[2]	San Simon, Arizona to Truth or Consequences, New Mexico	Below ATCAA
V-611	None	Christa ATCAAs[2]	Newman, Texas to Havre, Montana	Below ATCAA
J-13	None	Christa and Kendra ATCAAs	Mexican Border to Lethbridge, Canada	
J-57	None	Christa ATCAA	Truth or Consequences, New Mexico to Albuquerque, New Mexico	
J-65 (MEA 24,000 feet MSL)	Reserve A and B ATCAAs, WSMR ATCAAs	Cato, Christa, and Lobos B ATCAA	San Antonio, Texas to Seattle, Washington	J-65 normally not available within restricted areas Monday - Friday
J-86 (MEA 27,000 feet MSL)	Reserve B ATCAA and WSMR	Kendra ATCAA, Lobos ATCAA	Beatty, Nevada to Leeville, Louisiana	
J-104 (MEA 20,000 feet MSL)	None	Cato, Lobos A, B and C, and Christa ATCAAs	Los Angeles, California to Pueblo, Colorado	
J-108	Cato ATCAA	Cato and Christa ATCAAs	Winslow, Arizona to Wink, Texas	J-108 normally unavailable within restricted areas Monday-Friday (i.e., through WSMR)
J-166 (MEA 24,000 feet MSL)	None	Christa, Kendra and Lobos A, B and C ATCAAs	San Simon, Arizona to Wichita Falls, Texas	J-166 normally not available within restricted areas Monday - Friday (i.e., through WSMR)
J-184	Morenci ATCAA	Lobos A and C ATCAAs	Buckeye, Arizona to Newman, Texas	

Source: FAA 2018a.
Notes:[1] MEAs do not apply to all ATS routes. [2] Route is within the ROI but would be located beneath the ATCAA.
Legend: ATCAA-Air Traffic Control Assigned Airspace; MEA-Minimum En-route Altitude; MOA-Military Operations Area; MSL-mean sea level; ROI-region of influence; WSMR-White Sands Missile Range.

3.2.2.3 Valentine and Bronco MOAs

Valentine MOA is located south of Holloman AFB in Texas and covers approximately 2,432 square nm (see **Figure 2.4-2**). Holloman AFB schedules the use of Valentine MOA. The floor of this MOA is 15,000 feet MSL and extends up to 18,000 feet MSL. The associated ATCAA extends the training airspace to FL450. There has been no Air Force activity in this MOA in recent years.

The Bronco MOA (see **Figure 2.4-2**) is located east of Holloman AFB and covers approximately 5,115 square nm. Cannon AFB schedules use of Bronco MOA. The MOA is divided into four segments (1, 2, 3, and 4) with designated floors of 8,000 to 10,000 feet MSL and a ceiling that extends up to 18,000 feet MSL. With the associated ATCAA, the airspace extends to FL510. There has been no Air Force activity in Bronco 1 and 2 in recent years. Bronco 3 and 4 currently supports Air Force training.

3.3 ACOUSTIC ENVIRONMENT

3.3.1 Resource Definition

Noise is considered unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. Noise may be intermittent or continuous, steady or impulsive. It may also be stationary or transient. Stationary sources are normally related to specific land uses, e.g., housing tracts or industrial plants. Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airports), or randomly. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal). Although aircraft are not the only source of noise in any area, they are readily identifiable to those affected by noise they produce and are routinely singled out for special attention and criticism.

The physical characteristics of noise and/or sound include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air, and are sensed by the eardrum. This may be likened to the ripples in water that would be produced when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase, and the ear senses louder noise. The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). Obviously, as more zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers. Human hearing ranges from 0 dB (barely audible) to 120 dB, where physical discomfort is caused by the sound.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, not all sounds throughout this range are heard equally well. Because the human ear is most sensitive to frequencies in the 1,000 to 4,000 Hz range, sound meters may be calibrated to emphasize frequencies in this range. Sounds measured with these instruments are termed "A-

weighted," and are indicated in terms of A-weighted decibels (dBA). A-weighting simply accounts for the frequency sensitivity of the human ear. The dBA is also appropriate for measuring continuous sounds.

The duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts. As a basis for comparison when noise levels are considered, it is useful to note that at distances of about 3 feet, noise from normal human speech ranges from 63 to 65 dBA, operating kitchen appliances range from about 83 to 88 dBA, and rock bands approach 110 dBA.

3.3.1.1 Noise Metrics

The word "metric" is used to describe a standard of measurement. Many different types of noise metrics have been developed by researchers attempting to represent the effects of environmental noise. Each metric used in environmental noise analysis has a different physical meaning or interpretation.

The metrics supporting the assessment of noise from aircraft operations within this EIS are the Day-Night Average Sound Level (DNL), Onset Rate Adjusted Day-Night Average Sound Level (L_{dnmr}), C-weighted Day-Night Average Sound Level (CDNL), Maximum Sound Level (L_{max}), and Sound Exposure Level (SEL). Each metric is briefly discussed below.

DNL and L_{dnmr}

The DNL is an A-weighted cumulative noise metric that measures noise based on annual average daily aircraft operations. When DNL is averaged over a busy month of operations (vice an average month), and is adjusted for the onset rate of the noise to account for the "surprise factor," the metric is L_{dnmr}. In the case of this analysis, busy months were not used because Holloman AFB is a pilot training base. This assumes that the training tempo would be steady and there would be no scheduled "busy" months. Therefore, in this EIS the calculations of L_{dnmr} and DNL would be the same. Since DNL is the U.S. Government (including FAA, a cooperating agency for this EIS) standard for modeling the cumulative noise exposure and assessing community noise impacts, the subsonic noise exposure is reported in DNL. DNL has two time periods of interest: 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 its nighttime period by adding 10 dB to their single event sound level. Note that "daytime" and "nighttime" in calculation of DNL are sometimes referred to as "acoustic day" and "acoustic night" and always correspond to the times given above. This is often different than the "day" and "night" used commonly in military aviation, which are directly related to the times of sunrise and sunset, and vary throughout the year with the seasonal changes.

CDNL

CDNL is similar to DNL, in that it is based on C-weighted noise, which emphasizes lower frequency sound vibrations. C-weighting better targets the lower frequencies that are "felt," instead of "heard" – usually impulsive noise caused by things like explosions. 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 occur from aircraft flying at supersonic speeds.

L_{max} and SEL

Individual time-varying noise events have two main characteristics—a sound level, which changes throughout the event and a period of time during which the event is heard. L_{max} is the maximum sound level

experienced by a receptor during a 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. The SEL combines both of these characteristics into a single metric. The SEL takes all of the sound energy from a single event and compresses it into 1 second. This is useful for comparing single noise events. 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. So for example, as a jet approaches the observer, the sound gets louder and louder, until the jet passes 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 all of the sound energy into a 1-second timeframe.

3.3.1.2 Relationship Between Noise and Annoyance

Generally, the louder the noise, the more annoyance it causes. **Table 3.3-1** presents the results of over a dozen studies on the relationship between noise and annoyance levels. This relationship was suggested by Schultz (1978) and was re-evaluated for use in describing the reaction of people to environmental noise (Fidell et al. 1988). These data provide a perspective on the level of annoyance that might occur. For example, 12 to 22 percent of people exposed on a long-term basis to 65 to 70 DNL may be expected to be highly annoyed by noise events. The study results summarized in **Table 3.3-1** are based on outdoor noise levels.

Table 3.3-1. Estimated Percentage of Population Highly Annoyed by Outdoor Noise Exposure

DNL Interval (dBA)	Percentage of Persons Highly Annoyed
<65	<12
65-70	12 – 22
70-75	22 – 37
75-80	37 – 54
>85	61

Source: Adapted from National Academy of Sciences 1977.
Note: Noise impacts on individuals vary as do individual reactions to noise. This is a general prediction of the percentage of the community potentially highly annoyed based on environmental noise surveys conducted around the world.
Legend: <-less than; >-greater than; dBA- A-weighted decibels; DNL- Day-Night Average Sound Level.

3.3.1.3 Noise Induced Hearing Loss

Noise induced hearing loss risk has been studied extensively. As per DoD policy memorandum, populations exposed to noise greater than 80 DNL are at the greatest risk of potential hearing loss (Undersecretary of Defense for Acquisition Technology and Logistics 2009). The DoD policy directs that hearing loss risk should be assessed using the methodology described in U.S. Environmental Protection Agency (USEPA) Report No. 550/9-82-105, Guidelines for Noise Impact Analysis (USEPA 1982). USEPA's Guidelines for Noise Impact Analysis quantify hearing loss risk in terms of Noise Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in the threshold level below which a sound cannot be heard. NIPTS is stated in terms of the average threshold shift at several frequencies that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with exposure lasting 8 hours per day for 5 days per week.

The actual value of NIPTS for any given person depends on that individual's physical sensitivity to noise. Over a 40-year working lifetime, some people will experience more loss of hearing than others. The actual

noise exposure for any person living in an area subject to 80 DNL or greater is determined by the length of time that a person is outdoors and directly exposed to the noise. For example, noise exposure within an 80 DNL noise contour near an airfield would be affected by whether a person was at home during the daytime hours when most flying occurs. Many people would be inside their homes and would, therefore, be exposed to lower noise levels due to noise attenuation provided by the house structure. Under the existing airspace or under the airspace proposed by this action, no person or place would be exposed to noise levels greater than 80 DNL. Therefore, noise induced hearing loss is not discussed further in this analysis.

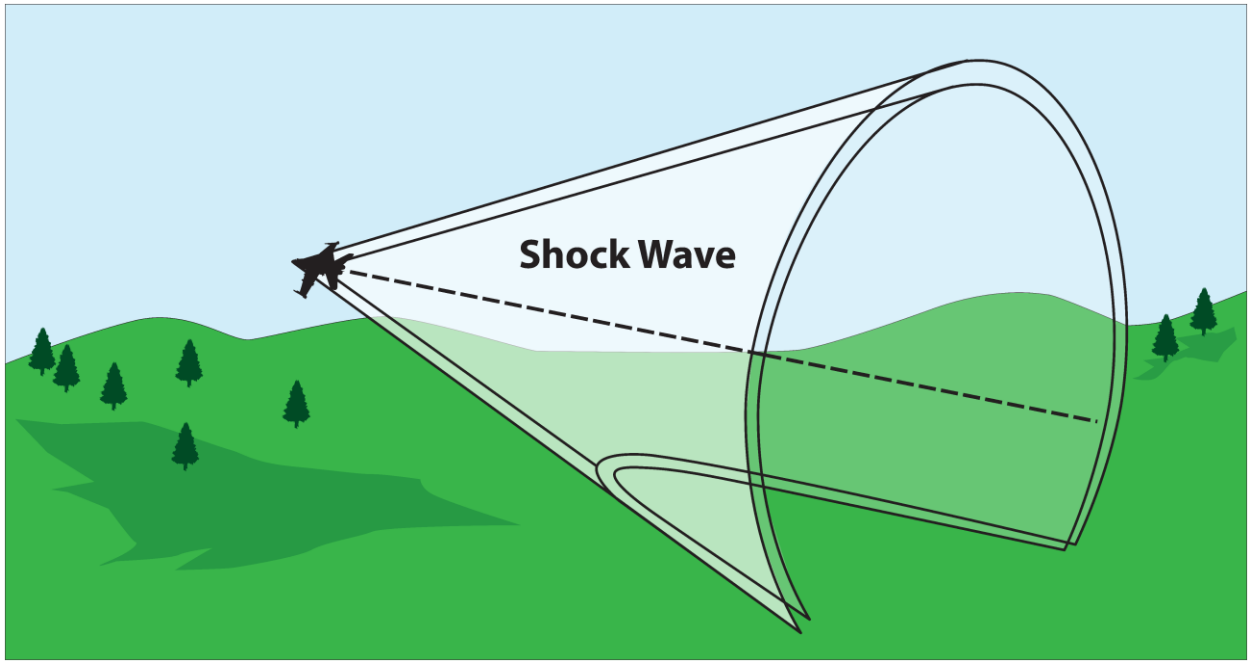
3.3.1.4 Subsonic and Supersonic Noise

For this EIS, two types of aircraft noise are assessed: subsonic noise and supersonic noise. Conventional subsonic noise is noise generated by an aircraft's engines and airframe. This is the most familiar form of aircraft noise.

The second type of noise is generated when an aircraft flies faster than the speed of sound. A sonic boom is the sound associated with shock waves generated when an aircraft travels at supersonic speeds. The shock wave forms a "cone" of pressurized or built-up air molecules which move outward and rearward in all directions from the aircraft (**Figure 3.3-1**). As the "cone" moves outward, upward, and away from the aircraft, it gets wider and its strength is reduced. The altitude at which the shock wave is created determines the distance shock waves travel before reaching the ground and affects the intensity of the boom. The higher the aircraft, the greater the distance the shock wave must travel before reaching receptors on the ground, reducing the intensity of the boom. In general, the width of the cone beneath the aircraft is about 1 mile for each 1,000 feet in altitude. For example, an aircraft traveling supersonic at FL300 can produce a cone with a width of about 30 miles.

The shape and sound of the sonic boom resulting from supersonic flight depends on the aircraft's size, weight, geometry, flight altitude, speed, and type of maneuvering. Aircraft exceeding the speed of sound always create a sonic boom; however, not all supersonic flight activities will cause a boom audible at the ground. As altitude increases, air temperature decreases, and these layers of temperature change can cause booms to be reflected, or turned upward, and in some cases the boom never reaches the ground.

A sonic boom is characterized as an overpressure which is a rapid rise in pressure, followed by a rapid drop-off before the pressure returns to normal atmospheric levels. This change occurs very quickly (i.e., in significantly less than one second). In the vast majority of cases, the overpressures created are well below levels that would cause physical injury or damage to structures. In rare cases, a sonic boom could cause physical damage, as to a window, if the overpressure is of sufficient magnitude. Sonic booms may also cause startle effects in humans and animals.



Note: Figure not to scale, for illustration purposes only.

Figure 3.3-1. Sonic Boom Shock Wave

3.3.2 Affected Environment

Federal, state, and local governments regulate noise to prevent noise sources from affecting noise sensitive areas, such as residences, hospitals, and schools, and to protect human health and welfare. Federal agencies, such as the Department of Housing and Urban Development, have established health-based maximum noise exposure recommendations. Local agencies, including cities and counties, are responsible for defining and enforcing land use compatibility in various noise environments.

Noise analysis requires data defining aircraft activity in terms of time in the MOA and ATCAA airspace, as well as the speed, altitude, power setting, and position information. Additionally, jet aircraft activity within MTRs that overlap the existing or proposed MOAs were also modeled as part of the existing conditions. MTRs are low-level flying routes used by military aircraft to access training areas (see **Section 3.2.2**, *Airspace Management and Operations,* for additional information on MTRs). The MTRs that transit the existing and proposed airspace discussed in this EIS have a minimum altitude of 100 feet AGL.

The noise analysis was performed using the input data on both subsonic and supersonic operations and accepted noise modeling programs, MR_NMAP and BOOMAP 96 sonic boom model (Plotkin 1996; Frampton et al. 1993), were used to define noise levels for both baseline and proposed conditions. MR_NMAP assumes an even distribution of noise across the entire airspace modeled. Therefore, contour results are not presented for subsonic aircraft noise.

Twenty-eight points of interest (POIs) were chosen beneath or near the existing and proposed airspace (**Figure 3.3-2 and Figure 3.3-3)**. These POIs include municipalities and towns (to include all locations where a public hearing will be held) beneath the airspace as well as a few representative areas outside of the airspace. Major outdoor recreation areas (National Forests, National Parks, National Wildlife Refuges, Wilderness Areas, and state parks) beneath or near the airspace were also selected as POIs. The baseline

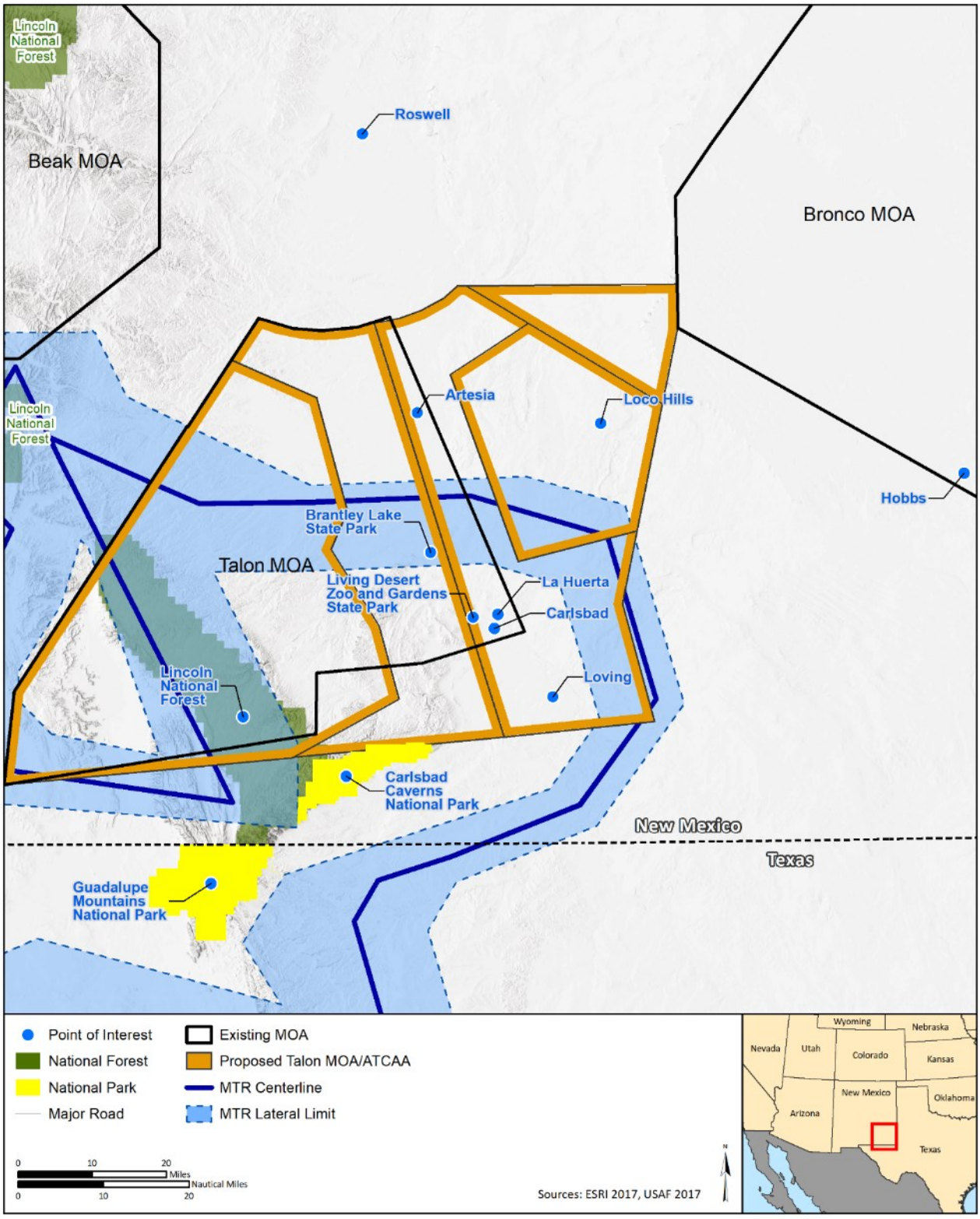
noise attributed to jet aircraft activity at these POIs was calculated using MR_NMAP. The subsonic and supersonic noise conditions at the POIs is provided in the following sections.

3.3.2.1 Subsonic Noise

As discussed in **Section 3.3.1.1** (Noise Metrics), the cumulative metric DNL represents the most widely accepted method of quantifying the noise impact. However, it does not provide an intuitive description of the noise environment. People often want to know what the loudness of an individual aircraft will be.

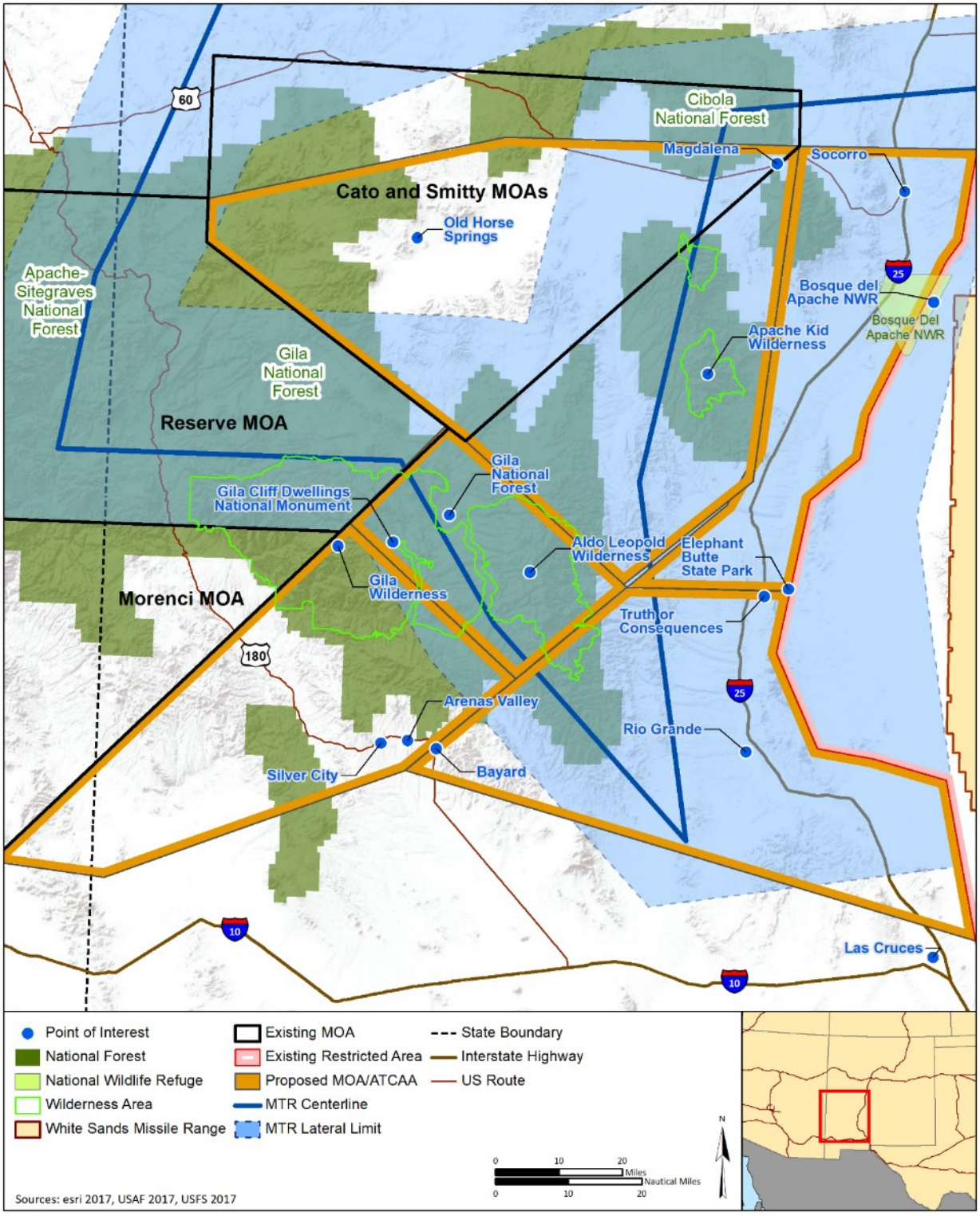
The analysis in this EIS also uses MR_NMAP to provide the L_{max} and SEL for individual aircraft overflights at various distances to provide a better perspective of what an observer may experience during an overflight. These results will be presented in **Section 4.3** (Acoustic Environment).

Under existing conditions, the Talon MOA is currently utilized for training by Holloman AFB. There are also MTRs within the existing and proposed Talon MOA that contribute to the baseline noise. Currently, Talon High East and Talon High West MOAs have maximum DNL values of 41 and 47 DNL, respectively. Talon Low MOA has the highest value of 54 DNL. The Cato and Smitty MOAs are existing airspace, though they are almost never used by Holloman AFB and have had little use in recent years so the noise contribution from military aircraft activity is zero. However, there is an MTR that overlaps the Cato and Smitty MOAs and the area proposed for the Lobos MOA. The aircraft activity along this MTR is included in the baseline noise calculation. **Table 3.3-2** shows the calculated noise levels from jet aircraft activity for the various POIs in and around the affected airspace. Under existing conditions, most values are less than 35 DNL or are below the model's ability to predict due to low noise levels from aircraft. The highest value, 53 DNL, occurs at Lincoln National Forest. To aid in understanding noise levels, **Table 3.3-3** shows values of common sounds in dBA. Note however, that the values in **Table 3.3-3** are single event values not cumulative noise levels like the DNL values presented in **Table 3.3-2** that represent a year's worth of aircraft generated noise.



Legend: ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area; MTR-Military Training Route.

Figure 3.3-2. Points of Interest East



Legend: MOA-Military Operations Area; NWR-National Wildlife Refuge.

Figure 3.3-3. Points of Interest West

Table 3.3-2. Baseline Noise Attributable to Military Aircraft Modeled for POIs beneath or near Proposed Airspace	
Name	**DNL (dBA)**
Eastern POIs	
Carlsbad, New Mexico	40
Artesia, New Mexico	40
Loving, New Mexico	<35
Loco Hills, New Mexico	<35
La Huerta, New Mexico	40
Hobbs, New Mexico	<35
Roswell, New Mexico	<35
Carlsbad Caverns National Park	<35
Guadalupe Mountains National Park	<35
Lincoln National Forest	53
Living Desert Zoo and Gardens State Park	41
Brantley Lake State Park	41
Western POIs	
Gila Cliff Dwellings National Monument	<35
Socorro, New Mexico	<35
Truth or Consequences, New Mexico	<35
Las Cruces, New Mexico	<35
Magdalena, New Mexico	<35
Bayard, New Mexico	<35
Old Horse Springs, New Mexico	<35
Arenas Valley, New Mexico	<35
Silver City, New Mexico	<35
Gila Wilderness	<35
Elephant Butte State Park	<35
Gila National Forest	49
Aldo Leopold Wilderness	<35
Apache Kid Wilderness	45
Bosque del Apache National Wildlife Refuge	<35
Rio Grande	<35

Legend: <-less than; dBA-A-weighted decibel; DNL-Day-Night Average Sound Level; POI-Point of Interest.

Table 3.3-3 Noise Levels of Common Activities			
Activity	**Noise Level (dBA)**	**Activity**	**Noise Level (dBA)**
Normal Breathing	10	Rainfall	50
Ticking Watch	20	Normal Conversation	60
Soft Whisper	30	City Traffic (inside car)	80-85
Quiet Residential Area	40	Thunder	120

Sources: Center for Hearing and Communication 2019, Centers for Disease Control and Prevention 2019.

Many of the areas that underlie the existing and proposed airspace that Holloman AFB would use are undeveloped wilderness or are rural areas. Because of the remote nature of these areas and their large size, ambient noise levels are difficult to predict, and in many cases ambient noise level data are not available. The NPS performed an ambient noise measurement study at Petroglyph National Monument, New Mexico, Pecos National Historical Park, New Mexico, Rio Grande Wild and Scenic River, Texas, and Montezuma's Castle National Monument, Arizona (NPS 2013a, 2013b, 2013c, 2013d). These places represent somewhat

similar environmental conditions as the rural and Wilderness Areas under the existing and proposed airspace and could be used to generally characterize the potential ambient acoustic environment. The ambient sound level data presented in these reports ranged from 32 dBA to 53 dBA during the daytime hours (7:00 am to 7:00 pm) and from 34 dBA to 49 dBA during nighttime hours (7:00 pm to 7:00 am). It is important to note that these values are reported in L_{Aeq}, which is the A-weighted equivalent continuous sound level over the given period of time. At these locations, the L_{Aeq} was calculated from approximately 30 days of ambient sound recordings (NPS 2013a, 2013b, 2013c, 2013d). While these values represent an average sound level (including both times of quiet and times of louder sounds) they are not directly comparable to the U.S. Government standard of DNL. However, the range of values does allow some inference into the ambient conditions with regard to noise levels in the rural and undeveloped areas in the ROI for which no ambient noise data is available. While there may be no data in areas directly beneath the existing and proposed airspace within the ROI, the values listed above are taken from areas that are similar in makeup. Therefore, these values of relative quiet may be used as representative noise levels for the areas in the ROI.

3.3.2.2 Supersonic Noise

Supersonic aircraft flight is primarily associated with air combat training. In this Proposed Action, supersonic flight would occur in airspace above FL300. Currently, aircraft from Holloman AFB use the Talon ATCAA for supersonic training activities.

Noise calculations for the current supersonic operations within the Talon ATCAA show values of less than 35 CDNL. Under existing conditions, there are no supersonic operations within the existing Cato ATCAA.

3.4 AIR QUALITY

3.4.1 Resource Definition

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern with respect to the health and welfare of the public. The major pollutants of concern, called "criteria pollutants," are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), total suspended particulate matter less than or equal to 10 (PM_{10}) and 2.5 ($PM_{2.5}$) micrometers in aerodynamic diameter, and lead (Pb). The USEPA has established National Ambient Air Quality Standards (NAAQS) for these pollutants as shown in **Table 3.4-1**.

Table 3.4-1. National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
CO	primary	8 hours	9 parts per million	Not to be exceeded more than once per year
		1 hour	35 parts per million	
Pb	primary and secondary	Rolling 3 month period	0.15 micrograms per cubic meter (1)	Not to be exceeded
NO_2	primary	1 hour	100 parts per billion	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years

Table 3.4-1. National Ambient Air Quality Standards (cont.)					
Pollutant		**Primary/ Secondary**	**Averaging Time**	**Level**	**Form**
		primary and secondary	1 year	53 parts per billion (2)	Annual mean
O_3		primary and secondary	8 hours	0.070 parts per million (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle pollution	$PM_{2.5}$	primary	1 year	12.0 micrograms per cubic meter	Annual mean, averaged over 3 years
		secondary	1 year	15.0 micrograms per cubic meter	Annual mean, averaged over 3 years
		primary and secondary	24 hours	35 micrograms per cubic meter	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 micrograms per cubic meter	Not to be exceeded more than once per year on average over 3 years
SO_2		primary	1 hour	75 parts per billion (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 parts per million	Not to be exceeded more than once per year

Source: USEPA 2016, current as of December 20, 2016.

Note: (1) In areas designated nonattainment for the lead standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 micrograms per cubic meter as a calendar quarter average) also remain in effect.

(2)The level of the annual nitrogen dioxide standard is 0.053 parts per million. It is shown here in terms of parts per billion for the purposes of clearer comparison to the 1-hour standard level.

(3)Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) ozone standards additionally remain in effect in some areas. Revocation of the previous (2008) ozone standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4)The previous sulfur dioxide standards (0.14 parts per million 24-hour and 0.03 parts per million annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous sulfur dioxide standards or is not meeting the requirements of a State Implementation Plan call under the previous sulfur dioxide standards (40 Code of Federal Regulations 50.4(3)). A State Implementation Plan call is a USEPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require National Ambient Air Quality Standards.

Legend: CO-carbon monoxide; NO_2-nitrogen dioxide; O_3-ozone; Pb-lead; PM $_{2.5}$-particulate matter less than or equal to 2.5 microns; PM_{10}-particulate matter less than or equal to 10 microns; SO_2 – sulfur dioxide.

Ambient air quality refers to the atmospheric concentration of a specific compound pollutant that occurs at a particular geographic location. Ambient air quality concentrations are generally reported as a mass per unit volume (e.g., micrograms per cubic meter of air) or as a volume fraction of the air (e.g., parts per million by volume). The ambient air quality concentrations at a particular location are determined by the interactions of emissions, meteorology, and chemistry. Emission considerations include the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological considerations include wind and precipitation patterns affecting the distribution, dilution, and removal of pollutant emissions. Chemical reactions can transform pollutant emissions into other chemical substances.

Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly emitting the pollutant in the ambient air (primary pollutants) or by direct emissions interacting in the atmosphere to form criteria pollutants (secondary pollutants). Secondary pollutants, such as O_3, NO_2, and some particulates form through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. PM_{10} and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, PM_{10} and $PM_{2.5}$ can form as secondary pollutants through chemical reactions or by gaseous pollutants condensing into fine aerosols. In general, for secondary pollutants, the emissions of the compounds that are considered "precursors" to secondary pollutants in the atmosphere are the pollutants for which emissions can be evaluated to control their level in the ambient air. These include reactive organic gases and nitrogen oxides (NO_x), which are precursors to O_3.

3.4.1.1 Hazardous Air Pollutants

In addition to the NAAQS for criteria pollutants, national standards exist for hazardous air pollutants (HAPs), which are regulated under Section 112(b) of the 1990 CAA Amendments.

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 (CO_2) and water. 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 will not be addressed further in this EIS.

3.4.1.2 General Conformity Rule

The USEPA designates an area as in attainment when it complies with the NAAQS. Areas that violate these ambient air quality standards are designated as nonattainment areas. Areas that have improved air quality from nonattainment to attainment are designated as attainment/maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are treated as attainment areas for regulatory purposes. When an area is designated in nonattainment and/or in maintenance, the CAA Section 176(c), General Conformity Rule, is applied. The intent of this rule is to ensure that Federal actions do not adversely affect the timely attainment of air quality standards in areas of nonattainment or maintenance.

3.4.1.3 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. Both natural processes and human activities generate these emissions. Each GHG is assigned a global warming potential, which is the ability to trap heat, and is standardized to CO_2, which has a global warming potential value of one. A GHG is multiplied by its global warming potential to calculate the total equivalent emissions of carbon dioxide (CO_2e). The accumulation of GHGs in the atmosphere regulates the earth's temperature. Observations show that warming of the climate is unequivocal. The global warming observed over the past 50 years is due primarily to human-induced emissions of heat-trapping gases. These emissions come mainly from the burning of fossil fuels (coal, oil, and gas), with contributions from forest clearing, agricultural practices, and other activities. To minimize GHG impacts, Federal agencies and installations are required to comply with Federal climate change policies.

3.4.2 Affected Environment

Potential effects to air quality must consider a vertical dimension because the emissions occur in a volume of air. The vertical dimension depends upon climatic conditions, and is defined from ground level to a certain "mixing height". The mixing height is generally defined as between ground level and 3,000 feet AGL and is based on historic climatic data (USEPA 1972), though more specific mixing height data are available for specific locations. The default mixing height of 3,000 feet AGL was used for this analysis. Criteria pollutant emissions generated above the mixing height are thus excluded from further analysis.

The affected environment for criteria pollutant emissions includes the area underlying the proposed low MOA components of Talon, Smitty, and Lobos MOAs since aircraft activities within these areas would occur below the 3,000 feet AGL mixing height. The affected environment for GHGs is the global atmosphere. **Table 3.4-2** shows the specific counties that underlie these areas and their current attainment status under the NAAQS. The areas where MOAs are located in New Mexico are in attainment for all criteria pollutants, though a small portion of Grant County is designated as a maintenance area for SO_2 (USEPA 2003). The area of Grant County that is a designated maintenance area includes land within a 3.5-mile radius of the now defunct Hurley Smelter in Hurley, New Mexico and surrounding land that is within an 8-mile radius and above 6,470 feet MSL. The small portion of the proposed Lobos MOA that would include Greenlee County in Arizona is also a maintenance area for SO_2 (USEPA 2004) due to the Phelps Dodge Morenci copper smelter, which ceased operation in 1984. Both of these maintenance area designations are due to emissions from copper smelting operations that are no longer operational. **Table 3.4-3** provides the annual emissions inventories for the counties that overlap the proposed low MOAs.

Table 3.4-2. Attainment Status for the Proposed Low MOAs for Criteria Pollutants

MOA	County	Status
Talon Low A and B	Chaves, Otero, Eddy – New Mexico	Attainment or Unclassified for all pollutants
Smitty	Sierra, Catron, Socorro – New Mexico	Attainment or Unclassified for all pollutants
Lobos Low	Grant, Hidalgo, Sierra, Catron – New Mexico Graham, Greenlee - Arizona	Attainment or Unclassified for all pollutants in Hidalgo, Sierra, Catron, New Mexico and Graham, Arizona Grant County, New Mexico and Greenlee County, Arizona are maintenance areas for SO_2

Legend: MOA-Military Operations Area; SO_2 – sulfur dioxide.

Table 3.4-3. 2014 Annual Emissions Inventory for Counties Underlying the Proposed Low MOAs

	Total Annual Emissions in Tons						
Location	**VOCs**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**	**CO_2e**
Talon Low A/ Low B MOAs							
Chaves County, New Mexico	75,290	27,411	4,709	72	15,833	2,134	476,433
Eddy County, New Mexico	122,786	34,407	10,767	1,798	16,350	2,696	523,939
Otero County, New Mexico	89,348	31,892	3,606	43	17,260	2,314	536,383

Table 3.4-3. 2014 Annual Emissions Inventory for Counties Underlying the Proposed MOAs (cont.)

Location	Total Annual Emissions in Tons						
	VOCs	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Smitty Low MOA							
Sierra County, New Mexico	60,137	17,207	1,706	10	3,835	537	199,655
Catron County, New Mexico	82,059	31,537	1,615	127	5,153	1,895	260,677
Socorro County, New Mexico	69,934	21,092	3,646	21	8,016	1,130	342,346
***Lobos Low MOA**							
Grant County, New Mexico	61,811	23,866	2,574	70	13,585	2,116	421,072
Hidalgo County, New Mexico	53,970	14,304	2,667	8	4,183	577	208,053
Graham County, Arizona	96,030	78,747	2,671	535	13,346	6,155	†1,165,748
Greenlee County, Arizona	39,305	33,919	1,075	219	23,102	4,319	252,678

Source: USEPA 2018.

Note: * Lobos Low MOA would also include Sierra and Catron Counties in New Mexico.

† GHG emissions (CO_2e) in Graham County were heavily influenced by wildfires in 2014.

Legend: CO-carbon monoxide; CO_2e-carbon dioxide equivalent; GHG-Greenhouse Gas; MOA-Military Operations Area; NO_x-nitrogen oxides; PM_{10}-paticulate matter less than or equal to 10 micrometers; $PM_{2.5}$- particulate matter less than or equal to 2.5 micrometers; SO_2-sulfur dioxide; VOC-Volatile Organic Compound.

The proposed Talon Low A MOA is located in proximity to two National Parks, Carlsbad Caverns National Park and Guadalupe Mountains National Park. The southeast corner of this MOA would lie within 4 to 11 miles from the northern perimeter of Carlsbad Caverns National Park and approximately 13 miles from the northern perimeter of Guadalupe Mountains National Park. The proposed Smitty Low and Lobos Low MOAs would be located above or near the Galiuro Wilderness in Graham County Arizona; Gila Wilderness in Catron and Grant Counties in New Mexico; and Bosque del Apache Wilderness in Socorro County. The National Parks and Wilderness Areas are categorized as Class I Areas identified in the Clean Air Act as protected from impairment of visibility resulting from manmade air pollution.

3.5 NATURAL RESOURCES

3.5.1 Resource Definition

For this analysis, natural resources are defined as wildlife and special-status species, those protected under Federal and state law, and the habitats within which they occur. Vegetation would not be affected by the Proposed Action, which involves only changes to airspace and no on-ground activities; therefore, vegetation will be discussed only in the context of the wildlife habitat.

Wildlife includes all animal species (invertebrates, fish, amphibians, reptiles, birds, and mammals) with the exception of those identified as special-status species. Due to the nature of the Proposed Action, and the fact that no ground disturbance would occur under the airspace, no effects to reptiles, small mammals (except bats), amphibians, fish, and invertebrates, or their associated habitats are anticipated. Most invertebrates hear poorly in the frequency range of aircraft noise. Little is known about the effects of noise on reptiles and amphibians because response is difficult to study since their heartrates are naturally variable and they do not demonstrate a startle response (Bowles et al. 1995). Snakes, turtles and tortoises hear poorly while amphibians are sensitive to vibration and hearing capacities vary more widely (Bowles 1995). Few field studies on small mammals have been conducted but those that have suggest no population level effects from airport noise (Bowles et al 1995). Large mammals, bats, and birds are potentially affected by noise; therefore, the wildlife section will focus on those species.

Special-Status species include animal species: (1) listed as endangered, threatened, or proposed for listing by the USFWS under the ESA and their designated critical habitats; (2) protected by the Federal MBTA; (3) protected under the BGEPA; or (4) listed under state ESAs or similar conservation laws.

Under the ESA, it is the responsibility of the action proponent to determine whether a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat. If the action proponent determines it may affect a listed species, they must consult with the USFWS. If the action proponent determines their proposed action would have "no effect" on listed species or their habitat, they do not need to consult further with USFWS. Species proposed for listing under ESA (candidate species) are not protected under law. However, these species could become federally-listed in the near-term; and therefore, they are considered in this analysis in order to avoid future conflicts if they were to be listed during the preparation of this EIS. Under Section 10(j) of the ESA, the USFWS can designate reintroduced populations established outside of the species' current range, but within its historical range, as "experimental". The experimental population can be designated as "essential" or "non-essential" to the continued existence of the species. The regulatory restrictions are considerably reduced for a species with a Non-essential Experimental Population designation. Critical habitat is designated by USFWS through a formal process to provide protection for those habitat areas believed to be essential to the species' conservation.

The MBTA prohibits the intentional take of migratory birds, nests, and eggs, except as permitted by the USFWS Migratory Bird Office. Assessment of a project's effect on migratory birds places an emphasis on "species of concern" as defined by EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*.

The bald eagle (*Haliaeetus leucocephalus)* was removed from the list of Federal threatened and endangered species on August 9, 2007. Both the bald eagle and golden eagle (*Aquila chrysaetos)* are protected under the MBTA and the BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, making it unlawful to disturb eagles.

In addition to federally-protected species, the states of Arizona and New Mexico maintain lists of species that are considered important for conservation. Federal agencies are not required to consult with state agencies on potential impacts to these protected species; however, this analysis considers the potential impacts to these species. The New Mexico Department of Game and Fish (NMDGF) is directed under the New Mexico Wildlife Conservation Act to develop recovery plans for species listed as threatened or endangered. The listed species are maintained in a database called the Biota Information System of New Mexico. The Arizona Game and Fish Department (AZGFD) has developed a State Wildlife Action Plan that defines a wildlife conservation strategy for the state and identifies Arizona's Species of Greatest Conservation Need (SGCN) (AZGFD 2012). The AZGFD maintains an online tool to provide SGCN species and habitat information for the state called HabiMap Arizona.

3.5.2 Affected Environment

The affected environment for natural resources includes the wildlife and special-status species that occur or potentially occur beneath the proposed airspace. The natural resources analysis focuses on the land beneath the proposed MOAs since the proposed Christa and Kendra ATCAAs would only be used as temporary bridges to connect the proposed MOAs to WSMR for transport purposes and the ATCAAs would be established at an altitude which would have limited noise or no change from existing noise already experienced from commercial aircraft activity at ground level (see **Sections 3.3 and 4.3**, *Acoustic*

Environment); therefore, the land beneath the Christa and Kendra ATCAAs was not addressed for natural resources.

3.5.2.1 Talon MOA

Wildlife

Ecoregions associated with the land beneath the proposed Talon MOA are provided in **Table 3.5-1**. As shown, most of the land beneath the MOA consists of Chihuahuan Basins and Playas. Outside the major river drainages, such as the Pecos River, the landscape is largely internally drained. Vegetative cover is predominantly desert grassland and arid shrubland, except for high elevation islands of woodland.

Table 3.5-1. Ecoregions beneath Proposed Talon MOA

Ecoregion Name	Acres	Percentage of MOA
Chihuahuan Desert Slopes	188,110	6.83
Madrean Lower Montane Woodlands	164,698	5.98
Chihuahuan Basins and Playas	2,124,312	77.14
Shinnery Sands	146,203	5.31
Arid Llano Estacado	22,229	0.81
Southern New Mexico Dissected Plains	108,374	3.94

Legend: MOA-Military Operations Area.

Common mammals found in these communities include pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), kangaroo rats (*Dipodomys* spp.), woodrats (*Neotoma* spp.), desert pocket gopher (*Geomys arenarius*), coyote (*Canis latrans*), and bobcat (*Lynx rufus*). Common birds include the black-throated sparrow (*Amphispiza bilineata*), greater roadrunner (*Geococcyx californianus*), curve-billed thrasher (*Toxostoma curvirostre*), Chihuahuan raven (*Corvus cryptoleucus*), scaled quail (*Callipepla squamata*), Gambel's quail (*Callipepla gambelii*), western burrowing owl (*Athene cunicularia hypugaea*), golden eagle (*Aquila chrysaetos*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), and ferruginous hawk (*Buteo regalis*) (Bailey 1995; Brown 1994).

The Brazilian free-tailed bat is a wildlife species of particular interest because it roosts in great numbers at Carlsbad Caverns National Park, just south of the existing and proposed Talon MOA. These bats are migratory, using the cave from March through October where their coordinated nightly flights attract tourists to the park. Summer foraging ranges are large, averaging 41 kilometers in diameter (Best and Geluso 2003). The species can forage up to 3,000 meters (m) above ground (approximately 9,800 feet), though most foraging occurs between 200 and 1,000 m (656 to 3,280 feet) (McCracken 1996). Annual population estimates vary widely, likely due in part to differences in estimation methodologies, however recent study suggests that there is a large daily variation within a single season. Using thermal infrared imaging and computer vision analysis, Hristov et al. (2010) observed bat flights that ranged from less than 70,000 to more than 793,000 individuals in a single season, with fluctuations of up to 291,000 individuals over a few days. The authors suggest such fluctuations represent natural responses of the colony to factors such as seasonal food availability and local and large-scale weather patterns. They conclude that the size of a count on any given night does not necessarily reflect a population estimate, and the pattern of decline widely reported may not be as severe as thought.

William S. Huey Wildlife Area is a designated area of 2,880 acres on both sides of the Pecos River between Artesia and Carlsbad. The area was purchased by NMDGF to mitigate habitat loss by the Brantley Dam

and contains flat farm land, grazing land, and a river bosque. Common wildlife in the area includes deer and turkey, various songbirds, quail, and waterfowl year round (NMDGF 2018a).

Special-Status Species

ESA-listed Species

There are 24 federally threatened, endangered, proposed, or candidate species with the potential to occur beneath the proposed Talon MOA (USFWS 2018a). Because the Proposed Action would not involve any ground disturbance, no effect to the 18 federally-listed mammals, fish, invertebrate, or plant species in **Table 3.5-2** would result from the Proposed Action; therefore, these species will not be discussed further.

Table 3.5-2. Federally-Listed Species for Which a No Effect Determination is Made

Common Name	Scientific Name	Status
Mammals		
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	E
Penasco least chipmunk	*Tamias minimus atristriatus*	C
Fish		
Pecos bluntnose shiner	*Notropis simus pecosensis*	T
Pecos gambusia	*Gambusia nobilis*	E
Invertebrates		
Texas hornshell	*Popenaias popeii*	PE
Koster's springsnail	*Juturnia kosteri*	E
Pecos assiminea snail	*Assiminea pecos*	E
Roswell springsnail	*Pyrgulopsis roswellensis*	E
Noel's amphipod	*Gammarus desperatus*	E
Plants		
Gypsum wild-buckwheat	*Eriogonum gypsophilum*	T
Kuenzler hedgehog cactus	*Echinocereus fendleri var. kuenzleri*	E
Lee pincushion cactus	*Coryphantha sneedii var. leei*	T
Pecos sunflower	*Helianthus paradoxus*	T
Sacramento mountains thistle	*Cirsium cinaceum*	T
Sacramento prickly poppy	*Argemone pleiacantha spp. pinnatisecta*	E
Sneed's pincushion cactus	*Coryphantha sneedii var. sneedii*	E
Todsen's pennyroyal	*Hedeoma todsenii*	E
Wright's marsh thistle	*Cirsium wrightii*	C

Legend: C-candidate; E-endangered; PE-proposed endangered; T-threatened.

There are six federally-listed bird species that could potentially be impacted by the noise associated with proposed aircraft operations within the proposed Talon MOA. No critical habitat for these species has been designated beneath the Talon MOA. **Table 3.5-3** contains a list of those species, their Federal listing status, and their potential to occur beneath the airspace. A description of each species, to include habitat and range, follows the table.

Table 3.5-3. Federally-Listed Species With Potential to Occur Beneath Proposed Talon MOA

Common Name	Scientific Name	Status	Counties Beneath Airspace Where Species May Occur
Birds			
Interior least tern	*Sterna antillarum*	E	Chaves, Eddy, Otero
Mexican Spotted Owl	*Strix occidentalis lucida*	T	Eddy, Otero
Northern aplomado falcon	*Falco femoralis septentrionalis*	EXPN, XN	Chaves, Eddy, Otero, Lea
Piping plover	*Charadrius melodus*	T	Chaves, Eddy
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	Eddy
Yellow-billed cuckoo	*Coccyzus americanus*	T	Chaves, Eddy, Otero

Source: USFWS 2019a, 2019b, 2019c, 2019d, 2019e, 2019f
Legend: E-endangered; EXPN, XN -Experimental Population, Non-Essential; MOA-Military Operations Area; T-threatened.

Interior Least Tern. The Interior Least Tern was listed as endangered in 1985. No critical habitat has been designated for this species. It is the smallest tern in North America and nests on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops. The Interior Least Tern breeds from April through August in isolated areas along the Missouri, Mississippi, Ohio, Red, and Rio Grande river systems and winters along coastal areas of Central and South America and the Caribbean Islands. The least tern is primarily endangered due to habitat loss and degradation as well as disturbance from recreation activities within their nesting habitat (USFWS 2014a). There have been occurrences within counties that underlie the proposed Talon MOA (USFWS 2019a). The terns' only known breeding population is in Chaves County along the Pecos River. It breeds at Bitter Lake National Wildlife Refuge near Roswell (outside the boundaries of the proposed Talon MOA). Occurrences in other areas have been rare (NMDGF 2017a).

Mexican Spotted Owl. The Mexican Spotted Owl was listed as threatened in 1993. Critical habitat for the Mexican Spotted Owl was designated in 2004, comprising approximately 3.5 million hectares on Federal lands in Arizona, Colorado, New Mexico, and Utah. No critical habitat is located under the existing or proposed Talon MOA. The Mexican Spotted Owl occurs in forested mountains and canyonlands throughout the southwestern U.S. and Mexico, ranging from Utah, Colorado, Arizona, New Mexico, western portions of Texas south into Mexico. The Mexican Spotted Owl was primarily listed due to alteration of habitat from timber management practices. Primary threats currently are from increased risk of stand-replacing wildland fire (USFWS 2012a). The Mexican Spotted Owl has been recorded year round in Eddy County in the southern portion of the Lincoln National Forest outside of the southern boundary of the proposed Talon MOA and may be present in Eddy and Otero Counties (USFWS 2019b).

Northern Aplomado Falcon. The northern aplomado falcons that occur in Arizona and New Mexico were designated as an experimental, non-essential population in 2006. It is one of three subspecies of the aplomado falcon and the only subspecies recorded in the U.S. No critical habitat has been designated for this species. The falcon occurs throughout the coastal prairie habitat along the southern Gulf coast of Texas, and in savanna and grassland habitat along both sides of the Texas-Mexico border, southern New Mexico, southeastern Arizona, and Mexico. The causes of decline for this subspecies include widespread shrub encroachment due to fire suppression and overgrazing and agricultural development in grassland habitats. Significant use of pesticides (such as DDT) may also have contributed to the decline of the species in the past (USFWS 2006). The historical range and the experimental population of the northern aplomado falcon

has limited occurrences in counties that underlie the Talon MOA (Eddy, Lea, and Otero Counties) (NMDGF 2017b, USFWS 2019c).

Piping Plover. The Northern Great Plains and Atlantic Coast populations of piping plover were listed as federally threatened in 1986. No critical habitat has been designated for this species. Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Their nesting habitat often includes small creeks or wetlands. Piping plovers breed in the northern U.S. and Canada, including the shorelines of the Great Lakes, shores of rivers and lakes in the Northern Great Plains, and along the Atlantic Coast. In the fall they migrate south to the Gulf Coast and other southern locations. The piping plover is threatened due to habitat loss and degradation, as well as nest disturbance and predation (USFWS 2016). The piping plover has only been known as a rare migrant in New Mexico. There is a single unsubstantiated report from Lake Avalon in Eddy County beneath the Talon MOA; and, it may also occur in Chaves County (NMDGF 2017c, USFWS 2019d).

Southwestern Willow Flycatcher. The southwestern willow flycatcher was listed as federally endangered in 1995. The southwestern willow flycatcher is known to breed in riparian areas in southern California, southern Nevada, southern Utah, southern Colorado, Arizona, New Mexico, western Texas, and extreme northwestern Mexico. Critical habitat for this species occurs along designated rivers throughout its range; but, none is located under the proposed Talon MOA airspace. They nest within the southwestern U.S. from May to September. The southwestern willow flycatcher breeds in areas near sea level to over 8,500 feet in riparian vegetation alongside rivers, streams, or other wetlands (USFWS 2013). The southwestern willow flycatcher populations have declined primarily due to extensive loss and degradation of breeding habitat from water diversion, groundwater pumping, changes in flood and fire regimes, clearing and controlling of vegetation, livestock grazing, and invasive non-native plants. In addition, brood parasitism by the brown-headed cowbird (*Molothrus ater*) has led to further decline in populations (USFWS 2002). The southwestern willow flycatcher may occur in Eddy County (NMDGF 2018b, USFWS 2019e).

Yellow-Billed Cuckoo. The western distinct population segment of the yellow-billed cuckoo was listed as federally threatened in 2014. The yellow-billed cuckoo breeds in riparian habitat along low-gradient rivers and streams and in open riverine valleys with wide floodplain conditions. The yellow-billed cuckoo requires large tracts of willow-cottonwood or mesquite forest or woodland for their nesting habitat. This species is found throughout the Western U.S. including Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, and Wyoming. Proposed critical habitat for this species is found throughout its range with some critical habitat units located beneath the proposed Lobos MOA (USFWS 2014b). In the west, the decline of the yellow-billed cuckoo has been attributed primarily to conversion of riparian habitat to farmland and housing (USFWS 2014b). The yellow-billed cuckoo may occur in Chaves, Eddy, and Otero Counties (NMDGF 2018c, USFWS 2019f).

MBTA and BGEPA

There are 24 migratory bird species (to include the bald eagle and golden eagle) that have the potential to be located beneath the Talon MOA area (USFWS 2018a). **Table 3.5-4** provides the species names and their breeding season within the Talon MOA area.

Table 3.5-4. MBTA and BGEPA Species With Potential to Occur Beneath Proposed Talon MOA		
Common Name	**Scientific Name**	**Breeding Season**
Baird's Sparrow	*Ammodramus bairdii*	Breeds elsewhere
Bald eagle	*Haliaeetus leucocephalus*	October 15 to July 31
Black-throated sparrow	*Spizella atrogularis*	March 15 to September 5
Black-chinned sparrow	*Spizella atrogularis*	April 15 to July 31
Burrowing owl	*Athene cunicularia*	March 15 to August 31
Cassin's sparrow	*Aimophila cassinii*	August 1 to October 10
Chestnut-collared longspur	*Calcarius ornatus*	May 1 to August 10
Elf owl	*Micrathene whitneyi*	May 1 to July 15
Golden eagle	*Aquila chrysaetos*	January 1 to August 31
Grace's warbler	*Dendroica graciae*	May 20 to July 20
Gray vireo	*Vireo vicinior*	May 10 to August 20
Hudsonian godwit	*Limosa haemastica*	Breeds elsewhere
Lark bunting	*Calamospiza melanocorys*	May 10 to August 15
Lesser yellowlegs	*Tringa flavipes*	Breeds elsewhere
Long-billed curlew	*Numenius americanus*	April 1 to July 31
Mccown's longspur	*Calcarius mccownii*	May 1 to August 15
Mexican Whip-poor-will	*Antrostomus arizonae*	May 1 to August 20
Semipalmated sandpiper	*Calidris pusilla*	Breeds elsewhere
Sprague's pipit	*Anthus spragueii*	Breeds elsewhere
Varied bunting	*Passerina versicolor*	April 25 to September 30
Virginia's warbler	*Vermivora viriniae*	May 1 to July 31
Whimbrel	*Numenius phaeopus*	Breeds elsewhere
Willet	*Tringa semipalmata*	April 20 to August 5
Willow flycatcher	*Empidonax traillii*	May 20 to August 31

Legend: BGEPA-Bald and Golden Eagle Protection Act; MBTA-Migratory Bird Treaty Act; MOA-Military Operations Area.

State-listed species

The NMDGF has identified numerous species as threatened or endangered within the counties associated with the Talon MOA (Chaves, Eddy, Lea, and Otero Counties). A full list of these species (birds, amphibians and reptiles, mammals, fish, invertebrates, and plants) can be found in **Appendix E** (Special-Status Species). Given the nature of the Proposed Action, no impact would be expected to amphibians and reptiles, small mammals (other than bats), fish, invertebrates, or plants; therefore, these species were not considered further in this EIS. Since counties are large and sensitive species usually have extremely specific habitat requirements, the potential for a species listed in the county to occur within the airspace area is low in most cases. The state-listed bird and bat species that may occur beneath or near the Talon MOA that could potentially be affected by noise are provided in **Table 3.5-5**.

Table 3.5-5. State-listed Bird and Bat Species With Potential to Occur Beneath Proposed Talon MOA		
Common Name	**Scientific Name**	**New Mexico Status**
Birds		
Abert's towhee	*Melozone aberti*	T
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*	E
Arctic peregrine falcon	*Falco peregrinus tundrius*	T
Baird's sparrow	*Ammondramus bairdii*	T
Bald eagle	*Haliaeetus leucocephalus*	T
Bell's vireo	*Vireo bellii*	T

Table 3.5-5. State-listed Bird and Bat Species With Potential to Occur Beneath Proposed Talon MOA (cont.)

Common Name	Scientific Name	New Mexico Status
Birds (cont.)		
Broad-billed hummingbird	*Cynanthus latirostris*	T
Brown pelican	*Pelecanus occidentalis*	E
Buff-collared nightjar	*Antrostomus ridgwayi*	E
Common black hawk	*Buteogallus anthracinus*	T
Common ground dove	*Columbina passerine*	E
Costa's hummingbird	*Calypte costae*	T
Elegant Trogon	*Trogon elegans*	E
Gila woodpecker	*Melanerpes uropygialis*	T
Gould's wild turkey	*Melagris gallopavo Mexicana*	T
Gray vireo	*Vireo vicinior*	T
Interior least tern	*Sterna antillarum*	E
Lucifer hummingbird	*Calothorax lucifer*	T
Neotropic cormorant	*Phalacrocorax brasilianus*	T
Northern aplomado falcon	*Falco femoralis septentrionalis*	E
Northern beardless-tyrannulet	*Camptostoma imberbe*	E
Peregrine falcon	*Falco peregrinus*	T
Piping Plover	*Charadrius melodus*	T
Southwestern willow flycatcher	*Empidonax traillii extimus*	E
Thick-billed kingbird	*Tyrannus crassirostris*	E
Varied bunting	*Passerina versicolor*	T
Violet-crowned hummingbird	*Amazilia violiceps*	T
Whiskered screech-owl	*Megascops trichopsis*	T
White-eared hummingbird	*Hylocharis leucotis*	T
Yellow-eyed junco	*Junco phaeonotus*	T
Bats		
Mexican long-nosed bat	*Leptonycteris nivalis*	E
Spotted bat	*Euderma maculatum*	T
Western yellow bat	*Lasiurus xanthinus*	T

Legend: E-endangered; MOA-Military Operations Area; T-threatened.

3.5.2.2 Cato, Smitty, and Lobos MOAs

Wildlife

The ecoregions associated with the proposed Cato, Smitty, and Lobos MOAs are provided in **Table 3.5-6**. Since these MOAs cover such a large and varied area, the ecoregion information has been provided separately. Beneath the Cato and Smitty MOAs the primary ecoregions are Conifer Woodlands and Savannas, Montane Conifer Forests, and Plains of San Agustin. Wildlife habitat beneath the proposed Cato, Smitty, and Lobos MOAs consists of vegetation characteristic of Bailey's Chihuahuan Desert Province (Bailey 1995). Lands beneath the Cato and Smitty MOAs are characterized largely by Conifer Woodlands and Savannas, and lands beneath the proposed Lobos MOA are primarily montaine forests (Dick-Peddie 1993). Common wildlife found in these habitat types are similar to those described above for the Talon MOA area.

Table 3.5-6. Ecoregions Beneath Proposed Cato, Smitty and Lobos MOAs				
	Cato and Smitty MOAs		Lobos MOA	
Ecoregion Name	Acres	Percentage	Acres	Percentage
Albuquerque Basin	44	0	0	0
Apachian Valleys and Low Hills	0	0	9,467	<1
Arizona/New Mexico Subalpine Forests	16,714	<1	34,141	2
Chihuahuan Basins and Playas	112,371	4	40,700	2
Chihuahuan Desert Grasslands	0	0	106,474	6
Conifer Woodlands and Savannas	1,204,203	47	185,298	11
Low Mountains and Bajadas	0	0	244,855	14
Lower Madrean Woodlands	0	0	31,653	2
Madrean Lower Montane Woodlands	0	0	628,435	36
Montane Conifer Forests	628,196	25	484,824	27
Plains of San Agustin	589,575	23	0	0

Legend: MOA-Military Operations Area; <-less than.

Several Wildlife Management Areas managed by NMDGF are located throughout the land beneath the proposed Cato, Smitty, and Lobos MOAs (**Table 3.5-7**). These areas provide wildlife habitat for numerous species as well as public access for wildlife viewing, fishing, and hunting.

Table 3.5-7. Wildlife Management Areas beneath Proposed Cato, Smitty, and Lobos MOAs		
Name	Location	Area
Bear Canyon Wildlife Area	Bear Canyon Reservoir, northeast of Silver City	75 acres
Bill Evans Wildlife Area	Between Cliff and Silver City	300 acres
Heart Bar Wildlife Area	36 miles north of Silver City	797 acres
Lake Roberts Wildlife Area	35 miles north of Silver City	79 acres
Mimbres Wildlife Area	2 miles north of San Lorenzo	23 acres
Red Rock Wildlife Area	26 miles north of Lordsburg	1,530 acres
Socorro-Escondida Wildlife Management Area	2 miles east of Socorro	94 acres

Legend: MOA-Military Operations Area

Special-Status Species

ESA-listed Species

Thirty-two candidate or federally-listed species potentially occur under the proposed airspace (USFWS 2018a,2018b). Because the Proposed Action would not involve any ground disturbance, no effect to the 23 federally-listed small mammals, reptiles, fish, invertebrate, or plant species in **Table 3.5-8** would result; therefore, these species will not be discussed further.

Table 3.5-8. Federally-Listed Species for Which a No Effect Determination is Made		
Common Name	Scientific Name	Status
Mammals		
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	E
Reptiles		
Narrow-headed gartersnake	*Thamnophis rufipunctatus*	T
New Mexican ridge-nosed rattlesnake	*Crotalus willardi obscurus*	T
Northern Mexican gartersnake	*Thamnophis eques megalops*	T
Chiricahua leopard frog	*Rana chiricahuensis*	T

Table 3.5-8. Federally-Listed Species for Which a No Effect Determination is Made (cont.)		
Common Name	**Scientific Name**	**Status**
Fish		
Beautiful shiner	*Cyprinella Formosa*	T
Chihuahua chub	*Gila nigrescens*	T
Gila chub	*Gila intermedia*	E
Gila topminnow	*Poeciliopsis occiendentalis*	E
Gila trout	*Oncorhynchus gilae*	T
Loach minnow	*Tiaroga cobitis*	E
Razorback sucker	*Xyrauchen texanus*	E
Rio Grande silvery minnow	*Hybognathus amarus*	E
Spikedace	*Meda fulgida*	E
Woundfin	*Plagopterus argentissiumus*	EXPN, XN
Invertebrates		
Alamosa springsnail	*Tyronia alamosae*	E
Chupadera springsnail	*Pyrgulopsis chupaderae*	E
Socorro springsnail	*Pyrgulopsis neomexicana*	E
Socorro isopod	*Thermosphaeroma thermophiles*	E
Plants		
Pecos sunflower	*Helianthus paradoxus*	T
Todsen's pennyroyal	*Hedeoma todsenii*	E
Wright's marsh thistle	*Cirsium wrightii*	C
Zuni fleabane	*Erigeron rhizomatus*	T

Legend: C-candidate; E-endangered; EXPN, XN -experimental population, non-essential; T-threatened.

There are nine federally-listed bird and mammal species that could potentially be impacted by the noise associated with proposed aircraft operations within the Cato, Smitty, and Lobos MOAs and are analyzed in this EIS. **Table 3.5-9** contains a list of those species, their Federal listing status, the potential to occur beneath airspace, and whether critical habitat has been designated beneath the airspace. A description of these species, to include habitat and range, follows the table. Species distribution information was derived from Biota Information System of New Mexico and from lists of threatened and endangered species provided by the USFWS.

Table 3.5-9. Federally-Listed Species with Potential to Occur Beneath Proposed Cato, Smitty and Lobos MOAs

Common Name	Scientific Name	Status	Counties Beneath Airspace Where Species May Occur	Critical Habitat Beneath Airspace
Birds				
Interior least tern	*Sterna antillarum*	E	New Mexico: Catron, Socorro	No
Mexican Spotted Owl	*Strix occidentalis lucida*	T	New Mexico: Catron, Grant, Hidalgo, Socorro, Sierra	Yes
Northern aplomado falcon	*Falco femoralis septentrionalis*	EXPN, XN	New Mexico: Grant, Hidalgo, Socorro, Sierra	No
Piping plover	*Charadrius melodus*	T	New Mexico: Socorro	No
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	New Mexico: Catron, Grant, Hidalgo, Socorro, Sierra Arizona: Graham, Greenlee	Yes
Yellow-billed cuckoo (Western Distinct Population)	*Coccyzus americanus occidentalis*	T	New Mexico: Catron, Grant, Hidalgo, Socorro, Sierra Arizona: Graham, Greenlee	Yes
Mammals				
Mexican wolf	*Canis lupus baileyi*	EXPN, XN	New Mexico: Catron, Grant, Hidalgo, Sierra Arizona: Graham, Greenlee	No
Jaguar	*Panthera onca*	E	New Mexico: Hidalgo	No
Mexican long-nosed bat	*Leptonycteris nivalis*	E	New Mexico: Grant, Hidalgo	No

Sources: USFWS 2019a, 2019b, 2019c, 2019d, 2019e, 2019f, 2019g, 2019h, 2019i
Legend: E-endangered; EXPN, XN -experimental population, non-essential; T-threatened; MOA-Military Operations Area.

Species descriptions and habitats of the Interior Least Tern, Mexican Spotted Owl, northern aplomado falcon, piping plover, southwestern willow flycatcher, and yellow-billed cuckoo were provided in **Section 3.5.2.1** (Talon MOA). The counties where these species have occurrences that overlap with the proposed Cato, Smitty, and Lobos MOAs are provided in **Table 3.5-9**. The Interior Least Tern, northern aplomado falcon, and piping plover are all considered rare in New Mexico. The least tern has only been reliably reported at Bosque del Apache National Wildlife Refuge outside the proposed MOAs (NMDGF 2017a). The southwestern willow flycatcher population in Gila/Cliff Valley, New Mexico was thought to be the largest known nesting concentration of flycatchers in this region (NMDGF 2018b).

Mexican Wolf. The Mexican wolf, a subspecies of the gray wolf, was listed as endangered in 1976 and was designated with experimental population status in 2015. The Mexican wolf is the smallest and rarest subspecies of gray wolf in North America. Mexican wolves are found in a variety of southwestern habitats but prefer mountain woodlands. Historically, the wolves ranged throughout the mountainous regions from central Mexico, through southeastern Arizona, southern New Mexico, and southwestern Texas. However, by the mid-1900s, the wolves were effectively eliminated from the U.S. due to intensive efforts to eradicate them due to the wolves preying on livestock. After lengthy recovery efforts, captive-reared Mexican gray wolves were released into the wild in the Blue Range Wolf Recovery Area in eastern Arizona and western New Mexico. At the end of 2015 at least 97 wolves occupied the Mexican Wolf Recovery Area (USFWS 2014c). Rare occurrences of the Mexican wolf have been reported in Catron County and it may also occur in Grant, Hidalgo, and Sierra Counties in New Mexico and Graham and Greenlee Counties in Arizona (NMDGF 2018d, USFWS 2019g).

Jaguar. The jaguar was listed as endangered under the ESA in 1997. Critical habitat for this species has been designated in southeastern and southwestern New Mexico. However, critical habitat is not located under the proposed airspace. Jaguars occur in a variety of vegetation communities, but tend to prefer lowland wet communities. In the southwestern U.S. they have been observed in arid areas. Currently, jaguars range from southwestern U.S. (primarily south-central Arizona and extreme southwestern New Mexico) to northern Argentina (USFWS 2012b). The jaguar has been recorded beneath the proposed Lobos MOA airspace (Hidalgo County); and, its historic range is beneath proposed airspace (Catron and Socorro Counties) (NMDGF 2018e, USFWS 2019h).

Mexican long-nosed bat. The Mexican long-nosed bat was federally-listed as endangered in 1988. Critical habitat for this species has not been designated. Mexican long-nosed bats occur in subtropical dry habitats in central and northern Mexico, the Big Bend area of Texas, and southwestern New Mexico and are known to migrate seasonally from Mexico. The Mexican long-nosed bat roosts in caves, abandoned mines, culverts, and hollow trees. Its diet consists primarily of nectar, pollen, and flowers of cacti and agaves (USFWS 1994; Texas Parks and Wildlife 2016). The Mexican long-nosed bat may occur in Grant and Hidalgo Counties in New Mexico (NMDGF 2018f, USFWS 2019i).

MBTA and BGEPA

There are 30 migratory bird species (to include the bald eagle and golden eagle) that have the potential to be located beneath the proposed Cato, Smitty, and Lobos MOAs (USFWS 2018a). **Table 3.5-10** provides the species names and their breeding season.

Table 3.5-10. MBTA and BGEPA Species With Potential to Occur Beneath Proposed Cato, Smitty, and Lobos MOAs

Common Name	Scientific Name	Breeding Season
Bald eagle	*Haliaeetus leucocephalus*	October 15 to July 31
Bendire's thrasher	*Toxostoma bendirei*	March 15 to July 31
Black-throated sparrow	*Spizella atrogularis*	March 15 to September 5
Black-chinned sparrow	*Spizella atrogularis*	April 15 to July 31
Black-throated gray warbler	*Dendroica nigrescens*	May 1 to July 20
Blue-throated hummingbird	*Lampornis clemenciae*	February 15 to October 10
Brewer's sparrow	*Spizella breweri*	May 15 to August 10
Burrowing owl	*Athene cunicularia*	March 15 to August 31
Chestnut-collared longspur	*Calcarius ornatus*	Breeds elsewhere
Clark's grebe	*Aechmophorus clarkia*	January 1 to December 31
Common black hawk	*Buteogallus anthracinus*	April 1 to September 20
Elf owl	*Micrathene whitneyi*	May 1 to July 15
Golden eagle	*Aquila chrysaetos*	January 1 to August 31
Grace's warbler	*Dendroica graciae*	May 20 to July 20
Grasshopper sparrow	*Ammodramus savannarum ammolegus*	June 1 to August 20
Gray vireo	*Vireo vicinior*	May 10 to August 20
Lark bunting	*Calamospiza melanocorys*	Breeds elsewhere
Lesser yellowlegs	*Tringa flavipes*	Breeds elsewhere
Lewis's woodpecker	*Melanerpes lewis*	April 20 to September 30
Long-eared owl	*Asio otus*	March 1 to July 15
Mexican whip-poor-will	*Antrostomus arizonae*	May 1 to August 20
Olive-sided flycatcher	*Contopus cooperi*	May 20 to August 31
Pinyon Jay	*Gymnorhinus cyanocephalus*	February 15 to July 15
Phainopepla	*Phainopepla nitens*	March 1 to August 20

Table 3.5-10. MBTA and BGEPA Species With Potential to Occur Beneath Proposed Cato, Smitty, and Lobos MOAs (cont.)		
Common Name	**Scientific Name**	**Breeding Season**
Red-faced warbler	*Cardellina rubrifons*	May 10 to July 15
Rufus hummingbird	*Selasphorus rufus*	Breeds elsewhere
Rufus-winged sparrow	*Aimophila carpalis*	June 15 to September 30
Virginia's warbler	*Vermivora viriniae*	May 1 to July 31
Willet	*Tringa semipalmata*	Breeds elsewhere
Willow flycatcher	*Empidonax traillii*	May 20 to August 31

Legend: BGEPA-Bald and Golden Eagle Protection Act; MBTA-Migratory Bird Treaty Act; MOA-Military Operations Area.

State-listed Species

The NMDGF has identified numerous species as threatened or endangered within the counties associated with the Cato, Smitty, and Lobos MOAs (Catron, Grant, Hidalgo, Sierra, and Socorro Counties). AZGFD has identified numerous species as SGCN within the counties associated with Lobos MOA (Graham and Greenlee Counties). A full list of these species (birds, amphibians and reptiles, mammals, fish, invertebrates, and plants) can be found in **Appendix E** (Special-Status species list). Given the nature of the Proposed Action, no impact would be expected to amphibians and reptiles, small mammals (other than bats), fish, invertebrates, or plants; therefore, these species were not considered further in this EIS. The Mexican wolf is discussed under the federally-listed species, but it is also listed as endangered by New Mexico and as SGCN by Arizona. Since counties are large and sensitive species usually have extremely specific habitat requirements, the potential for a species listed in the county to occur within the airspace area is low in most cases. The state-listed bird and bat species that may occur within or near the Cato, Smitty, and Lobos MOAs that could potentially be affected by noise are provided in **Table 3.5-11**.

Table 3.5-11. State-listed Bird and Bat Species with Potential to Occur Beneath Proposed Cato, Smitty, and Lobos MOAs			
Common Name	**Scientific Name**	**New Mexico Status**	**Arizona Status**
Birds			
Abert's towhee	*Melozone aberti*	T	SGCN
Arizona Bell's vireo	*Vireo bellii arizonae*	-	SGCN
American bittern	*Botaurus lentiginosus*	-	SGCN
Arizona Boterri's sparrow	*Peucaea botterii arizonae*	-	SGCN
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*	E	-
Arctic peregrine falcon	*Falco peregrinus tundrius*	T	-
Baird's sparrow	*Ammondramus bairdii*	T	-
Bald eagle	*Haliaeetus leucocephalus*	T	SGCN
Bell's vireo	*Vireo bellii*	T	-
Blue-throated hummingbird	*Lampornis clemenciae*	-	SGCN
Broad-billed hummingbird	*Cynanthus latirostris*	T	SGCN
Brown pelican	*Pelecanus occidentalis*	E	-
Buff-collared nightjar	*Antrostomus ridgwayi*	E	-
Common black hawk	*Buteogallus anthracinus*	T	-
Common ground dove	*Columbina passerine*	E	-
Costa's hummingbird	*Calypte costae*	T	-
Dusky-capped flycatcher	*Myiarchus tuberculifer*	-	SGCN
Elegant trogon	*Trogon elegans*	E	SGCN
Evening grosbeak	*Coccothraustes vespertinus*	-	SGCN

Table 3.5-11. State-listed Bird and Bat Species Potentially Beneath Proposed Cato, Smitty, and Lobos MOAs (cont.)			
Common Name	**Scientific Name**	**New Mexico Status**	**Arizona Status**
Birds (cont.)			
Ferruginous hawk	*Buteo regalis*	-	SGCN
Gila woodpecker	*Melanerpes uropygialis*	T	SGCN
Golden eagle	*Aquila chrysaetos*	-	SGCN
Gould's wild turkey	*Melagris gallopavo Mexicana*	T	-
Gray vireo	*Vireo vicinior*	T	-
Interior least tern	*Sterna antillarum*	E	-
Lincoln's sparrow	*Melospiza lincolnii*	-	SGCN
Lucifer hummingbird	*Calothorax lucifer*	T	-
Mexican Spotted Owl	*Strix occidentalis lucida*	-	SGCN
Mountain pygmy owl	*Glaucidium gnoma gnoma*	-	SGCN
Neotropic cormorant	*Phalacrocorax brasilianus*	T	-
Northern aplomado falcon	*Falco femoralis septentrionalis*	E	SGCN
Northern beardless-tyrannulet	*Camptostoma imberbe*	E	-
Northern goshawk	*Accipiter gentilis*	-	SGCN
Pacific wren	*Troglodytes pacificus*	-	SGCN
Peregrine falcon	*Falco peregrinus*	T	SGCN
Piping plover	*Charadrius melodus*	T	-
Rivoli's hummingbird	*Eugenes fulgens*	-	SGCN
Savannah sparrow	*Passerculus sandwichensis*	-	SGCN
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	SGCN
Sprague's pipit	*Anthus spragueii*	-	SGCN
Sulfur-bellied flycatcher	*Myiodynastes luteiventris*	-	SGCN
Thick-billed kingbird	*Tyrannus crassirostris*	E	SGCN
Varied bunting	*Passerina versicolor*	T	-
Violet-crowned hummingbird	*Amazilia violiceps*	T	SGCN
Western burrowing owl	*Athene cunicularia hypugaea*	-	SGCN
Western grasshopper sparrow	*Ammodramus savannarum perpallidus*	-	SGCN
Whiskered screech-owl	*Megascops trichopsis*	T	-
White-eared hummingbird	*Hylocharis leucotis*	T	-
Wood duck	*Aix sponsa*	-	SGCN
Yellow-billed cuckoo	*Coccyzus americanus*	-	SGCN
Yellow-eyed junco	*Junco phaeonotus*	T	-
Bats			
Arizona myotis	*Myotis occultus*	-	SGCN
Brazilian free-tailed bat	*Tadarida brasiliensis*	-	SGCN
California leaf-nosed bat	*Macrotus californicus*	-	SGCN
Cave myotis	*Myotis velifer*	-	SGCN
Greater western bonneted bat	*Eumops perotis californicus*	-	SGCN
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	-	SGCN
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	-	SGCN
Pocket free-tailed bat	*Nyctinomops macrotis*	-	SGCN
Spotted bat	*Euderma maculatum*	T	-
Western red bat	*Lasiurus blossevillii*	-	SGCN
Western yellow bat	*Lasiurus xanthinus*	T	SGCN
Yuma myotis	*Myotis yumanensis*	-	SGCN

Legend: E-endangered; MOA-Military Operations Area; SGCN- Species of Greatest Conservation Need; T-threatened.

3.6 LAND MANAGEMENT

3.6.1 Resource Definition

For this analysis, land use describes ownership and management of land that lies beneath the airspace affected by the Proposed Action and alternatives and examines any conflicts that may exist between the Proposed Action and land use plans and policies for the area potentially affected. The compatibility of existing and planned land use with aviation is usually associated with acoustic environment (noise), which is described in **Sections 3.3 and 4.3** (Acoustic Environment). Visitation data and visitor use are described in **Section 3.7 and 4.7** (Recreation Resources).

3.6.2 Affected Environment

The affected environment for land use is all lands underlying the existing and proposed SUA. The area beneath SUA in southern New Mexico is predominantly rural with areas of higher population density in Artesia, Carlsbad, Socorro, and Silver City. Extractive industries including oil production, forestry, and grazing operations are common in the region. Much of the land beneath the airspace is managed by Federal agencies, including the BLM, USFS, the Bureau of Reclamation (BOR), and the NPS.

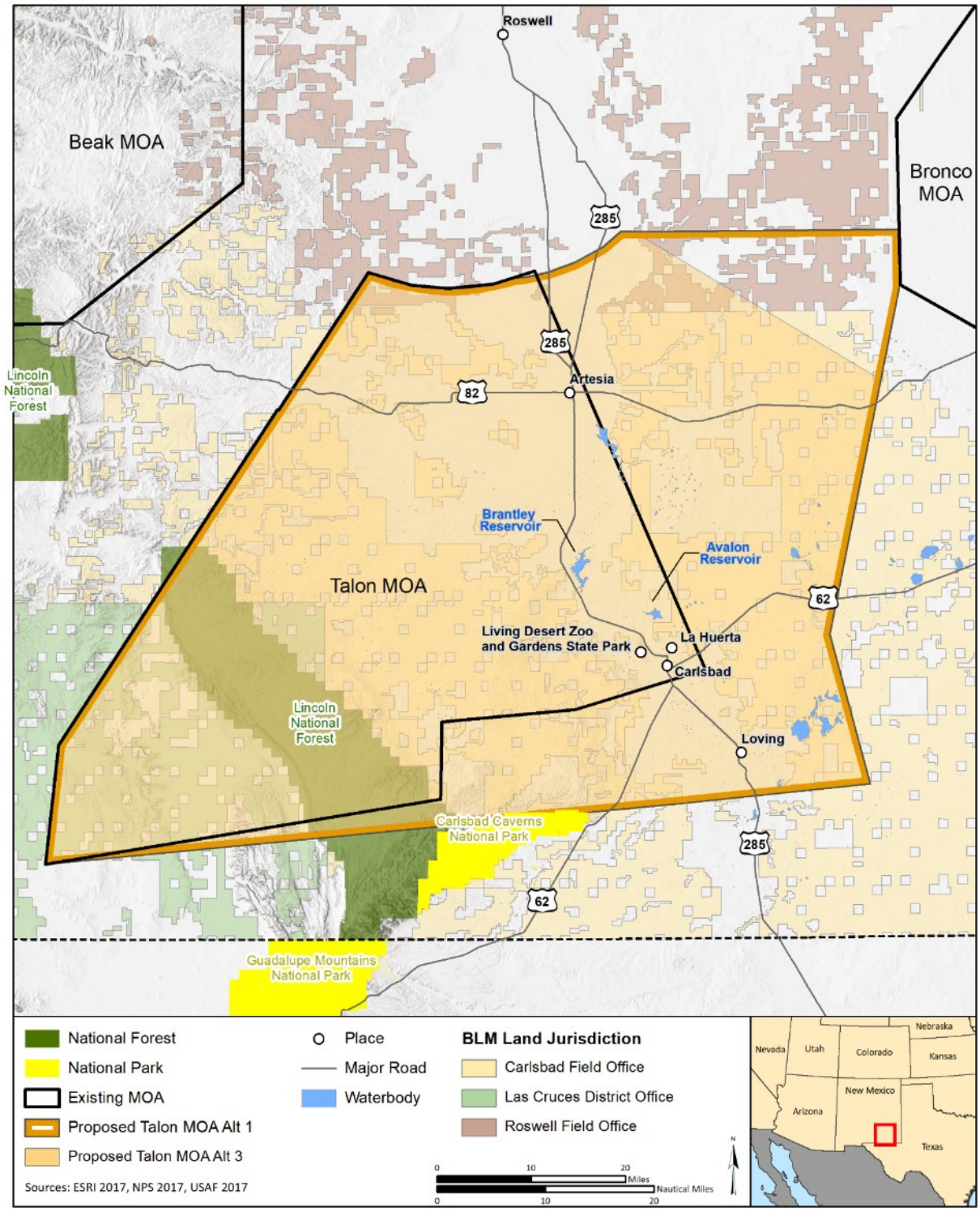
3.6.2.1 Talon MOA

Talon MOA lies above lands in Otero, Chavez, Eddy, and Lea Counties in southwestern New Mexico. Approximately 1,585,000 acres of land lie beneath the exiting boundaries. The Talon MOA would be reconfigured under Alternatives 1 and 3. **Table 3.6-1** contains acreages of land, including land managed by the Federal government, beneath the existing and proposed configurations of the Talon MOA. This is also illustrated on **Figure 3.6-1**.

Table 3.6-1. Land Ownership and Management Beneath Existing and Proposed Talon MOA, in acres

Agency and Managed Land		Existing	Alternative 1		Alternative 3	
			Proposed	Change	Proposed	Change
Non-Federal Land		567,366	1,054,768	487,402	997,069	429,703
BLM	Carlsbad Field Office	559,571	1,104,797	545,226	1,080,214	520,643
	Las Cruces District	227,264	241,185	13,921	241,185	13,921
	Roswell Field Office	19,051	116,056	97,005	48,541	29,490
USFS	Lincoln National Forest	202,306	225,434	23,128	225,434	23,128
BOR	Brantley Reservoir	4,365	4,365	0	4,365	0
	Avalon Reservoir	1,579	1,579	0	1,579	0
NPS	Carlsbad Caverns National Park	0	3,329	3,329	3,329	3,329
New Mexico State Parks	Brantley Lake	2,660	2,660	0	2,660	0
	Living Desert Zoo and Gardens	1,150	1,150	0	1,150	0
Total		**1,585,312**	**2,755,323**	**1,170,011**	**2,605,526**	**1,020,214**

Note: Acreages are derived from multiple data sources and so are approximate.
Legend: BLM-Bureau of Land Management; BOR-Bureau of Reclamation; MOA-Military Operation Area; NPS-National Park Service; USFS-U.S. Forest Service.



Legend: MOA-Military Operations Area.

Figure 3.6-1. Land Ownership and Management Beneath Existing and Proposed Talon MOA

Bureau of Land Management

The largest area of land beneath the existing and proposed Talon MOA is managed by the BLM's Carlsbad Field Office, Las Cruces District, and Roswell Field Office. The BLM is responsible for managing public lands for a variety of uses, while ensuring natural, cultural, and historic resources are maintained for present and future use. The BLM develops Resource Management Plans (RMPs) for each district or field office. RMPs guide appropriate multiple uses of land, provide for management and protection of protected resources, and include goals and prescriptions for activities including:

- Minerals management – exploration, leasing, development, and production
- Land and realty activities – establishment of rights-of-way and transportation and utility corridors, land acquisition, and disposal
- Livestock grazing
- Vegetation management
- Wildlife management
- Pest management
- Fire management
- Soil, water, and air quality maintenance and improvement
- Cultural and paleontological resources management
- Outdoor recreation

The Carlsbad Field Office is currently preparing a revision to its RMP to reflect the marked increase in oil and gas development and use of new technologies in the Permian Basin since its 1988 RMP and 1997 and 2008 RMP Amendments were prepared. The Las Cruces District Office issued an RMP in 2013 that covers lands it manages in Sierra, Otero, and Doña Ana Counties, including those BLM lands in Otero County that lie beneath the Talon MOA. The BLM Roswell Field Office RMP was prepared in 1997.

U.S. Forest Service

The Guadalupe Ranger District of the Lincoln National Forest lies under the existing Talon MOA, and approximately 23,000 additional acres would lie beneath the proposed reconfigured and expanded Talon MOA. The Lincoln National Forest 1986 Forest Land and RMP has been amended multiple times to reflect changes in protected species, recreation, fire, and timber management and is currently being revised. The plan outlines management prescriptions for recreation, wilderness, visual resources, cultural resources, wildlife and fish, range, and timber within the forest. The Guadalupe Ranger District is characterized by rolling hills in the north and deep canyons in the south. Land within the District is used for grazing and recreation including dispersed camping, hiking and backpacking, hunting, horse riding, and caving. No off road vehicle use is permitted in the district and there are no developed campgrounds.

Other Managed Lands

The BOR manages and develops water resources through oversight and operation of diversion, delivery, and storage projects throughout the western U.S. Beneath the Talon MOA on the Pecos River are the BOR-managed Avalon and Brantley dams. The Avalon and Brantley dams are located approximately 3 and 13 miles north of Carlsbad. The Avalon Reservoir is open for recreation including fishing, canoeing, and kayaking. The Brantley Dam impounds Brantley Lake, the southernmost lake in New Mexico. The land surrounding Brantley Lake is managed as a state park.

Two New Mexico State Parks underlie the existing configuration of Talon MOA. Brantley Lake State Park encompasses the land surrounding the Brantley Reservoir. The lake is the southernmost lake in New Mexico, and it is popular for boating and fishing. The park has 51 developed campsites with electricity, shower facilities, a playground, a visitor center, and other amenities. Living Desert Zoo and Gardens State Park, west of Carlsbad, provides exhibits of native wildlife and plants accessed by hiking trails.

Carlsbad Caverns National Park is located in Eddy County, and borders the Guadalupe District of the Lincoln National Forest to its east. The park is designated as a World Heritage Site and contains the deepest limestone cave, Lechuguilla Cave, in the U.S. The mission of the park is to preserve and protect cave resources, the Chihuahuan Desert ecosystem, and the Capitan Reef and the associated natural and cultural resources, while providing opportunities for public use. More than 33,000 of the park's nearly 47,000 acres is designated as the Carlsbad Caverns Wilderness. Recreation in the park includes caving and cave tours, hiking and backpacking, and backcountry camping.

Population Centers

The existing configuration of the Talon MOA overlies the cities of Carlsbad and Artesia and a number of towns and unincorporated small communities with more than 500 residents including La Huerta, Atoka, Happy Valley, and Livingston Wheeler. In addition to these, the proposed reconfigured and expanded Talon MOA would overlie the village of Loving.

3.6.2.2 Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs

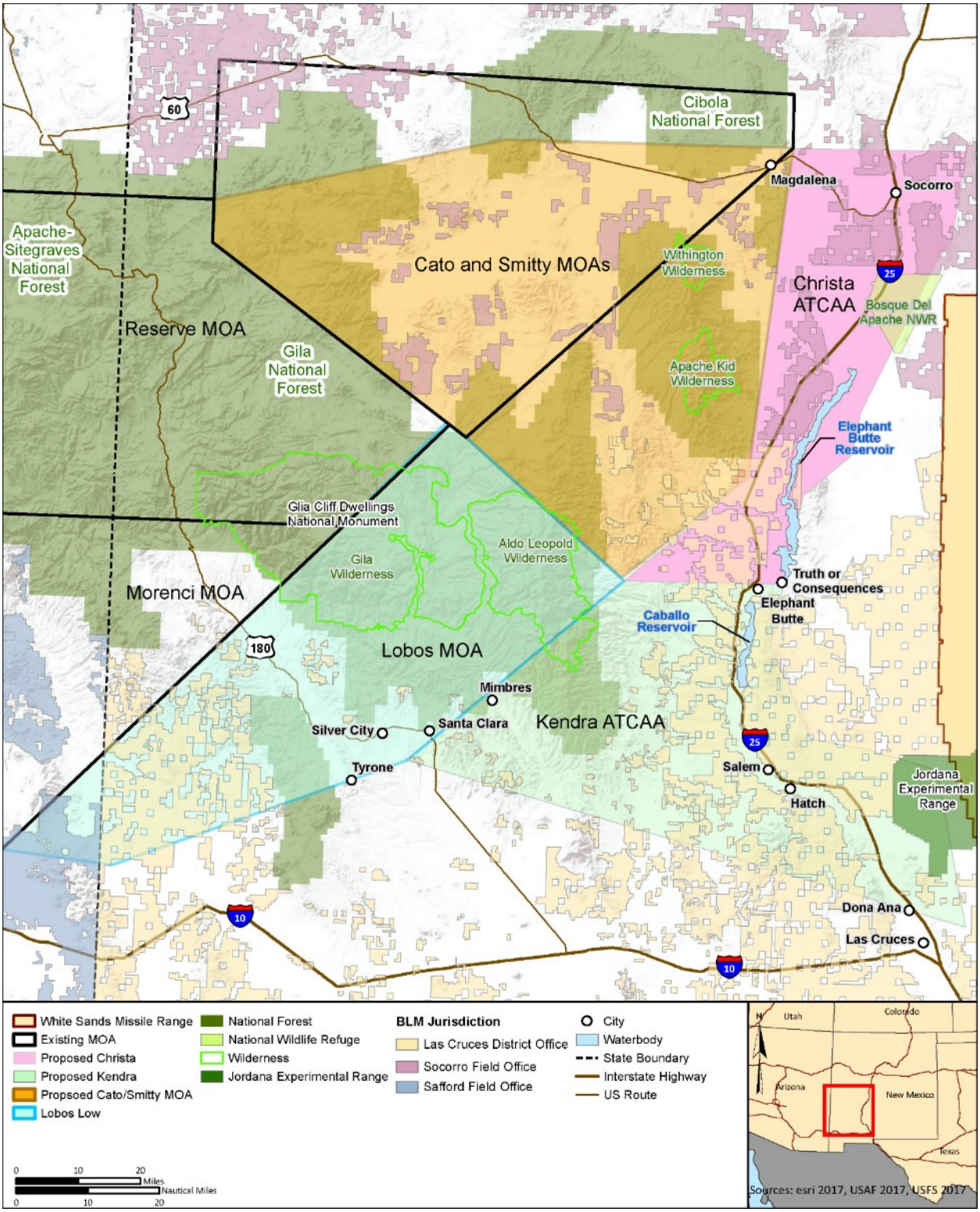
The Cato and Smitty MOAs are located in southwestern New Mexico. The existing configuration of the MOAs lies above lands in Catron and Socorro Counties. Under Alternatives 2 and 3, the Cato and Smitty MOAs would be reconfigured and expanded and Lobos MOA and the Christa and Kendra ATCAAs would be established. The proposed reconfiguration of the Cato and Smitty MOAs would extend south over land in Sierra County. The Lobos MOA would overlie land in Catron, Grant, Sierra, and Hildago Counties in New Mexico and Greenlee and Graham Counties in Arizona. The Christa and Kendra ATCAAs would overlie land in Grant, Sierra, Luna, Doña Ana, and Socorro Counties, New Mexico. **Table 3.6-2** contains land acreages, including that managed by the Federal government, beneath the existing and proposed reconfiguration and expansion of the Cato and Smitty MOAs, the proposed Lobos MOA, and the proposed Christa and Kendra ATCAAs. This is also illustrated on **Figure 3.6-2**.

Table 3.6-2. Land Ownership and Management beneath Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs, in acres

		Cato and Smitty MOAs					
		Existing	Proposed	Change	Proposed Lobos MOA	Proposed Christa and Kendra ATCAAs	Total Change
Non-Federal Land		890,990	1,062,328	171,338	1,151,976	387,812	1,711,126
USFS	Cibola National Forest	389,230	456,612	67,382	0	70,699	138,081
	Withington Wilderness (within Cibola National Forest)	1,406	18,815	17,409	0	0	17,409
	Apache Kid Wilderness (within Cibola National Forest)	0	44,671	44,671	0	0	44,671
	Gila National Forest	214,579	440,991	226, 412	476,038	138,761	841,211
	Aldo Leopold Wilderness (within Gila National Forest)	0	3,657	3,657	177,228	20,826	201,712
	Gila Wilderness (within Gila National Forest)	0	0	0	325,086	0	325,086
	Apache-Sitgreaves National Forest	374,257	193,957	-180,300	0	0	-180,300
BLM	Socorro Field Office	384,242	321,230	-63,012	0	233,519	170,507
	Las Cruces District	0	9,885	9,885	304,065	740,862	1,054,812
	Safford Field Office	0	0	0	62,340	0	62,340
USDA	Jornada Experimental Station	0	0	0	0	64,442	64,442
USFWS	Bosque del Apache National Wildlife Refuge	0	0	0	0	41,763	41,763
BOR	Elephant Butte and Caballo Reservoirs	0	0	0	0	37,596	37,596
NPS	Gila Cliff Dwellings National Monument	0	0	0	463	0	463
Total		**2,254,704**	**2,552,146**	**297,442**	**2,497,197**	**1,736,280**	**4,530,919**

Note: Acreages are derived from multiple data sources and so are approximate.

Legend: ATCAA-Air Traffic Control Assigned Airspace; BLM-Bureau of Land Management; BOR-Bureau of Reclamation; MOA-Military Operations Area; NPS-National Park Service; USDA-U.S. Department of Agriculture; USFS-U.S. Forest Service; USFWS-U.S. Fish and Wildlife Service.



Legend: ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operation Area.

Figure 3.6-2. Land Ownership and Management Beneath Existing and Proposed Cato, Smitty, and Lobos MOAs

U.S. Forest Service

The majority of federally-managed land beneath the existing and proposed configurations of the Cato and Smitty MOAs is managed by the USFS as the Cibola, Gila, and Apache-Sitgreaves National Forests. There are approximately 390,000 acres of Cibola National Forest (Magdalena Ranger District), and an additional 1,400 acres of the Withington Wilderness beneath the current configuration of the Cato and Smitty MOAs. The proposed Cato and Smitty MOAs would add more than 67,000 acres of Cibola National Forest and more than 62,000 acres of the Withington and Apache Kid Wilderness. The proposed Christa and Kendra ATCAAs would lie over an additional 70,000 acres of the Cibola National Forest. The Cibola National Forest Mountain Ranger Districts Preliminary Draft Land and Resource Management Plan (USFS 2016) states that the Magdalena Ranger District supports continued historical multiple uses including grazing, hunting, recreation, mining, and harvest of forest products through responsible resource management. The Apache Kid Wilderness is characterized by narrow steep canyons of the southern San Mateo Mountains. There are no roads into the area; but, it does encompass a number of trails and a developed campground. The Withington Wilderness is located on the northern San Mateo Mountains and includes the 10,100 foot Mount Withington and supports an extensive but seldom used trail system.

More than 214,000 acres of the Gila National Forest lie beneath the existing Cato and Smitty MOAs. The proposed reconfigured and expanded Cato and Smitty MOAs and the establishment of Lobos MOA would add approximately 702,450 acres, and more than 665,000 acres of the Gila and Aldo Leopold Wilderness, to the total of USFS land beneath airspace. The Gila National Forest Management Plan is in the early stages of revision. Its 1986 plan has been amended eleven times, most recently in 2006 to reflect changes to resources management. A portion of the Aldo Leopold Wilderness lies beneath the proposed boundaries of the reconfigured and expanded Cato and Smitty MOAs. Additionally, the proposed Lobos MOA and the Christa and Kendra ATCAAs would overlay more than 660,000 acres of the Aldo Leopold and Gila Wilderness. The Aldo Leopold Wilderness covers the rugged Black Range, including part of the continental divide. The Gila Wilderness is the first wilderness established in the U.S., advocated by Aldo Leopold, then a USFS employee. The Gila Wilderness is an area of rich biological diversity, being the terminus of the Rocky and Sierra Madre mountain ranges and encompassing parts of the Chihuahuan and Sonoran deserts.

The Apache-Sitgreaves National Forest land in New Mexico is managed and administered by the Gila National Forest as the Quemado Ranger District. The proposed reconfiguration and expansion of the Cato and Smitty MOAs would overlie nearly 180,000 fewer acres of the Quemado Ranger District than the current configuration.

Bureau of Land Management

As described above in **Section 3.6.2.1** (Talon MOA), the BLM manages land for multiple uses, including minerals management, grazing, fire management, and recreation, while providing for protection of natural resources. The existing Cato and Smitty MOAs overlies approximately 384,000 acres of BLM lands managed by the Socorro Field Office. The proposed reconfiguration and expansion of the Cato and Smitty MOAs, proposed Lobos MOA, and Christa and Kendra ATCAAs would overlie more than 1.2 million additional acres of BLM lands managed by the Socorro and Safford Field Offices and the Las Cruces District Office. The Socorro Field Office RMP was prepared in 2010 to reflect the changing resource demands that have resulted from population growth. In response, there is increase policy emphasis on control of noxious weeds and invasive species, fire management, and protecting unique areas (BLM 2010). The BLM Las Cruces District's Tri-County RMP (BLM 2013) was issued in response to new policies

related to recreation management, renewable energy project siting, and special-status species habitats, and to address changing management needs resulting from a use of lands by a growing population. BLM lands in the Arizona portion of the project area are managed by the Safford Field Office whose 1991 RMP has been amended several times to reflect changes in rangeland and wildfire management, as well as land tenure issues and renewable energy projects.

Other Managed Lands

The NPS manages Gila Cliff Dwellings National Monument, all of which lies under the proposed Lobos MOA. The monument was established in 1907 and expanded in 1962. Today it incorporates 45 Mogollon cultural sites, which are the only examples in the National Park system (Russel 1992). A General Management Plan for the monument is planned.

Along the Rio Grande, Bosque del Apache National Wildlife Refuge, managed by the USFWS, and the Elephant Butte and Caballo Dams and Reservoirs, managed by the BOR, lie beneath the proposed Christa and Kendra ATCAAs. Bosque del Apache National Wildlife Refuge was established in 1939 to provide a stopover site for migrating waterfowl and is known for the large flocks of cranes and waterfowl that winter there annually. Both Elephant Butte and Caballo Dams and Reservoirs store water for irrigation and power generation. Recreation, including boating, fishing, wildlife viewing, picnicking, and camping, at both reservoirs is managed by New Mexico State Parks.

The USDA Agricultural Research Service's Jornada Experimental Range, located just north of Las Cruces beneath the proposed Kendra ATCAA, is a field research laboratory established in 1912 with a mission of carrying out research on ecosystem processes and sustainable agriculture in dryland systems, particularly arid and semiarid rangelands. Researchers include the National Science Foundation, Department of Interior, USDA, non-government organizations, producer groups, and universities.

The National Science Foundation National Radio Astronomy Observatory's Very Large Array Radio Telescope facility lies beneath existing and proposed reconfigured and expanded Cato and Smitty MOAs. The array consists of 28 antennae mounted on rails, located on the Plains of San Agustin in New Mexico, northwest of Socorro.

Population Centers

The existing and proposed configurations of the Cato and Smitty MOAs overlie the village of Magdalena, with a population of more than 900. The proposed Lobos MOA would overlie the following towns with populations of more than 500: Silver City, Santa Clara, Arenas Valley, and Tyrone. The proposed Christa ATCAA would overlie the cities of Elephant Butte and Socorro. The proposed Kendra ATCAA would overlie the following locations with populations greater than 500: Hurley, Bayard, Mimbres, Hatch, Doña Ana, Radium Springs, Salem, Placitas, Las Cruces, and Truth or Consequences.

3.7 RECREATION RESOURCES

3.7.1 Resource Definition

Recreation includes indoor and outdoor activities that take place away from the residence of the participant. For this analysis, recreation includes outdoor activities that occur on land that lies beneath the airspace affected by alternatives under the Proposed Action.

3.7.2 Affected Environment

Common types of recreation that occur on the land beneath all the proposed airspace areas include hiking; viewing natural features, wildlife, and historic sites; camping; fishing; hunting; driving for pleasure; bicycling; horseback riding; water activities; and skiing. Recreational activities can occur on both public and private lands. The majority of lands under the proposed airspace are public. Land management is undertaken by multiple Federal and state agencies, including the USFS, BLM, NPS, USFWS, USDA, BOR, and New Mexico State Parks. See **Section 3.6** (Land Management), for specific information regarding land management under the existing and proposed airspace areas.

The vast majority of public lands under the proposed airspace are managed by the BLM and USFS. Both agencies provide access and recreational opportunities to the public on these lands. The recreation analysis will focus on public lands and major areas of outdoor recreation beneath the affected airspace.

3.7.2.1 Talon MOA

The Lincoln National Forest is under the existing and proposed Talon MOA (See **Figure 3.6-1**). The USFS conducts National Visitor Use Monitoring to maintain estimates of forest visitation, use, and socioeconomic impact. For the Lincoln National Forest, there were an estimated 696,180 visitors in fiscal year 2009, which increased to an estimated 766,723 visitors in FY 2014. The most common recreational activities that occur in the forest are viewing natural features, viewing wildlife, hiking, relaxing, and driving for pleasure (USFS 2018a). Within the Lincoln National Forest, no designated Wilderness Areas exist beneath the existing or proposed Talon MOA.

The northern boundary of Carlsbad Caverns National Park overlaps slightly with the proposed Talon High MOA, the floor of which would be 12,500 feet. In 2018 there were 465,912 visitors including 184 backcountry campers. Average visitation over the last 10 years (2009-2018) was 429,153 (NPS 2019). Recreational opportunities at the Carlsbad Caverns National Park include touring the caverns; the bat flight program, which runs from late May to October each year; the night sky program; and hiking along surface trails (NPS 2018). Small portions of the Guadalupe Ridge Trail and Carlsbad Caverns Trail underlie the proposed Talon High MOA.

Two New Mexico State Parks, Brantley Lake State Park and the Living Desert Zoo and Gardens State Park, are located beneath the existing and proposed Talon MOA. Brantley Lake State Park offers boating, kayaking, canoeing, fishing, hiking, bird watching, and camping (New Mexico EMNRD 2018a). Recent visitation statistics for Brantley Lake State Park are not available, but the park averaged 127,040 visitors annually between FY 1997 and FY 2001 (New Mexico EMNRD no date). The Living Desert Zoo and Gardens State Park is a native wildlife zoo that also offers hiking and picnicking (New Mexico EMNRD 2018b). In 2009, the Park had 51,568 visitors (New Mexico EMNRD 2011). Additionally, the William S Huey Wildlife Area, managed by NMDGF is located beneath the proposed Talon MOA. While primarily managed for wildlife habitat, such areas also are accessible to the public for wildlife viewing, fishing, and hunting.

The Avalon Reservoir is also located under the existing and proposed Talon MOA. The reservoir is managed by the BOR; however, recreation at the reservoir is managed by the Carlsbad Irrigation District. Recreational opportunities at the Avalon Reservoir include canoeing, kayaking, and fishing (New Mexico EMNRD 2018c). There are no visitation statistics available for the Avalon Reservoir.

3.7.2.2 Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs

The National Forests under the existing and proposed Cato and Smitty MOAs and the proposed Lobos MOA include the Gila National Forest, Cibola National Forest, and Apache-Sitgreaves National Forest (See **Figure 3.6-2**).

As stated above, the USFS conducts National Visitor Use Monitoring to maintain estimates of forest visitation, use, and socioeconomic impact. For the Gila National Forest, there were an estimated 513,861 visitors in FY 2011, but visitation decreased to an estimated 389,530 in FY 2016. The most common recreational activities that occur in the forest are hiking, viewing natural features, viewing wildlife, relaxing, visiting historic sites, and driving for pleasure (USFS 2018a). There are designated Wilderness Areas within the Gila National Forest that have been preserved in their natural condition. Beneath proposed airspace, these areas include the Aldo Leopold and Gila Wilderness. Travel into the Wilderness Areas is only permitted by foot or horseback, and no motorized vehicles or mechanized vehicles (including mountain bikes) are permitted. Hunting and fishing are allowed in the Wilderness Areas under New Mexico game laws (USFS 2018b). There were approximately 34,134 visits to Wilderness Areas in the Gila National Forest during FY 2016 (USFS 2018a).

For the Cibola National Forest, there were an estimated 1,426,285 visitors in FY 2011, which increased to an estimated 1,590,919 visitors in FY 2016. The most common recreational activities that occur in the forest are viewing natural features, hiking, relaxing, and viewing wildlife (USFS 2018a). There are designated Wilderness Areas within the Cibola National Forest that have been preserved in their natural condition. Beneath existing and proposed airspace, these areas include the Apache Kid and Withington Wilderness Area. Recreational opportunities in the Cibola National Forest's Wilderness Areas include hiking and camping. No mechanized vehicles are allowed in the Wilderness Areas (USFS 2018c). There were approximately 161,470 visits to Wilderness Areas in the Cibola National Forest during FY 2016 (USFS 2018a).

For the Apache-Sitgreaves National Forest, there were an estimated 1,172,729 visitors in FY 2007, which decreased to an estimated 520,473 visitors in FY 2014. The most common recreational activities that occur in the forest are hiking, relaxing, viewing wildlife, viewing natural features, fishing, picnicking, and camping (USFS 2018a). There are no designated Wilderness Areas within the Apache-Sitgreaves National Forest beneath existing or proposed airspace.

The Gila Cliff Dwellings National Monument is beneath the proposed Lobos MOA, surrounded by the Gila National Forest. Recreational opportunities at the Gila Cliff Dwellings National Monument include bird watching, hiking, interpretive programs, nature walks, wildlife viewing, and tours of the cliff dwellings. There is no backcountry use (NPS 2016). In 2018 there were 79,108 visitors. Average visitation over the last 10 years (2009-2018) was 42,460 (NPS 2019).

The Bosque del Apache National Wildlife Refuge is located beneath the proposed Christa and Kendra ATCAAs. Recreational opportunities within the refuge include guided tours, wildlife watching, hiking nature trails, bicycling, hunting, and fishing (USFWS 2017). There are approximately 160,000 visitors to the Bosque del Apache National Wildlife Refuge each year (USFWS 2012).

Elephant Butte and Caballo Reservoirs are located under the proposed Christa and Kendra ATCAAs. These areas offer recreational opportunities such as wildlife viewing, camping, hiking, fishing, and water-related activities such as swimming, boating, and kayaking (New Mexico EMNRD 2018d, 2018e). There are no

visitation statistics available for the Elephant Butte and Caballo Reservoirs. Additionally, several Wildlife Areas and Wildlife Management Areas, managed by NMDGF, are located beneath airspace (see **Table 3.5-7**). These areas provide wildlife habitat for numerous species as well as public access for wildlife viewing, fishing, and hunting.

3.8 SOCIOECONOMICS

3.8.1 Resource Definition

The CEQ regulations implementing NEPA state that when economic or social effects and natural or physical environmental effects are interrelated, these effects on the human environment should be discussed (40 CFR 1508.14). The CEQ regulations further state that the "human environment shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment." In addition, 40 CFR 1508.8 states that agencies need to assess not only direct effects, but also "aesthetic, historic, cultural, economic, social, or health" effects. Following from these regulations, the socioeconomic analysis evaluates how elements of the human environment might be affected.

3.8.2 Affected Environment

The affected environment for socioeconomics, as described in this section, includes the counties located under the existing and proposed airspace that could be potentially impacted by the change in the acoustic environment from the pilot training activities. This analysis focuses on the MOAs only since the proposed use of Christa and Kendra ATCAAs would be at an altitude which would have minimal to no noise contributions at ground level. Additionally, information on New Mexico and Arizona overall is provided for purposes of context when reviewing the county-level data.

A description of the population, housing, and economic characteristics of the affected environment is provided for the MOAs. In addition to those characteristics, this analysis also looks at local spending activity associated with National Forest visitation since National Forests comprise a large land area below the airspace and contribute to the local economy. While there are other recreational opportunities beneath the airspace, the National Forests are the most likely to attract out of town visitors that generate revenue in the local economy (see **Section 3.7,** Recreation Resources).

3.8.2.1 Talon MOA

Population

Table 3.8-1 presents population information for New Mexico, and the counties that are associated with the existing and proposed Talon MOA for the years 2000, 2010, and 2016, as well as annual rates of population change in each county during the 2000-2010 and 2010-2016 periods. The proposed Talon MOA overlies portions Otero, Lea, Chaves, and Eddy Counties. Lea County was the fastest growing county over both the 2000 to 2010 and 2010 to 2016 periods, growing at annual rates of 1.5 percent and 1.1 percent, respectively. From 2000 to 2010 all other counties in the Talon MOA grew at a slower rate than New Mexico (1.0 percent per year), with Otero County only growing at 0.1 percent per year and Eddy and Chaves Counties growing at 0.4 percent and 0 percent per year, respectively. As of 2016, populations in Eddy, Otero, and Lea Counties increased, while Chaves County showed a slight population decline.

Table 3.8-1. Talon MOA Population and Population Trends, 2000-2016					
	2000	**2010**	**2016**	**Annual Rate of Change 2000-2010**	**Annual Rate of Change 2010-2016**
New Mexico	1,819,046	2,013,122	2,082,669	1.0%	0.6%
Otero County	62,298	62,782	65,333	0.1%	0.7%
Lea County	55,511	64,727	68,930	1.5%	1.1%
Chaves County	61,382	65,645	65,610	0.7%	0.0%
Eddy County	51,658	53,829	56,369	0.4%	0.8%

Sources: U.S. Census Bureau 2000, 2010, 2016.
Legend: %-percent; MOA-Military Operations Area.

Housing Characteristics

Table 3.8-2 presents information on housing characteristics for New Mexico, Otero, Lea, Chaves, and Eddy Counties for the year 2016. Otero County had the largest number of housing units (30,976) and Eddy had the fewest (23,428). Lea and Chaves Counties had the highest vacancy rates (12.1 percent and 11.0 percent respectively), while Eddy County had the lowest (4.4 percent). Median housing values for all counties in the Talon MOA were lower than New Mexico overall, with the highest values under the Talon MOA being $134,100 compared to New Mexico's $161,600. Otero County had the highest median gross rent under the Talon MOA ($827 per month), and was the only county with higher rent than New Mexico overall ($792 per month).

Table 3.8-2. Talon MOA Housing Characteristics, 2016					
	New Mexico	**Otero County**	**Lea County**	**Chaves County**	**Eddy County**
Total housing units[1]	912,445	30,976	25,340	26,710	23,428
Occupied housing units	762,551	23,043	21,542	23,153	20,941
Vacant housing units	149,894	7,933	3,798	3,557	2,487
Rental vacancy rate	8.8%	7.6%	12.1%	11.0%	4.4%
Median housing value	$161,600	$105,000	$111,400	$102,400	$134,100
Median gross rent	$792	$827	$797	$706	$780

Sources: U.S. Census Bureau 2010, 2016, [1]2019.
Note: [1]A housing unit is a house, apartment, mobile home, group of rooms, single room occupied as a separate living quarter, or vacant units intended for occupancy.
Legend: %-percent; MOA-Military Operations Area.

Economic Characteristics

Table 3.8-3 presents information on economic characteristics for New Mexico, Otero, Lea, Chaves, and Eddy Counties. As of 2016, with the exception of Otero County (11.0 percent), all of the counties beneath Talon MOA had lower unemployment rates than New Mexico overall (8.5 percent). Lea and Eddy Counties had higher median household incomes and lower poverty rates than New Mexico, while Otero and Chaves Counties had lower median incomes and higher rates of poverty than the state as a whole.

Table 3.8-3. Talon MOA Economic Characteristics, 2016					
	New Mexico	Otero County	Lea County	Chaves County	Eddy County
Number Employed	876,210	22,856	28,847	26,687	26,343
Number Unemployed	81,175	2,822	2,041	2,026	1,539
Unemployment Rate	8.5%	11.0%	6.5%	7.0%	5.5%
Median household income	$45,674	$41,502	$58,152	$41,356	$59,625
Families with incomes below the poverty line	15.9%	19.4%	12.8%	17.6%	10.1%

Source: U.S. Census Bureau 2016.
Legend: %-percent; MOA-Military Operations Area.

The existing and proposed Talon MOA overlies the Eastern Workforce Investment Region, which includes 12 counties: Chaves, Curry, De Baca, Eddy, Guadalupe, Harding, Lea, Lincoln, Otero, Quay, Roosevelt, and Union. Agriculture, including beef and dairy cattle ranching, is an important economic activity in this area. DoD expenditures (captured under public administration) at Cannon AFB, Holloman AFB, and WSMR also play a large role in the economy. Other important industries are oil, gas, manufacturing, education, research, banking, and medical services. This region has 1.5 candidates per job opening and the average annual wage is $43,992 (New Mexico Workforce Connection 2018a).

Table 3.8-4 provides the top employment industries in 2016 for the counties associated with the existing and proposed Talon MOA. Primary employment industries in these counties includes: retail trade; education services, and health care and social assistance; and agriculture.

Table 3.8-4. Talon MOA Percentage of Total Employees by Industry, 2016				
Industry	Otero	Lea	Chaves	Eddy
Agriculture, forestry, fishing and hunting, and mining	2.8	20.3	9.8	17.7
Construction	8.7	8.3	5.5	7.0
Manufacturing	1.9	3.3	5.3	5.1
Wholesale trade	1.0	5.7	2.0	3.5
Retail trade	11.9	10.0	12.8	11.3
Transportation and warehousing, utilities	4.0	8.1	6.9	7.7
Information	1.3	0.8	0.7	1.2
Finance and insurance, and real estate and rental and leasing	4.1	3.4	4.0	3.8
Professional, scientific, and management, and administrative and waste management services	7.4	6.1	5.9	5.4
Educational services, and health care and social assistance	23.5	16.4	26.3	17.4
Arts, entertainment, and recreation, and accommodation and food services	14.0	9.1	10.3	7.6
Other services, except public administration	4.1	4.7	4.8	5.5
Public administration[1]	15.3	3.7	5.7	6.8

Source: U.S. Census Bureau 2016.
Note: [1] Includes DoD expenditures.
Legend: MOA-Military Operations Area.

3.8.2.2 Cato, Smitty, and Lobos MOAs

Population

Table 3.8-5 presents population information for New Mexico, Arizona, and the counties that underlie the existing and proposed Cato, Smitty, and Lobos MOAs for the years 2000, 2010, and 2016, as well as annual rates of population change in each municipality during the 2000-2010 and 2010-2016 periods. The counties associated with the Cato, Smitty, and Lobos MOAs include: Graham and Greenlee (Arizona), and Hidalgo, Grant, Catron, Sierra, and Socorro (New Mexico). Population in many of the counties under the Cato, Smitty, and Lobos MOAs declined from 2000 to 2016, with Hidalgo and Sierra Counties showing the largest declines. Graham County grew most quickly from 2000 to 2010 (1.1 percent per year), while Greenlee County grew at the quickest rate from 2010 to 2016 (1.5 percent per year).

Table 3.8-5. Cato, Smitty, and Lobos MOAs Population and Population Trends, 2000-2016

	2000	2010	2016	Annual Rate of Change 2000-2010	Annual Rate of Change 2010-2016
Arizona	**5,130,632**	**6,392,017**	**6,728,577**	**2.2%**	**0.9%**
Graham County	33,489	37,220	37,529	1.1%	0.1%
Greenlee County	8,547	8,437	9,224	-0.1%	1.5%
New Mexico	**1,819,046**	**2,013,122**	**2,082,669**	**1.0%**	**0.6%**
Hidalgo County	5,932	4,894	4,531	-1.9%	-1.3%
Grant County	31,002	29,514	28,879	-0.5%	-0.4%
Sierra County	13,270	11,988	11,442	-1.0%	-0.8%
Catron County	3,543	3,725	3,547	0.5%	-0.8%
Socorro County	18,078	17,866	17,324	-0.1%	-0.5%

Sources: U.S. Census Bureau 2000, 2010, 2016.
Legend: %-percent; MOA-Military Operations Area.

Housing Characteristics

Table 3.8-6 presents information on housing characteristics for the years 2010 and 2016 for New Mexico and Arizona as a whole, and for the counties under the Cato, Smitty, and Lobos MOAs: Graham and Greenlee (Arizona), and Hidalgo, Grant, Catron, Sierra, and Socorro (New Mexico). All of the counties under the Cato, Smitty, and Lobos MOAs had lower median housing values than either Arizona or New Mexico overall, with Catron having a higher median value ($161,200) than any other county, which was on par with the state. Similarly, median rents in both Arizona counties were below those of Arizona overall, and median rents in all four New Mexico counties were lower than New Mexico overall.

Economic Characteristics

Table 3.8-7 presents information on economic characteristics for New Mexico and Arizona and the counties of Graham, Greenlee, Hidalgo, Grant, Catron, Sierra, and Socorro. As of 2016, of the counties under the Cato, Smitty, and Lobos MOAs, Graham County had the highest unemployment rate (14.4 percent) and Catron County had the lowest (4.0 percent). Greenlee County had the highest median income ($51,801) and Sierra County had the lowest ($29,679). Hidalgo County had the highest percentage of families living below the poverty line (20.2 percent), while Catron and Greenlee Counties had the lowest rate (10.3 percent in both counties).

Table 3.8-6. Cato, Smitty, and Lobos MOAs Housing Characteristics, 2016									
	Arizona	Graham County	Greenlee County	**New Mexico**	Hidalgo County	Grant County	Catron County	Sierra County	Socorro County
Total housing units[1]	**2,913,541**	13,268	4,424	**912,445**	2,399	14,678	3,930	8,289	8,004
Occupied housing units	**2,448,919**	10,915	3,295	**762,551**	1,763	11,941	1,425	5,341	4,786
Vacant housing units	**464,622**	2,353	1,129	**149,894**	636	2,737	2,505	2,948	3,218
Rental vacancy rate	**7.9%**	9.0%	8.0%	**8.8%**	6.2%	5.9%	21.1%	16.5%	23.3%
Median housing value	**$176,900**	$121,400	$81,600	**$161,600**	$77,800	$135,000	$161,200	$89,900	$120,200
Median gross rent	**$937**	$794	$421	**$792**	$524	$668	$663	$582	$607

Source: U.S. Census Bureau 2016.
Note: [1]A housing unit is a house, apartment, mobile home, group of rooms, single room occupied as a separate living quarter, or vacant units intended for occupancy.
Legend: %-percent; MOA-Military Operations Area.

Table 3.8-7. Cato, Smitty, and Lobos MOAs Economic Characteristics, 2016									
	Arizona	Graham County	Greenlee County	**New Mexico**	Hidalgo County	Grant County	Catron County	Sierra County	Socorro County
Number Employed	**2,879,372**	12,014	3,561	**876,210**	1,721	10,638	1,078	3,969	5,744
Number Unemployed	**249,972**	2,025	347	**81,175**	221	1,092	45	442	351
Unemployment Rate	**8.0%**	14.4%	8.9%	**8.5%**	11.4%	9.3%	4.0%	10.0%	5.8%
Median household income	**$51,340**	$47,422	$51,801	**$45,674**	$34,528	$38,890	$38,142	$29,679	$34,542
Families with incomes below the poverty line	**12.9%**	17.2%	10.3%	**15.9%**	20.2%	14.8%	10.3%	14.6%	14.7%

Source: U.S. Census Bureau 2016.
Legend: %-percent; MOA-Military Operations Area.

The existing and proposed Cato, Smitty, and Lobos MOAs overlie the Southwestern Workforce Investment Region, which includes seven counties: Catron, Doña Ana, Grant, Hidalgo, Luna, Sierra, and Socorro. Agriculture and copper mining provide many jobs in this area. The New Mexico Institute of Mining and Technology, New Mexico State University, and Western New Mexico University are also important sources of employment in the region (New Mexico Workforce Connection 2018b).

Table 3.8-8 provides the top employment industries in 2016 for the counties associated with the Cato, Smitty, and Lobos MOAs. The primary employment industries for the Cato, Smitty, and Lobos MOAs counties include: educational services, and health care and social assistance; agriculture; and public administration.

Table 3.8-8. Cato, Smitty, and Lobos MOAs Percentage of Total Employees by Industry, 2016							
Industry	**Graham County (Arizona)**	**Greenlee County (Arizona)**	**Hidalgo County**	**Grant County**	**Catron County**	**Sierra County**	**Socorro County**
Agriculture, forestry, fishing and hunting, and mining	13.2%	44.5%	14.7%	14.4%	20.6%	7.1%	5.5%
Construction	5.9%	9.2%	6.7%	6.7%	2.6%	8.1%	4.6%
Manufacturing	3.4%	1.1%	1.7%	1.6%	1.5%	1.7%	3.7%
Wholesale trade	1.3%	1.2%	0.9%	1.6%	0.0%	1.2%	0.9%
Retail trade	14.2%	6.2%	11.6%	11.4%	5.8%	11.3%	8.0%
Transportation and warehousing, utilities	3.0%	3.2%	5.5%	2.7%	10.9%	5.6%	3.3%
Information	1.2%	0.4%	1.1%	0.4%	1.5%	1.2%	0.8%
Finance and insurance, and real estate and rental and leasing	3.3%	1.4%	2.2%	4.9%	0.4%	4.0%	4.3%
Professional, scientific, and management, and administrative and waste management services	5.7%	2.8%	4.0%	4.9%	9.2%	5.5%	7.8%
Educational services, and health care and social assistance	25.5%	14.9%	25.2%	30.1%	17.4%	27.9%	43.1%
Arts, entertainment, and recreation, and accommodation and food services	9.0%	7.8%	11.7%	11.3%	8.2%	11.8%	10.8%
Other services, except public administration	4.9%	2.0%	1.3%	4.8%	5.2%	4.0%	1.5%
Public administration	9.4%	5.3%	13.4%	5.1%	16.8%	10.6%	5.6%

Source: U.S. Census Bureau 2016.
Legend: %-percent; MOA-Military Operations Area.

3.8.2.3 National Forest Visitor Spending

Table 3.8-9 presents information on visitor spending related to visits at all of the National Forests below the existing and proposed airspace to include: Gila National Forest, Lincoln National Forest, Apache-Sitgreaves National Forest, and Cibola National Forest. Cibola National Forest received the most visits (1.6 million) and had the most visitor spending ($48 million). Apache-Sitgreaves National Forest had the second most visits (1.4 million), and Lincoln National Forest had the second highest visitor spending ($41 million).

Table 3.8-9. National Forest Visitor Spending, FY 2014 and FY 2016

	Gila National Forest (FY 2016)	Lincoln National Forest (FY 2014)	Apache-Sitgreaves National Forest (FY 2014)	Cibola National Forest (FY 2016)
Annual National Forest Visits	696,180	1,172,729	1,426,285	1,590,919
Average Trip Duration (Nights)	5.7	4.3	6.4	5.3
Average Party Size	2.5	2.9	2.7	2.3
Number of Party Trips	49,427	93,408	82,053	130,561
Average Total Trip Spending per Party	$525	$438	$388	$369
Total Annual Visitor Spending	**$25,949,054**	**$40,912,514**	**$31,836,439**	**$48,176,900**

Sources: USFS 2016a, 2016b, 2014a, 2014b.
Legend: FY-fiscal year.

3.9 ENVIRONMENTAL JUSTICE

3.9.1 Resource Definition

In 1994, President Clinton signed EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. The general purposes of the EO are to 1) focus the attention of Federal agencies on the human health and environmental conditions in minority communities and low-income communities with the goal of achieving environmental justice; 2) foster nondiscrimination in Federal programs that substantially affect human health or the environment; and 3) give minority communities and low-income communities greater opportunities for public participation in and access to public information on matters relating to human health and the environment.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was issued in 1997 to identify and address issues that affect the protection of children. Children may suffer disproportionately more environmental health and safety risks than adults because of various factors: children's neurological, digestive, immunological, and other bodily systems are still developing; children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults; children's behavior patterns may make them more susceptible to accidents because they are less able to protect themselves; and children's size and weight may diminish the protection they receive from standard safety features.

3.9.2 Affected Environment

3.9.2.1 Minority and Low-Income Populations

This section identifies minority or low-income populations that could potentially be affected by the Proposed Action. For the purpose of this evaluation, minority refers to people who identified themselves in

the U.S. Census as Black or African American, Asian, or Pacific Islander, American Indian or Alaskan Native, other non-White races, or as being of Hispanic or Latino origin. Persons of Hispanic and Latino origin may be of any race (CEQ 1997). The CEQ identifies these groups as minority populations when either 1) the minority population of the affected area exceeds 50 percent or 2) the minority population percentage in the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis. While not defined by the CEQ, the term "meaningfully greater" for the purposes of this EIS has been interpreted to mean that the total minority population is 20 percent or more than the minority population of the geographic region of comparison. Poverty (i.e., low-income) status is determined by dollar-value thresholds that vary by family size and composition. If a family's total income is less than the dollar-value of the appropriate threshold, then that family and every individual in it are considered to be in poverty.

Changes in the noise environment were the primary consideration in the analysis, and as such, determinations are made as to whether changes in the noise environment would adversely affect the health or environment of populations living in the affected areas.

Table 3.9-1 provides the total population, total minority, percentage minority, total low-income population, and low-income percentage for the counties affected by the Proposed Action. Minority and low-income populations are then compared to their respective state.

The minority population within the ROI exceeds 50 percent in seven of the eleven counties. Five of the eleven counties have low-income populations that exceed 20 percent.

Table 3.9-1. Minority and Low-Income Populations under the Talon, Cato, Smitty, and Lobos MOAs

	Total Population	Minority Population[1]	Percent Minority	Low-Income Population	Percent Low-Income
State of Arizona	6,728,577	2,950,701	43.9	1,165,636	17.3
Graham County	37,529	18,216	48.5	7,419	19.8
Greenlee County	9,224	4,817	52.2	1,216	13.2
State of New Mexico	2,082,669	1,277,066	61.3	426,814	20.5
Catron County	3,547	759	21.4	809	22.8
Chaves County	65,610	38,731	59.0	14,196	21.6
Eddy County	56,369	28,552	50.7	7,638	13.6
Grant County	28,879	15,297	53.0	6,086	21.1
Hidalgo County	4,531	2,640	58.3	1,075	23.7
Lea County	68,930	42,585	61.8	10,549	15.3
Otero County	65,333	32,330	49.5	1,165,636	17.3
Sierra County	11,442	3,856	33.7%	2,471	21.6%
Socorro County	17,324	11,151	64.4	7,419	19.8

Source: U.S. Census Bureau 2016.
Note: [1]Minority population calculated by subtracting the non-Hispanic white only population total from total population values.
Legend: MOA-Military Operations Area.

3.9.2.2 Protection of Children

This section identifies populations under the age of 18 that could potentially be affected by the Proposed Action. As shown in **Table 3.9-2**, the percentage of the population estimated to be under age 18 was 24.1 percent in Arizona and New Mexico with Greenlee County and Lea County having the largest percentages, respectively.

Table 3.9-2. Percentage of Residents under Age 18 under the Talon, Cato, Smitty, and Lobos MOAs		
	Total Population	**Percentage Under Age 18[1]**
State of Arizona	6,728,577	24.1
Graham County	37,529	27.8
Greenlee County	9,224	28.3
State of New Mexico	2,082,669	24.1
Catron County	3,547	15.7
Chaves County	65,610	27.1
Eddy County	56,369	26.2
Grant County	28,879	20.9
Hidalgo County	4,531	23.2
Lea County	68,930	30.2
Otero County	65,333	23.8
Socorro County	17,324	26.1

Source: U.S. Census Bureau 2016.
Note: [1] Calculated by subtracting percentage of population 18 years and older from 100.

3.10 SAFETY

This section addresses ground and flight safety associated with activities conducted by units operating within the existing Talon, Cato, and Smitty MOAs. Ground safety includes activities associated with crash response and fire risk and management. Flight safety considers aircraft flight risks such as aircraft mishaps and bird/wildlife-aircraft strikes.

3.10.1 Resource Definition

The Air Force practices Operational Risk Management as outlined in AFI 90-901, *Operational Risk Management* (Air Force 2011). Requirements outlined in this document provide for a process to maintain readiness in peacetime and achieve success in combat while safeguarding people and resources. The safety analysis contained in the following sections addresses issues related to the health and well-being of both military personnel and civilians under the training airspace. Specifically, this section provides information on aircraft mishaps, Bird/Wildlife-Aircraft Strike Hazard (BASH), and chaff and flares.

The FAA is responsible for ensuring safe and efficient use of U.S. airspace by military and civilian aircraft and for supporting national defense requirements. To fulfill these requirements, the FAA has established safety regulations, airspace management guidelines, a civil-military common system, and cooperative activities with the DoD. The primary safety concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes) to occur, which could be caused by mid-air collisions with other aircraft or objects, weather difficulties, mechanical failures, pilot error, or bird/wildlife-aircraft strikes.

3.10.2 Affected Environment

3.10.2.1 Ground Safety

Crash Response

Holloman AFB maintains detailed emergency and mishap response plans to react to an aircraft accident, should one occur. These plans assign agency responsibilities and prescribe functional activities necessary to react to major mishaps, whether on or off base. Response would normally occur in two phases. The initial

response focuses on rescue, evacuation, fire suppression, safety, elimination of explosive devices, ensuring security of the area, and other actions immediately necessary to prevent loss of life or further property damage. This consists of those personnel and agencies primarily responsible to initiate the initial phase. This element will include the Fire Chief, who will normally be the first On-scene Commander, fire-fighting and crash-rescue personnel, medical personnel, security police, and crash-recovery personnel. A subsequent response team will be comprised of an array of organizations whose participation will be governed by the circumstances associated with the mishap and actions required to be performed. Subsequently, the second, or investigation phase, is accomplished.

Holloman AFB also maintains Mutual Aid Agreements with the City of Albuquerque and Otero County's 20 fire departments. These Mutual Aid Agreements agree to provide fire protection and hazardous materials response to the city or county if requested of Holloman AFB. Holloman AFB Fire Emergency Service responds to any Air Force aircraft incident within a 25 mile radius of Holloman AFB. If an incident occurs outside of the 25 mile radius, Holloman AFB Fire Emergency Service would establish a convoy and respond to the incident if warranted.

Regardless of the agency initially responding to the accident, efforts are directed at stabilizing the situation and minimizing further damage. If the accident has occurred on non-Federal property, a National Defense Area would be established around the accident scene and the site would be secured to protect classified information or DoD equipment and/or material for the investigation phase.

After all required investigations and related actions on the site are complete, the aircraft would be removed. The Base Civil Engineer accomplishes cleanup of the site or contracts to an outside agency to accomplish the cleanup. Overall, the purpose of response planning is to:

- save lives, property, and material by timely and correct response to mishaps;
- quickly and accurately report mishaps to higher Headquarters; and
- investigate the mishap to preclude the reoccurrence of the same or a similar mishap.

Fire Risk Management

The land area under the existing and proposed MOAs/ATCAAs airspace is managed by a variety of separate entities, including BLM, NPS, and USFS. Fire suppression of wildland fires on Federal lands is the responsibility of the entity that owns/manages that land, and is geared toward protecting lives and suppressing wildfire.

The USFS maintains fire incident data back to 1992. From 1992 to 2015, there were 1,674 recorded fire incidents within the existing airspace for the Talon, Cato, and Smitty MOAs (Short 2017). Of the 1,674 incidents, 1,124 occurred within the Cato and Smitty MOAs, and of those 973 (87 percent) were caused by lightning. Within the Talon MOA, 550 fire incidents occurred. Of that 550, 29 percent were classified as "miscellaneous", and 26 percent were caused by lightning. No recorded incident was directly related to aircraft mishaps or training activities.

3.10.2.2 Flight Safety

Aircraft flight operations in the existing and proposed MOAs and ATCAAs are governed by standard rules of flight. Additionally, specific procedures applicable to local operations are contained in detailed Standard Operation Procedures (SOPs) that must be followed by all aircrews operating from the installation (Holloman AFB Instruction 11-250).

The primary public concern with regard to flight safety is the potential for aircraft accidents. Such mishaps may occur as a result of mid-air collisions, collisions with manmade structures or terrain, weather-related accidents, mechanical failure, pilot error, or bird/wildlife-aircraft collisions. Flight risks apply to all aircraft; they are not limited to the military. Flight safety considerations addressed include aircraft mishaps and bird/wildlife-aircraft strikes.

Aircraft Mishaps

Aircraft mishaps and their prevention represent a paramount concern of the Air Force. The Air Force defines four categories of aircraft mishaps: Classes A, B, C, and D (DoD 2011), as shown in **Table 3.10-1**. Class A mishaps are of primary concern because of their potentially catastrophic results.

Table 3.10-1. Aircraft Class Mishaps

Mishap Class	Total Property Damage	Fatality/Injury
A	$2,000,000 or more and/or aircraft destroyed	Fatality or permanent total disability
B	$500,000 or more but less than $2,000,000	Permanent partial disability or three or more persons hospitalized as inpatients
C	$50,000 or more but less than $500,000	Nonfatal injury resulting in loss of one or more days from work beyond day/shift when injury occurred
D	$20,000 or more but less than $50,000	Recordable injury or illness not otherwise classified as A, B, or C

Source: DoD 2011.

Class A mishaps, the most severe, provide an indicator of aircraft safety. Based on historical data on mishaps at all installations and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory to provide the basis for evaluating risks among different aircraft and levels of operations. These mishap rates do not consider combat losses due to enemy action. The predominant aircraft operating at Holloman AFB, F-16 (all models) aircraft have flown more than 10,889,000 hours since the aircraft entered the Air Force inventory during 1975. Over that period, 374 Class A mishaps have occurred and 335 aircraft have been destroyed. This results in a Class A mishap rate of 3.43 per 100,000 flight hours, and an aircraft destroyed rate of 3.08 (AFSEC 2018a).

Bird/Wildlife-Aircraft Strike Hazard

Bird aircraft strikes constitute a safety concern because they can result in damage to aircraft or injury to aircrews or local populations if an aircraft crashes. Aircraft may encounter birds at altitudes up to FL300 or higher. However, most birds fly close to the ground. Over 98 percent of reported bird-strikes occur below 5,000 feet AGL (AFSEC 2018b). Approximately 49 percent of bird-strikes happen in the airport environment (climb-out, traffic pattern, approach and landing); and, about 42 percent occur during low altitude flight training (AFSEC 2018c).

Migratory waterfowl (e.g., ducks, geese, and swans) are the most hazardous birds to low-flying aircraft because of their size and their propensity for migrating in large flocks at a variety of elevations and times of day. Waterfowl vary considerably in size, from 1 to 2 pounds for ducks, 5 to 8 pounds for geese, and up to 20 pounds for most swans. There are two normal migratory seasons, fall and spring. Waterfowl are usually only a hazard during migratory seasons. These birds typically migrate at night and generally fly

between 1,500 to 3,000 feet AGL during the fall migration; and, from 1,000 to 3,000 feet AGL during the spring migration.

In addition to waterfowl, raptors, shorebirds, gulls, herons, songbirds, and other birds also pose a hazard. In considering severity, the results of bird aircraft strikes in restricted areas show that strikes involving raptors result in the majority of Class A and Class B mishaps related to bird aircraft strikes. Areas of significant bird of prey activity within training airspace used by Holloman AFB aircrews include the Guadalupe Mountains, Black Range, and the western escarpment of the Sacramento Mountains. Peak migration periods for raptors, especially eagles, are from October to mid-December and from mid-January to the beginning of March. In general, flights above 1,500 feet AGL would be above most migrating and wintering raptors.

Songbirds are small birds, usually less than one pound. During nocturnal migration periods, they navigate along major rivers, typically between 500 to 3,000 feet AGL. The potential for bird aircraft strikes is greatest in areas used as migration corridors (flyways) or where birds congregate for foraging or resting (e.g., open water bodies, rivers, and wetlands).

While any bird aircraft strike has the potential to be serious, many result in little or no damage to the aircraft, and only a minute portion result in a Class A mishap. During the years 1985 to 2014, the Air Force BASH Team documented 108,670 bird-strikes worldwide (AFSEC 2018d). Of these, 16 resulted in Class A mishaps where the aircraft was destroyed (AFSEC 2018e). Bird aircraft strike data from 2004 to 2016 indicate that Holloman-based aircraft experienced a total of 58 bird-strikes, or an average of less than 5 per year (Holloman AFB 2016).

3.10.2.3 Chaff and Flares

Chaff

The primary airspace safety issue related to chaff deployment is the potential to interfere with air traffic control radar. During a 10-year period (1983 to 1993) evaluated for a 1997 analysis, the entire Air Force experienced only 53 high accident potential events associated with chaff system malfunctions during flight operations involving a variety of aircraft (Air Force 1997). Twenty-nine of the 53 events (approximately 55 percent) occurred in 1985 to 1986. During this timeframe, the Air Force experienced a mechanical problem with a particular type of dispensing system resulting in a high incidence of inadvertent releases. The system was repaired in 1987 and high accident potential incidents for chaff systems during flight operations occurred at a rate of less than three per year (Air Force 1997). During this same 10-year period, there were no chaff system-related Class A, B, or C mishaps, and only five Class D mishaps and 42 high accident potential occurrences during non-aircraft related, ground operations (Air Force 1997). In the *Environmental Effects of Self –Protection Chaff and Flares Final Report*, the Air Force determined that potential radar conflicts could be avoided if prior to chaff use, a frequency clearance was obtained from the Air Force Frequency Management Center and Headquarters FAA (Air Force 1997).

The RR188 chaff used for training is currently authorized for use by Holloman AFB aircraft in numerous airspace units. Chaff may be deployed in applicable airspace but not within 60 nm of radar facilities for El Paso Approach or Albuquerque Center (Holloman AFB Instruction 11-250).

Flares

The effective use of flares in combat requires training and frequent use by aircrews to master the timing of deployment, the capabilities of the devices, and to ensure safe and efficient handling by ground crews. Under this proposal, aircrews would use M206 defensive flares, the same type the F-16s currently use.

When threatened by "enemy" radar, pilots must take evasive action to avoid detection and/or attack by adversary air defense systems, including the discharging of pyrotechnic flares. Flares consist of highly flammable material that burns rapidly at extremely high temperatures. Their purpose is to provide a heat source other than the aircraft's engine exhaust as a target for a threatening heat seeking missile. The current and proposed use of flares would be performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health requirements. The handling, processing, and storage of products for these activities are accomplished in accordance with all Federal and state requirements applicable to the substance generated.

Flare deployment in authorized airspace is governed by a series of regulations that are based on safety and environmental considerations and limitations. Among these regulations are the following:

- AFI 13-201 establishes practices to decrease disturbances from flight operations and protect the public from the hazards and effects associated with flight operations.
- AFI 13-212 outlines procedures governing weapons range use of flares.
- AFI 11-214 delineates procedures for flare employment.

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 3.10-2).** 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 3.10-2. 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

Table 3.10-2. Flare Burnout Rate and Distance[1] (cont.)	
Time (in seconds)	**Distance (in feet)**
8.5	1163.225
9.0	1304.100
9.5	1453.025
10.0	1610.000

Source: Air Force 2011.
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.

Holloman AFB restricts flare use during "Very High" or "Extreme" fire danger and this restriction would apply to the F-16 mission in proposed new airspace units. In addition to restricting flare use during times of elevated fire danger, flares may not be dropped below an altitude of 2,000 feet AGL within the existing or proposed airspace. This ensures that the flare has had ample time to exhaust itself and further prevents the chances of fires from flare use. There have been no reported flare caused fires beneath the MOAs or ATCAAs as a result of Holloman AFB pilot training.

3.11 CULTURAL RESOURCES

3.11.1 Resource Definition

Cultural resources include, but are not limited to, buildings, structures, objects, prehistoric and historical archaeological resources, or any other physical evidence of human activity considered important to a culture for scientific value, traditional use, or other reasons. Only cultural resources determined to be significant are protected under the National Historic Preservation Act.

Significant cultural resources are those generally over 50 years of age that are listed in, or determined eligible for listing in, the National Register of Historic Places (NRHP) based on having met one or more of the following criteria for significance defined in 36 CFR 60.4:

- Association with events that have made a significant contribution to the broad patterns of history or prehistory;
- Association with the lives of persons significant in our past;
- Represent unique or distinctive architectural characteristics of a type, period, method of construction, or possess high artistic values or the work of a master; or
- Have yielded, or may be likely to yield, information important in history or prehistory.

In addition to historic significance, a cultural resource must also retain integrity, which is the ability to convey historic significance. The NRHP criteria recognizes seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. A resource must retain several, if not all of these aspects, to be considered eligible for listing in the NRHP. For archaeological resources, eligibility is generally determined under Criterion D for the ability to provide important information in prehistory and/or history. The assessment of integrity for archaeological properties depends on the data requirements of an applicable research design. This includes the identification of appropriate physical remains in an intact depositional (horizontal or vertical) context.

Section 106 of the NHPA requires all Federal agencies to take into account the effects of their undertakings on historic properties and seek to avoid, minimize, or mitigate adverse effects to these properties (36 CFR

800.1(a)). Section 106 also requires agencies to consult with federally-recognized Indian tribes and other stakeholders with a vested interest in the undertaking. Holloman AFB consults with federally-recognized tribes on a recurring basis, to include non-scheduled consultations when required (see **Section 1.4**, Interagency and Intergovernmental Coordination).

3.11.2 Affected Environment

The affected environment for cultural resources is the area within which the Proposed Action has the potential to affect known cultural resources. For the Proposed Action, the affected environment is defined as the proposed boundaries of the airspace that would be used by F-16 aircraft.

Information on cultural resources within the affected environment was derived from conducting background research to identify National Register and the State Register of Historic Places properties beneath the affected airspace; national historic landmarks; national battlefields; national historic trails; any cultural landscapes, historic forts, or historic ranches recorded or known within the same area; and American Indian Reservations, sacred areas, or traditional use areas. Aircraft operations are most likely to affect historic buildings, structures, and districts where setting is an important aspect of a property's significance and where overpressures from sonic booms pose potential effects to those types of resources. In general, archaeological sites would not incur any effects as a result of the Proposed Action. However, archaeological sites listed in the NRHP were included in the analysis, as some are standing structures and rock art sites. Other sites of historic significance and interest, namely ghost towns, are located within the affected environment; however, these areas are not included on the NRHP and will not be further addressed (Ghost Towns 2018). Potential impacts to these areas would be the same as potential impacts to architectural sites from sonic boom overpressures.

Coordination letters were sent to the Arizona and New Mexico SHPOs, regional offices of the BLM, and National Forests under the airspace (see **Appendix B and Appendix J** for copies of correspondence letters). Government-to-government consultation was initiated with the Tribes and Pueblos that are located beneath or near the affected airspace or may have traditional ties to these lands to include: The Navajo Nation, San Carlos Apache Tribe, Zuni Tribe, Mescalero Apache Tribe, Apache Tribe of Oklahoma, The Hopi Tribe, White Mountain Apache Tribe, Ysleta del Sur Pueblo, Fort Sill Apache Tribe of Oklahoma, Kiowa Tribe of Oklahoma, Comanche Nation of Oklahoma, Pueblo of Acoma, Pueblo of Cochiti, Pueblo of Isleta, Pueblo of Jemez, Pueblo of Laguna, Pueblo of Nambe, Ohkay Owingeh, Pueblo of Picuris, Pueblo of Pojoaque, Pueblo of San Felipe, Pueblo of San Ildefonso, Pueblo of Sandia, Pueblo of Santa Ana, Pueblo of Santa Clara, Pueblo of Santo Domingo, Pueblo of Taos, Pueblo of Tesuque, Pueblo of Zia, and Pueblo of Zuni.

3.11.2.1 Talon MOA

Archaeological and Architectural Resources

There are ten archaeological sites and 17 architectural sites listed in the NRHP beneath the existing and proposed Talon MOA (**Table 3.11-2**). No historic trails, national monuments, or historic battlefields are located under the existing and proposed Talon MOA (NPS 2018a, 2018b, 2018c). The archaeological sites primarily consist of ruins, artifact scatters, and historic ranches. The architectural sites consist of one trail marker, one historic district, one bank, and multiple houses.

Table 3.11-2. NRHP-listed Archaeological and Architectural Sites beneath Existing and Proposed Talon MOA		
Resource Identification	**County**	**City/Town**
Archaeological		
AR-03-08-03-128	Eddy	Queen
AR-03-08-03-195	Eddy	Queen
AR-03-08-03-232	Eddy	Queen
LA 157206- White Oaks Pictograph Site	Eddy	Queen
LA 162411- Lost Again Shelter	Eddy	Queen
LA 64908- Ambush Two Hands Shelter	Eddy	Queen
LA 71921- Horse Well Shelter	Eddy	Queen
LA158783- Ambush Site	Eddy	Queen
Last Chance Canyon Apache/Calvary Battle Site	Eddy	Queen
Painted Grotto*	Eddy	Carlsbad
Architectural		
Armandine*	Eddy	Carlsbad
Baskin Building*	Eddy	Artesia
Carlsbad Irrigation District*	Eddy	Carlsbad
Dr. Robert M. Ross, House*	Eddy	Artesia
Edward R. Gesler, House*	Eddy	Artesia
F.L. Lukins, House*	Eddy	Artesia
First National Bank of Eddy*	Eddy	Carlsbad
Hodges-Runyan-Brainard House*	Eddy	Artesia
Hodges-Sipple House*	Eddy	Artesia
John Acord, House*	Eddy	Artesia
Mauldin-Hall House*	Eddy	Artesia
Moore-Ward Cobblestone House*	Eddy	Artesia
Ozark Trails Marker at Lake Arthur	Chaves	Lake Arthur
Rober Weems & Mary E. Tansill House*	Eddy	Carlsbad
Sallie Chisum Robert, House*	Eddy	Artesia
William Baskin, House*	Eddy	Artesia
Willie D. Atkeson, House*	Eddy	Artesia

Note: * Resource located beneath existing MOA
Legend: MOA-Military Operations Area; NRHP-National Register of Historic Places.

Traditional Cultural Properties

Government-to-government consultation was initiated during the scoping phase (August 2017) and continued through the development of the EIS (December 2018). Correspondence with the Tribes and Pueblos included in consultation is located in **Appendix J**. To date, no identification of traditional cultural properties have been received from the federally-recognized Tribes and Pueblos associated with the lands under the proposed Talon MOA.

3.11.2.2 Cato, Smitty, and Lobos MOAs

Archaeological and Architectural Resources

There are nine archaeological sites and 35 architectural sites listed in the NRHP beneath the proposed Cato, Smitty, and Lobos MOAs. The archaeological sites primarily consist of pueblo ruins, artifact scatters, village sites, and a National Monument. The architectural sites primarily consist of historic districts, ranches, a fire lookout cabin, one fire lookout tower, and many buildings located on the Western New Mexico University campus in Silver City. All of these resources are within Catron, Grant, and Socorro

Counties. No historic trails, national monuments, or historic battlefields are located under the Cato and Smitty MOAs (NPS 2018b, 2018c). No national historic trails or national battlefields are located under the proposed Lobos MOA (NPS 2018a, 2018c).

One National Monument, the Gila Cliff Dwellings National Monument, is under the proposed Lobos MOA near Silver City, New Mexico (NPS 2018b). It consists of 553 acres of remains of the Mogollon Culture, including multi-room cliff dwellings (NPS 2018d). See **Section 3.7,** *Recreation Resources*, for additional information about the Gila Cliff Dwellings National Monument.

One historic landmark, the Fort Bayard Historic District, is located under the proposed Lobos MOA near the town of Santa Clara in Grant County, New Mexico (NPS 2002). The Fort was in use as a medical center until very recently, when modern replacement facilities were built across the street.

Table 3.11-3. NRHP-listed Archaeological and Architectural Sites beneath Cato, Smitty, and Lobos MOAs

Resource Identification	County	City/Town
Archaeological		
Ake Site (VLA-1)*	Catron	Datil
Bat Cave*	Catron	Horse Springs
Bat Cave; boundary increase (SR 93); LA 4935; (LA 44182/North Shelter, LA 56988, NM-02-194. NM-02-439)*	Catron	Horse Springs
Gila Cliff Dwellings National Monument	Catron	Silver City
Burro Springs Site	Grant	Tyrone
Woodrow Ruin	Grant	Cliff
Janss Site	Grant	San Lorenzo
Mattocks Site	Grant	Mimbres
Wheaton-Smith Site	Grant	San Juan
Architectural		
Clemens Ranchhouse	Socorro	Magdalena
MacTavish House*	Socorro	Magdalena
Aragon House*	Socorro	Magdalena
Salome Store*	Socorro	Magdalena
MacDonald Merchandise Building*	Socorro	Magdalena
Salome Warehouse*	Socorro	Magdalena
Hall Hotel*	Socorro	Magdalena
Gutierrez House*	Socorro	Magdalena
Magdaline House*	Socorro	Magdalena
Bank of Magdalena*	Socorro	Magdalena
Lewellen House*	Socorro	Magdalena
Main Street Commercial Building*	Socorro	Magdalena
Atchison, Topeka and Santa Fe Railway Depot*	Socorro	Magdalena
Ilfeld Warehouse*	Socorro	Magdalena
Hilton House*	Socorro	Magdalena
Mangas Mountain Lookout Complex*	Catron	Mangas
El Caso Lookout Complex*	Catron	El Caso Lake
Fort Bayard Historic District	Grant	near Santa Clara
Pinos Altos Historic District	Grant	Pinos Altos
L.C. Ranch Headquarters	Grant	Gila
Black Mountain Lookout Cabin	Catron	Black Mountain
Reeds Peak Lookout Tower	Grant	Reeds Peak
St. Mary's Academy Historic District	Grant	Silver City

Table 3.11-3. NRHP-listed Archaeological and Architectural Sites beneath Cato, Smitty, and Lobos MOAs (cont.)		
Resource Identification	**County**	**City/Town**
Architectural (cont.)		
Silver City Water Works Building	Grant	Silver City
Silver City Historic District North Addition	Grant	Silver City
Silver City Historic District	Grant	Silver City
Chihuahua Hill Historic District	Grant	Silver City
H.B. Ailman House	Grant	Silver City
Bullard Hotel	Grant	Silver City
Light Hall, Western New Mexico University	Grant	Silver City
Fleming Hall, Western New Mexico University	Grant	Silver City
Ritch Hall, Western New Mexico University	Grant	Silver City
Bowden Hall, Western New Mexico University	Grant	Silver City
Heating Plant, Western New Mexico University	Grant	Silver City
Graham Gymnasium	Grant	Silver City

Note: * Resource located beneath existing MOA
Legend: MOA-Military Operations Area; NRHP-National Register of Historic Places.

Traditional Cultural Properties

Government-to-government consultation was initiated during the scoping phase (August 2017) and continued through the development of the EIS. Correspondence sent to the Tribes and Pueblos is located in **Appendix J** (NHPA and NAGPRA Consultation Correspondence). To date, no identification of traditional cultural properties have been received from the federally-recognized Tribes and Pueblos associated with the lands under the proposed Cato, Smitty, or Lobos MOAs.

3.12 HAZARDOUS MATERIALS

3.12.1 Resource Definition

Hazardous materials are identified and regulated under the Comprehensive Environmental Response, Compensation and Liability Act; the Occupational Safety and Health Act; and the Emergency Planning and Community Right-to-Know-Act. Hazardous materials analysis typically consider the use and disposal of hazardous materials at a particular facility and discusses the total amount of material on the installation, environmental cleanup sites, and SOPs in processing hazardous materials. For this proposal, however, the analysis will consider the potential introduction of hazardous materials within existing or proposed SUA. The introduction of hazardous materials into the environment could occur by an aircraft mishap or crash. While aircraft mishaps are rare (refer to **Section 3.10,** Safety, for mishaps statistics), this section focuses on the hazardous materials that could be released and the emergency response procedures that would be followed in the unlikely event of an aircraft mishap or crash.

Chaff and flare and their associated residual materials are not considered hazardous materials or waste (Air Force 1997; USEPA 1997); however, a discussion of the components and toxicity of chaff and flare is provided in this section.

3.12.2 Affected Environment

The affected environment for hazardous materials includes the existing and proposed MOAs and ATCAAs. These airspace units would be used by Holloman AFB aircrews during F-16 pilot training. Operational

aircraft consist of various components and fluids that may be hazardous if inadvertently released to the environment.

3.12.2.1 Aircraft Hazardous Materials Management

A Hazardous Aerospace Material Mishap Emergency Response Integrated Process Team was chartered in 2000 by the Deputy Assistant Secretary of the Air Force for Environmental, Safety, and Occupational Health. The goals of the Hazardous Aerospace Material Mishap Emergency Response project were to identify and inventory all hazardous aerospace materials on Air Force weapon systems and ensure procedures were in place to protect personnel from safety/health hazards associated with aerospace vehicle mishaps. The Air Force has developed specific emergency response procedures for aircraft mishaps involving hazardous materials contained in Technical Order 00-105E-9, *Aerospace Emergency Rescue and Mishap Response Information* (Air Force 2006). The Technical Order identifies the hazards associated with the parts and equipment on an aircraft including the potential changes to health and safety characteristics after a fire resulting from an aircraft mishap.

Emergency procedures include how to respond to known solid, liquid, and gaseous products; radioactive materials; composite materials; radar absorbing and conventional coatings materials; and other materials and situations that can pose health and safety hazards. Hazardous materials associated with most aircraft include jet fuels, ethylene glycol, and hydraulic fluid. In addition to these common materials, the emergency power unit for the single engine F-16 fighter jet uses hydrazine, a highly volatile propellant, to restart the engine in case of emergency. Hydrazine is also used in agricultural chemicals, chemical blowing agents, pharmaceuticals, photography chemicals, boiler water treatment, and textile dyes. Acute (short-term) exposure to high levels of hydrazine may include irritation of the eyes, nose, and throat, dizziness, headache, nausea, pulmonary edema, seizures, and coma in humans (USEPA 2000). Hydrazine rapidly degrades in the environment (USEPA 2000).

Radioactive materials are used in small quantities for navigation systems, instruments, and some coatings. Composite materials are used in most aircraft in some form. Newer aircraft such as the F-22 and F-35 use extensive amounts of composite materials for the fuselage and the equipment. Older aircraft still have aluminum frames and skins but some equipment is made from composite materials to save weight. Once composite materials are put into use, they have fully hardened and are inert; however, the materials turn into hazardous materials when burned at high temperatures typical of an aircraft crash. The emergency procedures take into consideration the burning effects performed during tests on composite materials. The test program included full-scale fire testing of composite materials for toxicology and expected exposure to response personnel.

Some general conclusions included (Wright et al. 2003):

- Burn data suggest that the combustion characteristics of composite materials are roughly equivalent to other combustible materials. Combustion products released by burning composite materials are similar to those released from other solid combustibles.
- Burning of composite materials can release fibers that are respirable.
- Respirable fibers released from burning composite materials can penetrate into the lungs, causing respiratory irritation. Factors known to affect the toxicity of these inhaled fibers include dosage, physical dimensions, retention time in the lung, location of deposition in the lung, and solubility of the fibers in the lung.

- Exposed fibers along the edges of fragmented composite debris present a dermal puncture hazard. The skin can be irritated and sensitized if punctured by exposed fibers.
- The toxicity of combustion products from burning aircraft composite materials currently used does not appear to be exceptional. Types and quantities of combustion products from burning composite materials fall within the same spectrum as other burning combustibles at an aircraft mishap site.
- No additional smoke toxicity hazards created by burning composite materials were identified.
- Personal protective equipment recommendations for firefighters responding to composite aircraft mishaps include a self-contained breathing apparatus, standard firefighter protective clothing and/or proximity suits, and steel-tipped/shanked boots.

Conventional coating materials include a variety of materials that are applied to aircraft similar to paint designed to protect critical parts from extreme weather and temperature. Radar absorbing materials are also applied similar to paint to help aircraft from being detected by enemy radar.

The Air Force follows a set of SOPs during aircraft mishaps to identify potential hazardous materials and situations, protect responding personnel and the environment from immediate hazards, and to provide guidelines for the ultimate cleanup and disposal of crash residues.

3.12.2.2 Chaff and Flares

Chaff

Chaff strands are primarily silica (60 percent) and aluminum (40 percent) with a Neofat coating (stearic acid). Trace amounts of iron, copper, magnesium, and zinc have also been detected in the controlled combustion of chaff (Air Force 1997). 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 earth's crust, forming some of the most common minerals, such as feldspars, micas, and clays. Natural background soil concentrations of aluminum ranging from 10,000 to 300,000 parts per million have been documented. The solubility of aluminum is greater in acidic and highly alkaline soils than in neutral pH conditions. 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 (Air Force 1997). Stearic acid is a saturated fatty acid derived from animal and vegetable fats and oils and degrades when exposed to light and air (Air Force 2011).

Flares

Chemical flares comprise magnesium pellets ejected from tubes that either ignite within the tube (for parasitic flares such as the proposed M206 flare) or in the wake behind the aircraft. Flares are designed to burn out in three to five seconds, fully consuming the magnesium pellet. 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 one once and one pound. Additionally, occupational exposure studies have shown that magnesium oxide dust may cause metal fume fever (Air Force 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 (Air Force 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 (Air Force 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 (Air Force 2011). Only magnesium and boron showed levels in sufficient concentrations for further evaluation in field and laboratory tests on flares (Air Force 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 (Air Force 1997).

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4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter presents an assessment of the potential environmental consequences of the Proposed Action and alternatives, including the No Action Alternative, involving the relevant resources and significant issues identified in comments from the public and Federal and state agencies during scoping. Each of the environmental resources described in Chapter 3 is affected to a different degree and has a different method of analysis. In compliance with NEPA and CEQ guidelines, the discussion of the affected environment (i.e., existing conditions) focuses only on those resource areas potentially subject to impacts. Additionally, the level of detail used in describing a resource is commensurate with the anticipated level of potential environmental impact.

"Significantly," as used in NEPA, requires considerations of both context and intensity. Context means that the significance of an action must be analyzed in several contexts such as society as a whole (e.g., human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of a Proposed Action. For instance, in the case of a site-specific action, significance would usually depend on the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant. Intensity refers to the severity or extent of the potential environmental impact, which can be thought of in terms of the potential amount of the likely change. In general, the more sensitive the context, the less intense a potential impact needs to be in order to be considered significant. Likewise, the less sensitive the context, a more intense potential impact would be expected to be significant.

This section describes the potential impacts to the following resources: airspace management and operations; acoustic environment; air quality; natural resources; land management; recreation resources; socioeconomics; environmental justice; safety; cultural resources; and hazardous materials.

4.2 AIRSPACE MANAGEMENT AND OPERATIONS

The airspace management and operations analysis presents the potential effects to civilian air traffic and airports when compared to the existing environment presented in **Section 3.2** (Airspace Management and Operations). It takes into consideration the proposed changes in airspace configuration and airspace use, and relates those changes to existing and ten-year forecast civil flight operations within the ROI. The 10-year forecast was determined by using the FAA Terminal Area Forecast, the official FAA forecast of aviation activity for U.S. airports (Air Force 2017). This section is a summary of the detailed data and analyses provided in **Appendix D1** (Airports in region of influence), **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) and **Appendix D3,** which contains a detailed analysis of the impacts to routing of aircraft through the ROI for the various alternatives.

Elements Common to All Action Alternatives

Under all of the proposed Alternatives except for the No Action Alternative, the reconfigured and proposed MOAs would be charted for use from 7:00 a.m. to 10:00 p.m., Monday through Friday, with use at other times by NOTAM. Each alternative involves an increase in military flight operations, the specifics of which are detailed in **Tables 2.8-2, 2.8-6, and 2.8-9**.

General aviation pilots operating under VFR can fly in an activated MOA using see and avoid rules. As stated in **Section 2.2.2,** *Training Operations*, life flights and medivac flights are always given priority in the airspace.

Use of expendable flares and chaff is proposed under each alternative. Flare use does not impact airspace management or air traffic. As part of the Proposed Action the FAA would approve the use of chaff in accordance with the FAA Order 6050.32B, *Spectrum Management Regulations and Procedures Manual*. The FAA's Frequency Management Office is responsible for coordinating with DoD organizations to ensure that chaff operations do not impact the NAS (FAA 2005). Use of chaff in accordance with these regulations would ensure that there would be no impact to airspace management or operations.

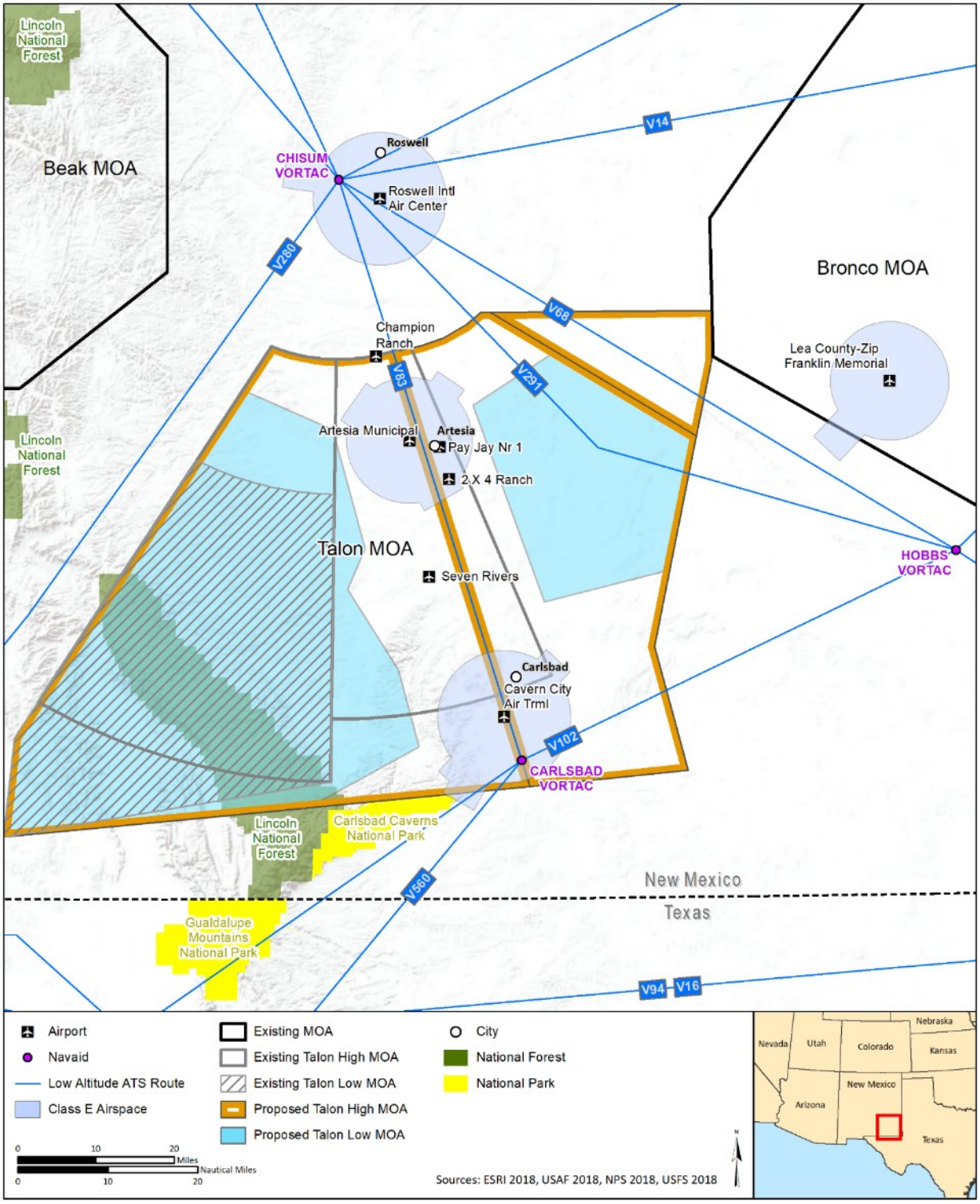
The establishment and rules of use for the new ATCAAs would be documented in a Letter of Agreement between the Albuquerque Center and the Air Force. The process for establishing and modifying this airspace would be in compliance with AFI 13-201, *Air Force Airspace Management* (Air Force 2012), and FAA Order JO 7400.2M, *Procedures for Handling Airspace Matters* (FAA 2019).

Each of the alternatives includes returning all or portions of existing MOAs to the NAS (see **Sections 2.8.1.1, 2.8.2.1, and 2.8.3.1**). These areas have not been used by the Air Force in recent years and are no longer needed for training purposes. Returning these areas back to the NAS would have no or slightly positive impacts to airspace management. There are currently no Air Force operations in the northern portion of the Cato and Smitty MOAs, Bronco 1 MOA, Bronco 2 MOA, or Valentine MOA. The current operations that occur within the lower portion of the existing Talon Low MOA (300 to 500 feet AGL) would be shifted to the new proposed Talon Low A and B MOAs and are accounted for in that analysis. The lower altitude of the existing Talon MOA was primarily used by the German Air Force which has now departed Holloman AFB. Returning the northern portion of the Cato and Smitty MOAs to the NAS would eliminate any potential conflict with users of R-5123, as it would no longer be located within the same airspace. Additionally, it would make additional airspace available for Albuquerque Center to support air traffic flying east and west between major airports. Releasing Bronco 1 and 2 MOAs would also provide a positive benefit to air traffic management in these areas.

There are MTRs in the ROI which are not part of the Proposed Action. MTR usage is included in the noise analysis since aircraft activity on MTRs contributes to the acoustic environment, but management of those aircraft operations in the MTRs would not change or be affected with any of the Action Alternatives. Use of the MTRs would continue as it does currently under all the alternatives.

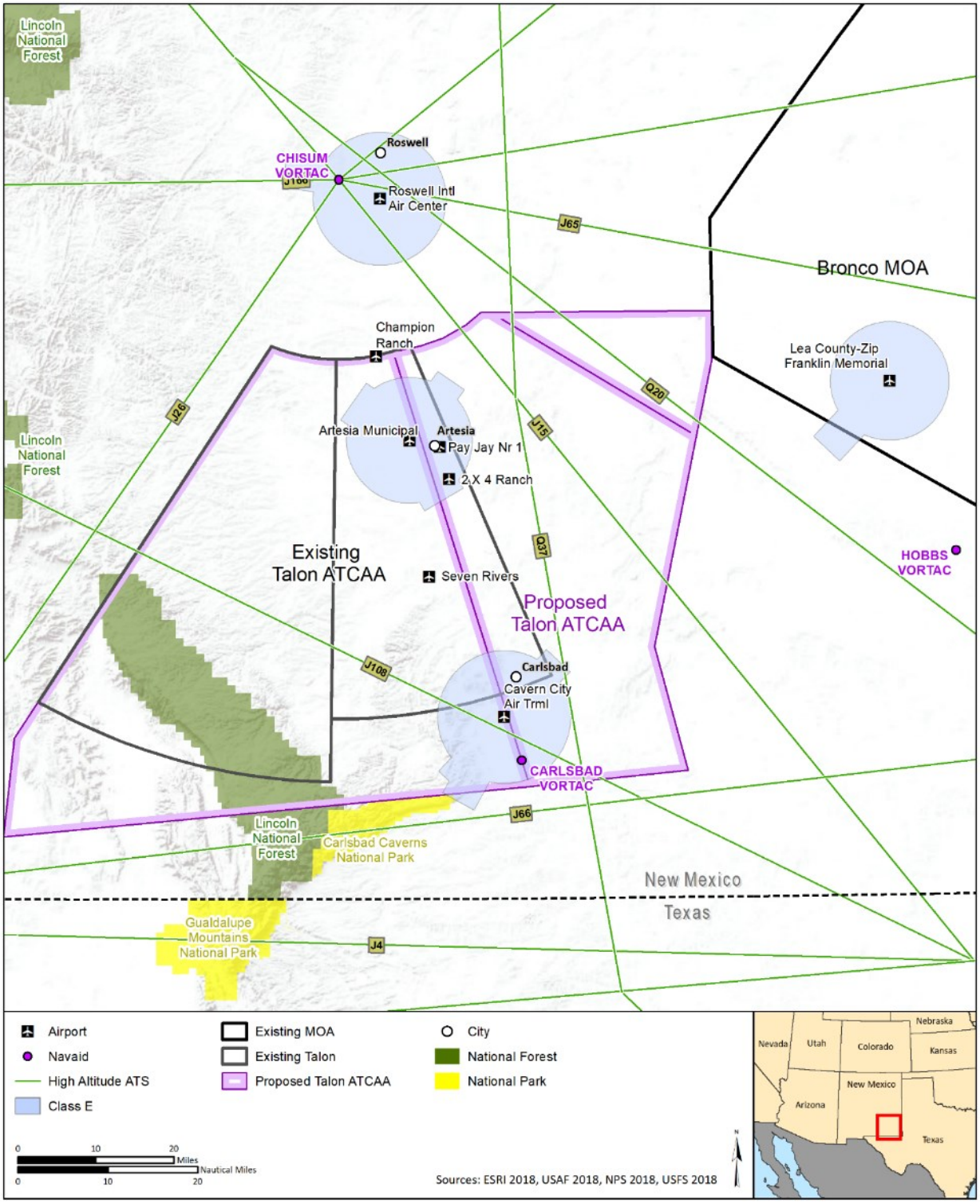
4.2.1 Alternative 1: Talon MOA

As shown in **Figures 4.2-1 and 4.2-2**, there are some ATS routes that go through the existing Talon MOA/ATCAA and would continue to do so. **Table 4.2-1** provides a summary of FY16 and projected civilian operations along these ATS routes in the Talon MOA. Detailed PDARS data are provided in **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base).



Legend: ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 4.2-1. Airspace Components in Talon MOA ROI below 18,000 feet MSL



Legend: ATS-Air Traffic Service; ATCAA- Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 4.2-2. Airspace Components in Talon MOA ROI above 18,000 feet MSL

Table 4.2-1. Alternative 1 - Current and Projected Civilian Operations in Proposed Talon MOA/ATCAA		
Airspace	Civilian Operations[1]	
	FY16[2]	10 Year Forecast
Proposed Talon Low A MOA	2,184	2,184
Proposed Talon Low B MOA	2,100	2,091
Proposed Talon High A MOA	2,262	2,223
Proposed Talon High B MOA	2,724	2,709
Proposed Talon High C MOA	1,020	966
Proposed Talon A and B ATCAA	16,803	20,495
Proposed Talon C ATCAA	2,155	2,637

Source: Air Force 2017, 2018.
Notes: [1] Operations can occur across multiple segments of the MOA, so these operations should not be totaled.
[2] FY16 civilian operations reported here are total operations for a full day. It should be noted that Appendix D3 focuses the analysis on the civilian operations that occurred during the proposed times of operation for the MOA: Monday through Friday, 7:00 a.m. to 10:00 p.m.
Legend: ATCAA-Air Traffic Control Assigned Airspace; FY-fiscal year; MOA-Military Operations Area.

4.2.1.1 Impacts to Civil Aviation

Appendix D3: *Impacts to Civil Aviation,* provides a detailed evaluation of the potential impacts to civil aviation from the Proposed Action. A summary of that analysis is provided here.

Talon Low A and B MOAs – Under this alternative, there would be two low MOAs within the new Talon MOA designated as Low A and B (see **Figure 4.2-1)**.

The only ATS route that intersects either of these areas is V-291, which goes through the proposed Talon Low B MOA. As shown in **Table 4.2-1**, about 2,100 annual civil flights intersect this block of airspace currently. Under Alternative 1, the IFR aircraft among them would be re-routed by Albuquerque Center during times when the Talon Low B MOA was active. Under Alternative 1, the Air Force would use the Talon Low B MOA for approximately 2,035 sorties per year (including transients), or about four times per weekday on average (for two aircraft), for up to 40 minutes per sortie. These re-routed flights could cover the shorter distance along the route defined by V-68, or pass to the west side of the Talon Low B. VFR aircraft could go through the MOA during these times, or also deviate around on either side. The existing low altitude air traffic associated with patrolling oil fields in this area would be VFR and would continue to be able to fly through this area. Given the expected frequency of their use (daily) and that these aircraft would be patrolling (i.e., focusing their attention downward and operating at lower altitudes), the F-16 pilots operating above at higher altitudes would remain vigilant and instill "see and avoid" procedures to ensure safe operation of both users.

Traffic on some more common routes (such as Lubbock, Texas to El Paso, Texas) would have the same deviation as they would for the existing Talon Low MOA. **Appendix D3** shows that the time to deviate for common routes would range from 1 to 9 minutes additional transit time, depending on origin and destination. The deviation would only occur during the time when the Talon Low B MOA was active (Monday through Friday, 7:00 a.m to 10:00 p.m.) which would be about 2.6 hours per training day on average. If the Talon Low B MOA was active, and the Talon High B was not, the traffic on V-291 would also have the option to stay on the route at altitudes above 12,500 feet MSL.

Talon High A, B and C MOAs– Under this alternative, the existing Talon High East and West MOAs would be expanded eastward, and renamed Talon High A, B, and C (see **Figure 4.2-1)**. A number of ATS routes intersect the existing Talon High MOAs. The V-83 goes through the existing Talon High East MOA and would lie exactly on the seam between the proposed Talon High A and Talon High B. If either one is being used, the traffic on that route (above 12,500 feet MSL) would be re-routed slightly toward the unused side with negligible impact. Any traffic on the route below 12,500 feet MSL would be unaffected. When Talon High A and B were both in use simultaneously, IFR traffic above 12,500 feet would have to be routed around, either in the vicinity of the Talon High C (in the east), or around the west. **Table 4.2-1** shows about 2,700 annual civil flights that intersect this airspace, which would be used by military aircraft for approximately 6,930 (including transients) sorties under Alternative 1, or about 13 times per weekday (for two aircraft) for about 40 minutes (approximately 8.9 hours per training day). During those times, the IFR civil aircraft would have to be re-routed by Albuquerque Center. VFR aircraft could transit the MOA, or could go around it as well. **Appendix D3** shows that many of the possible conflicting civil flights would either originate from or arrive to local airports, and it is likely that simply remaining below 12,500 feet MSL for the initial or latter portions of the flight would allow the aircraft to stay on their course and remain below the Talon High A/B/C MOAs. Many of the aircraft using the local airports would be lighter aircraft that operate below these altitudes anyway. For aircraft with the capability to climb higher than 12,500 feet MSL, re-routing to the lower altitude may cause a small increase in fuel consumption, but would not cost any significant time.

The V-291 route also intersects the Talon High B (see **Figure 4.2-1**). When Talon High B would be in use, traffic would be re-routed, likely to the east through Talon High C if it was not active. If the Talon High C is active the traffic could remain below 12,500 feet MSL.

The V-68 transits the proposed Talon High C airspace. The Talon High C would be anticipated to be used for approximately 300 sorties per year under Alternative 1, and would be in conjunction with both the Talon High A and B. This would occur less than once per week, for approximately 40 minutes. When the Talon A, B, and C are activated together, IFR civil traffic (including that on the V-83 and V-68) above 12,500 feet MSL would have to be routed either around the west side of the Talon MOA complex, or descend below 12,500 feet MSL. During times that the Talon High C was active, the Air Force would not activate the Bronco 3 MOA, so it would also be possible to route traffic around the east side of the Talon MOAs. **Appendix D3** shows that when the Talon High C MOA would be active, the flights that would be routed around the east side would see flight times increase between one and three minutes.

Traffic on the V-102 would have to be shifted a few miles to the south when the proposed Talon High A or B would be active, as it touches the corner of both proposed areas. This would be a minimal impact.

Talon ATCAAs – Under Alternative 1, the ATCAAs over the MOAs (also labeled A, B, and C) would interfere with civil air traffic already passing through that airspace. **Table 4.2-1** shows that the ATCCA airspace is used about 16,000 times per year, with a growth expected to just over 20,000 in the next ten years. None of this traffic is VFR. It is all IFR traffic, under control of Albuquerque Center. **Appendix D2** (Special Use Airspace Modification, Holloman Air Force Base) shows that the majority of the traffic to be east-west, (some on J-108, and some on vectors) passing from somewhere well west of the ROI (Phoenix, Los Angeles, etc.) to places well east (Dallas/Ft. Worth, Houston, etc.). This traffic (which is bi-directional) already passes south of the WSMR airspace in the vicinity of El Paso, Texas, and runs along the southern edge of the proposed Talon ATCAAs. When the ATCAAs would be active, these flights would have to stay south of the proposed ATCAAs. **Appendix D3** shows that for the most frequently used routes that touch

this airspace, the deviation required under the Proposed Action would average less than one minute. Also in this space are the ATS routes Q-20, Q-37, and J-15, which would have to be routed around the Talon ATCAAs, or have altitude separation provided by Albuquerque Center.

4.2.1.2 Impacts to Airports

As described in **Section 3.2.2.1**, *Talon MOA* and **Appendix D1**: *Airports in the Region of Influence*, there are four public airports in the ROI for the Talon MOA: Artesia Municipal Airport, Lea County-Zip Franklin Memorial Airport, Roswell International Air Center Airport, and Cavern City Air Terminal Airport. There are four private airports within the ROI: Seven Rivers Airport, 2 X 4 Ranch Airport, Champion Ranch Airport, and Pay Jay Nr 1/2. Potential impacts to each of these airports are discussed below.

The Artesia Municipal Airport is currently located beneath the existing Talon High East MOA. Under Alternative 1, this airport would be located beneath the proposed Talon High A MOA. The existing and proposed MOAs have the same floor (12,500 feet MSL); therefore, there would be no change to the overlying SUA or the approach and departure procedures at this airport.

The Lea County-Zip Franklin Memorial Airport is currently located beneath the Bronco 3 MOA. Alternative 1 would not change the dimensions or altitudes of SUA above this airport. The proposed Talon High C MOA would be approximately 20 miles from the airport and approximately 15 miles from the southwest extension of the Class E airspace around this airport. Bronco 3 would be deactivated when the Talon High C MOA was activated and would not affect approach or departure procedures at this airport.

The Roswell International Air Center Airport would continue to be located approximately 20 miles north of the northern boundary of the existing and proposed Talon MOAs. The northern boundary of the existing and proposed Talon MOA was created by an 18 mile arc centered on the CME VORTAC navigational aid. The airport's Class E airspace would also be located outside of the proposed Talon MOA. Alternative 1 would not affect the airport or its approach or departure procedures. Civilian traffic approaching this airport along V-68 may be re-routed approximately 10 miles to the north through Bronco 3 MOA when Talon High C MOA would be active, or could begin a descent below 12,500 feet MSL (to get into Roswell) before reaching the lateral limits of the proposed Talon High C MOA with no time deviation. Aircraft remaining above 12,500 feet MSL would have a deviation of less than two minutes. The relative rarity of the Talon High C MOA being active (approximately 40 minutes per weekday) means that this deviation would be rarely required.

The Cavern City Air Terminal Airport is currently located about three miles south of the existing Talon High East MOA. Under Alternative 1, this airport would lie beneath the border of the proposed Talon High A and B MOAs. The proposed floor of these MOAs would be 12,500 feet MSL, which is more than 9,000 feet above the airport. The proposed Talon Low A and B MOAs are well clear of the Cavern City Airport, and its Class D surface areas. Therefore, there would be no adverse impacts to airport operations due to the Proposed Action.

The four private airports are all located beneath the existing Talon High East MOA. Under Alternative 1, these airports would be located beneath the proposed Talon High A and B MOAs. The proposed ceiling of the Talon High A and B MOAs is the same as the current Talon High East MOA; therefore, the SUA above these airports would not change. Alternative 1 would not affect airport operations at any of these private airports.

As discussed in Section 4.2.1.1, many civilian flights transit the ROI. These flights originate from a number of airports, as indicated in **Appendix D3**. Under Alternative 1, the portion of these flights that are under IFR would be re-routed while the proposed MOA was active (VFR traffic would be allowed to transit the MOAs at the pilot's discretion). The re-routing, however, would be minimal (see **Appendix D3**) and would not affect airport operations at the origination or destination airports.

4.2.2 Alternative 2: Cato, Smitty, and Lobos MOAs, and Christa and Kendra ATCAAs

Under Alternative 2, the published days of use in the Cato and Smitty MOAs would change from 8:00 a.m. to 10:00 p.m. Monday through Saturday (an average of 14 hours per day, 6 days each week) to 7:00 a.m. to 10:00 p.m. Monday through Friday (an average of 15 hours per day, 5 days per week). This would reduce the overall scheduled times of use from 84 to 75 hours per week and from six to five days per week. Activation at other times by NOTAM would remain in place. **Figures 4.2-3 and 4.2-4** show the airspace management components for Alternative 2 below and above 18,000 feet. **Table 4.2-2** provides a summary of the FY16 and projected civilian operations along the ATS routes in the proposed Smitty, Cato, and Lobos MOAs and the proposed ATCAAs.

Table 4.2-2. Current and Projected Civilian Operations in Area of Proposed Airspace Alternative 2

Airspace	Civilian Operations[1]	
	FY16[2]	10 year Forecast
Proposed Smitty MOA	1,572	1,963
Proposed Cato MOA	1,572	1,545
Proposed Cato ATCAA	43,296	51,565
Proposed Lobos Low MOA	2,706	3,383
Proposed Lobos High MOA	2,760	3,450
Proposed Lobos ATCAA	123,837	145,880
Proposed Christa ATCAA	37,251	45,781
Proposed Kendra ATCAA	47,490	58,365

Source: Air Force 2017, 2018.

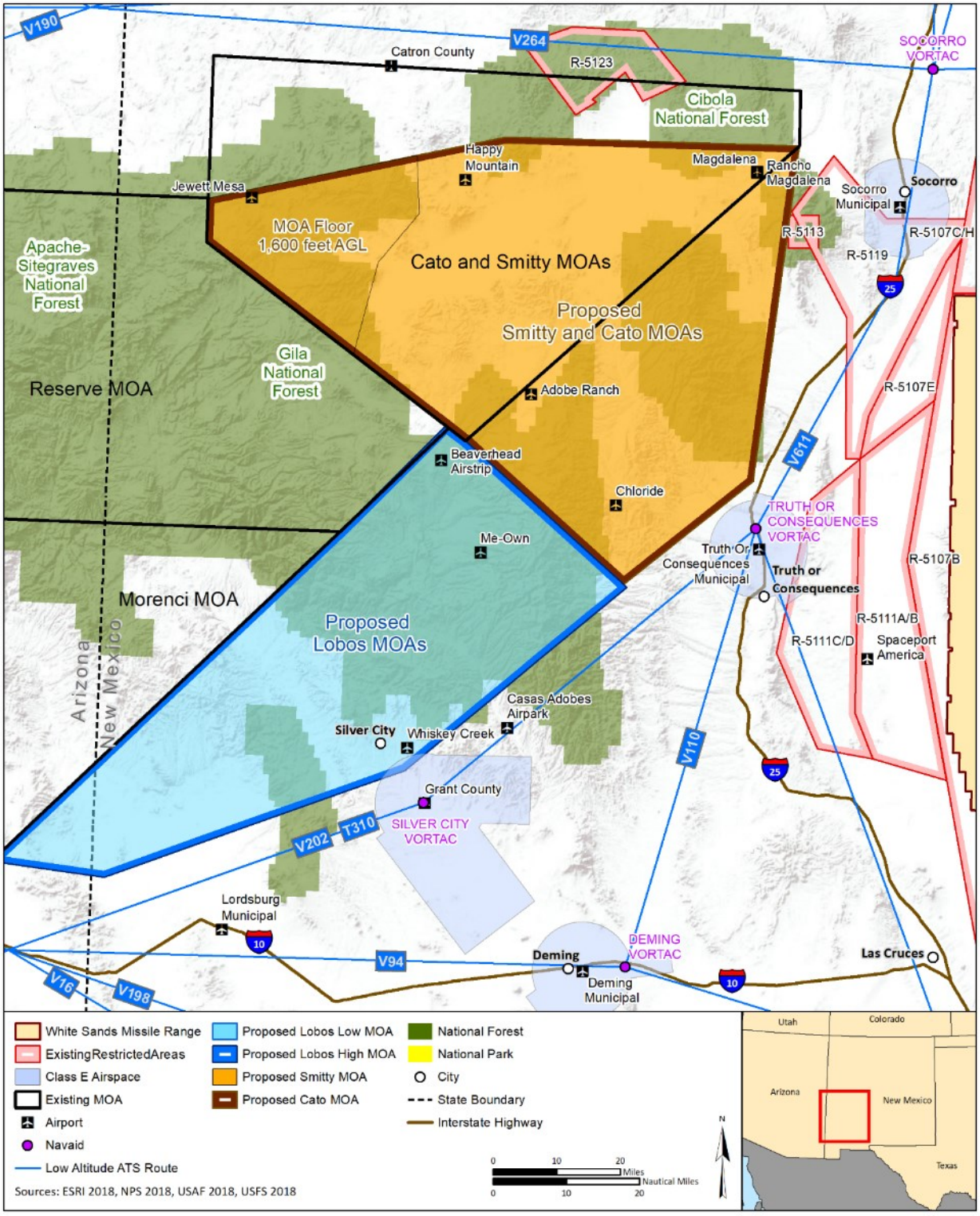
Notes: [1] Operations can occur across multiple segments of the MOA, so these operations should not be totaled.

[2] FY16 civilian operations reported here are total operations for a full day. It should be noted that Appendix D3 focuses the analysis on the civilian operations that occurred during the proposed times of operation for the MOA: Monday through Friday, 7:00 a.m. to 10:00 p.m.

Legend: ATCAA-Air Traffic Control Assigned Airspace; FY-fiscal year; MOA-Military Operations Area.

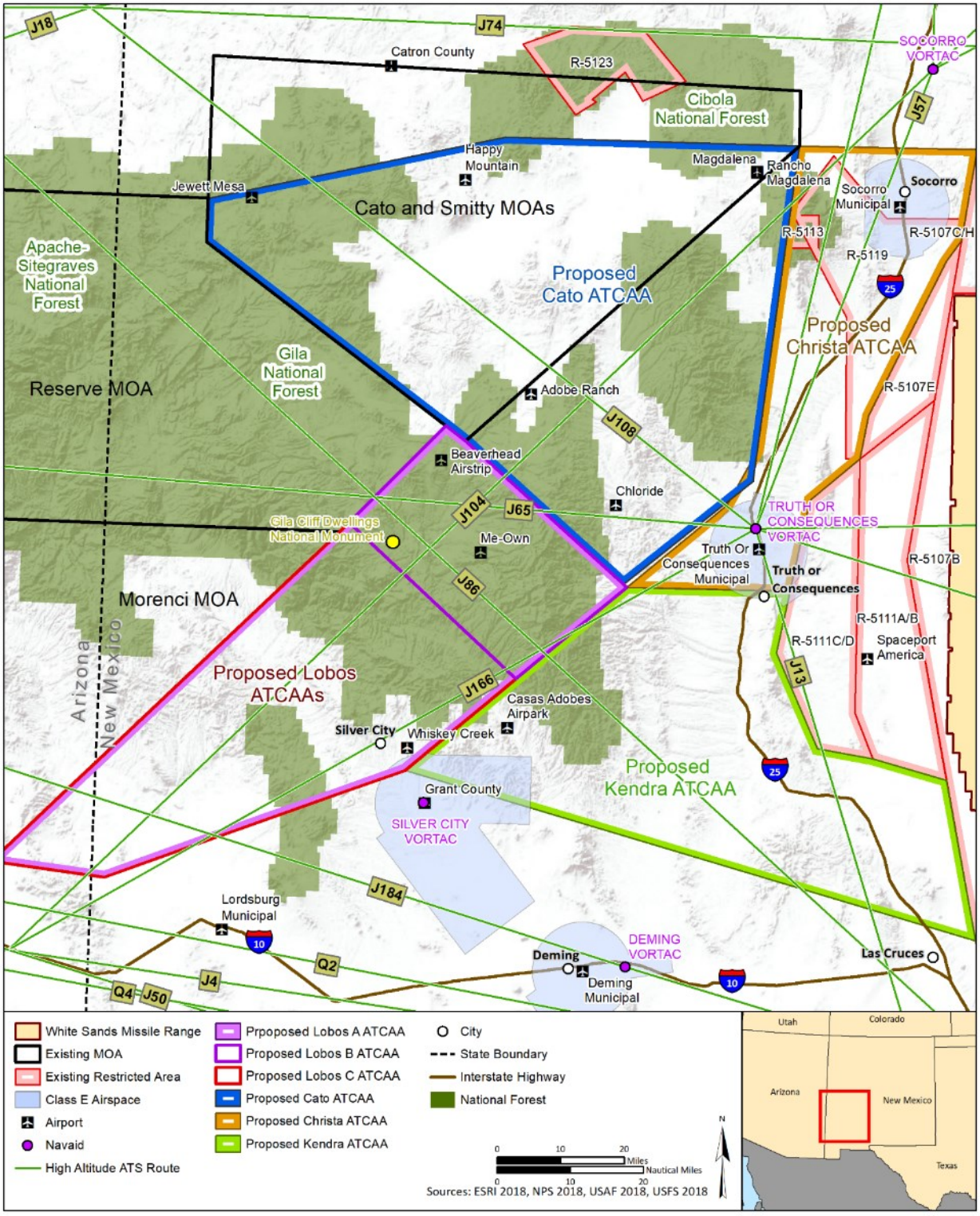
4.2.2.1 Impacts to Civil Aviation

Smitty MOA – Under Alternative 2, the proposed Smitty MOA would be shifted south and east (see **Figure 4.2-3)**. There are no ATS routes through the existing or proposed Smitty MOA. **Table 4.2-2** shows about 1,600 civil operations in 2016 in this area, and that number is projected to grow to nearly 2,000 over the next ten years. Civil traffic operating under IFR would be routed around the Smitty MOA by Albuquerque Center when the MOA is active under this alternative. This MOA would be used by military aircraft approximately 3,190 times per year under Alternative 2 (including transients), or about six times per weekday (with two aircraft at a time) for about 30 minutes per use. As is currently the case, under FAA rules, civil traffic operating under VFR would still be able to transit this area without restriction.



Legend: ATS-Air Traffic Service; MOA-Military Operations Area.

Figure 4.2-3. Airspace Components in Cato, Smitty, and Lobos MOAs ROI below 18,000 feet MSL



Legend: ATS-Air Traffic Service; ATCAA- Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

Figure 4.2-4. Airspace Components in Cato, Smitty, and Lobos MOAs ROI above 18,000 feet MSL

As explained in **Appendix D3**, some of this traffic would not be affected, as it would already route itself around this area due to aircraft performance considerations with the high terrain in the area. ***Cato MOA*** – Under Alternative 2, the proposed Cato MOA would also shift to the south and east (see **Figure 4.2-3)**. There are no ATS routes through the existing or proposed Cato MOA. **Table 4.2-2** shows civil use for the area of the proposed Cato MOA, about 1,600 civil operations in 2016, with little change forecast for the next ten years. Under Alternative 2, the Cato MOA would be used approximately 4,400 times by military aircraft (including transients). Assuming use by two aircraft at a time, that would result in use during about 8-9 periods of 30 minutes per weekday. During this use, IFR civil traffic would have to be routed around the Cato MOA by Albuquerque Center.

Lobos Low MOA – Under Alternative 2, the proposed Lobos Low MOA would be established. This airspace block was designed so that no ATS routes would go through this airspace. **Table 4.2-2** shows that this airspace was used for about 2,700 civil operations in 2016. Additionally, that airspace use would be expected to grow to about 3,400 in the next ten years. When the proposed Lobos Low MOA would be active, the civil aircraft operating under IFR below 13,500 feet MSL would be routed around the airspace by Albuquerque Center. It is highly likely that IFR traffic at those altitudes would already be routed around most of this proposed MOA due to terrain restrictions, as detailed in **Appendix D3**, making this a very small impact. VFR traffic could still enter an active MOA. Under Alternative 2, the proposed Lobos Low MOA would be used approximately 770 times per year by military aircraft, including transients. With two aircraft at a time, that would mean that the MOA would be activated less than two times per weekday on average, for 30 minutes per period.

Lobos High MOA - Under Alternative 2, the proposed Lobos High MOA would be established. This airspace block was designed so that no ATS routes would go through this airspace. **Table 4.2-2** shows that this airspace was used for about 2,800 civil operations in 2016. Additionally, that airspace use would be expected to grow to about 3,500 in the next ten years. When the proposed Lobos High MOA would be active, the civil aircraft operating under IFR above 13,500 feet MSL would be routed around the airspace by Albuquerque Center. VFR traffic could still enter an active MOA. Under Alternative 2, the proposed Lobos High MOA would be used by military aircraft approximately 4,530 times per year. With two aircraft at a time, that would mean that the MOA would be activated about 8-9 times per weekday on average, for 30 minutes per period.

Cato ATCAA – The proposed Cato ATCAA established under Alternative 2 would be intersected by two ATS routes: the J-104 that goes roughly southwest-northeast, and the J-108 that goes roughly northwest to southeast (see **Figure 4.2-4**). Both of these routes would be affected when the Cato ATCAA would be active, requiring aircraft to be routed around the ATCAA by Albuquerque Center. **Table 4.2-2** shows this airspace being used about 43,000 times in 2016, with that number projected to grow to about 53,000 per year in the next ten years. **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) shows that this civil traffic is spread out across all hours of the day and some of this traffic is during "red-eye" hours when the ATCAA would not often be activated. The data in **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) also shows a great deal of traffic not on either of these routes (J-104 or J-108) mainly going east-west. An investigation of the origin and destination airports shows that many of these crossings are on long distance routes connecting airports well west (e.g. Los Angeles or San Diego) with airports well East (e.g. Dallas-Ft. Worth or Atlanta). This east-west traffic would have to be routed around the activated ATCAA; but, the impact would be minimal since the avoidance requirement would be communicated a great distance away from this area. Under Alternative 2, the proposed Cato

ATCAA would be used by military aircraft approximately 4,400 times, including transients. Assuming use by two aircraft at a time, that would result in use during about 8-9 periods of 30 minutes per weekday. During this use IFR civil traffic would have to be routed around the Cato ATCAA by Albuquerque Center. **Appendix D3** shows that the deviations required of civil airliners on their typical routes to avoid all of the ATCAAs under this alternative are minimal, adding an average of less than one minute to the trip.

Lobos ATCAA – Under Alternative 2, the proposed Lobos ATCAA would be created. The proposed Lobos ATCAA would be intersected by five ATS routes: J-104, J-166, J-65, J-184, and J-86 (see **Figure 4.2-4**). **Table 4.2-2** shows the civil use for the area of the proposed Lobos ATCAA, about 124,000 civil operations in 2016 with forecast growth to about 144,000 operations for the next ten years. **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) shows that the majority of the civil operations going through this area are either on the J-86 or in the vicinity of the J-184. All of the J-184 traffic could easily be re-routed slightly south to remain clear of the proposed Lobos ATCAA when it would be active. The Air Force and FAA have coordinated an airspace proposal to have the northern part of the proposed Lobos ATCAA split in altitude, with a proposed ATCAA ceiling at FL260, so that the J-86 traffic could use that space from FL270 and up when they are on that route. This would allow civil traffic to proceed without re-routing while the other segments of the proposed ATCAA would still be in use by the Air Force. The other ATS routes mentioned (J-104, J-166, and J-65) would be re-routed by Albuquerque Center when the proposed Lobos ATCAA would be activated. This ATCAA would be used by military aircraft (including transients) approximately 6,050 times per year under Alternative 2. With two aircraft operating at a time the ATCAA would be active about 12 times per weekday for about 30 minutes. **Appendix D3** shows that the deviations required of civil airliners on their typical routes to avoid all of the ATCAAs under this alternative are minimal, adding an average of less than one minute to the trip.

Christa ATCAA – The proposed Christa ATCAA created under Alternative 2 would be intersected by multiple ATS routes at the southern end of the proposed airspace: J-13 and J-57 which go roughly north-south; and J-65, J-108, and J-166 which go roughly east-west (see **Figure 4.2-4**). **Table 4.2-2** shows the civil use for the area of the proposed Christa ATCAA was about 37,000 operations in 2016, with forecast growth to about 46,000 operations for the next ten years. **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) shows that the majority of that traffic is east-west, and not really on the published routes, but very much the same as the long distance traffic that affects the Cato ATCAA discussed above. The Christa ATCAA is proposed for use at the same rate as the Cato ATCAA, about 8-9 periods of 30 minutes per weekday. During this use IFR civil traffic would have to be routed around the proposed Christa ATCAA by Albuquerque Center. The majority of the east-west traffic would be adjusted slightly north or south to avoid the active airspace. **Appendix D3** shows that the deviations required of civil airliners on their typical routes to avoid all of the ATCAAs under this alternative are minimal, adding an average of less than one minute to the trip. The smaller amount of north-south traffic would likely get either routed east of the WSMR or west of the active ATCAAs, depending on their origin and destination. **Appendix D-3** shows that these deviations average less than one minute for the majority of the flights.

Kendra ATCAA – Under Alternative 2, the Kendra ATCAA would be created. The Kendra ATCAA would be intersected by three ATS routes: J-166, J-86, and J-13 (see **Figure 4.2-4**). **Table 4.2-2** shows the civil use for the area of the proposed Kendra ATCAA, about 47,000 civil operations in 2016, with forecast growth to about 58,000 operations for the next ten years. **Appendix D2** (Special Use Airspace Modifications, Holloman Air Force Base) shows that the civil operations going through this area are a mix of north-south and east-west traffic, with the overwhelming majority being east-west. The potential impact

of establishing the Kendra ATCAA would be similar to that of the proposed Christa ATCAA discussed above. When the ATCAA would be active, the north-south traffic would have to be re-routed by Albuquerque Center either to the east of WSMR, or to the west of the active ATCAAs, depending on the flight's origin and destination. These flights are a small portion of the traffic in the area, as noted in **Appendix D3**. The east-west traffic would be handled similarly to that re-routed for the proposed Cato and Christa ATCAAs, deflecting the flights either slightly north or slightly south of the active ATCAAs. **Appendix D-3** shows that these deviations average less than one minute for the majority of the flights. This ATCAA would be used approximately 4,400 times per year under this alternative. With two aircraft operating at a time the ATCAA would be active about 8-9 times per weekday for about 30 minutes.

4.2.2.2 Impacts to Airports

As described in **Section 3.2.2.**, *Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs,* and **Appendix D1**: *Airports in the Region of Influence*, there are 18 airports within the ROI. The potential impacts to each of these airports is discussed below.

The Lordsburg Municipal Airport and the Deming Municipal Airport are not currently located beneath any type of training airspace. Under Alternative 2, these airports would continue to be outside of the proposed training airspace by at least 10 miles. Operations at these airports would not be affected by the Proposed Action.

The Jewett Mesa Airport, Happy Mountain Airport, Magdalena Airport, and the Rancho Magdalena Airport are all currently located beneath the Cato and Smitty MOAs. Under Alternative 2, these airports would continue to be located beneath the Cato and Smitty MOAs. Operations at these airports would not be affected by the Proposed Action.

Spaceport America and Monte Prieto Ranch Airport are located beneath restricted areas associated with WSMR. The Proposed Action does not include any changes to these restricted areas; therefore, operations at these airports would not be affected by the Proposed Action.

The Catron County Heliport is located beneath the northern edge of the existing Cato and Smitty MOAs. Under Alternative 2, this area of the MOAs would be returned to the NAS and this heliport would no longer be under any training airspace.

The Grant County Airport is not currently located beneath training airspace. Under Alternative 2, the airport would be outside of the boundaries of the proposed MOAs and ATCAAs, but would be within 5 miles of the proposed Lobos Low MOA. In addition, arrivals and departures on the east side of the airport would be beneath the proposed Kendra ATCAA. The proposed floor of the ATCAA (18,000 feet MSL) would be far enough above the airport that there would be no impact from the ATCAA.

The Socorro Municipal Airport and Truth or Consequences Municipal Airport are currently not located under any training airspace. Under Alternative 2, these airports would be located beneath the proposed Christa ATCAA. These two airports are at elevations of 4,875 and 4,862 feet MSL, respectively, and the ATCAA (when active) would begin at 18,000 feet MSL. Therefore; there would be no impact to either of these airports when the proposed ATCAA was active.

The Adobe Ranch Airport and Chloride Airport are located outside of the existing Cato and Smitty MOA boundaries, but would be located beneath the proposed Cato and Smitty MOA boundaries. Neither of these airports reported operations to the FAA. Any aircraft potentially using these private airstrips would be

operating under VFR and would be able to transit the active MOA by employing see and avoid procedures. Private pilots using these airports would have to check NOTAMS to be aware of the MOA operating schedules. Air Force pilots operating in the proposed Smitty MOA (the low MOA) would also have to remain vigilant of potential VFR aircraft.

The Beaverhead Airstrip, Me-Own Airport, and Whiskey Creek are private airports that are not currently under training airspace, but would be beneath the proposed Lobos Low MOA under Alternative 2. The reported operations at these airports was 50, 30, and 1,100, respectively. Aircraft using these airstrips would be operating under VFR and would be able transit the active MOA by employing see and avoid procedures. Private pilots using these airports would have to check NOTAMS to be aware of the MOA operating schedules. Air Force pilots operating in the proposed Lobos Low MOA would have to remain vigilant of potential VFR aircraft. Approximately 770 annual sorties are proposed in the Lobos Low MOA under Alternative 2; an average of 0.7 hours per day. This limited training activity is not expected to impact airport operations at these airports.

The Casas Adobes Airpark is not currently located under any training airspace. Under Alternative 2, it would be located beneath the proposed Kendra ATCAA. The field elevation at this airport is 5,800 feet MSL, and the proposed ATCAA would begin at 18,000 feet MSL. Therefore, there would be no impact to this airport when the ATCAA was active.

4.2.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

Alternative 3 results in impacts that are less than any described in Alternatives 1 or 2, since the total operations would be spread across the east area (Talon MOAs/ATCAAs) and the west area (Cato and Smitty MOAs, Lobos MOAs/ATCAA, and the Christa/Kendra ATCAAs). This section will cover the differences (reductions) in those impacts associated with Alternative 3.

4.2.3.1 Impacts to Civil Aviation

Talon High A/B/C MOAs - Under Alternative 3, the Air Force would use the Talon High A and B MOAs (and the associated ATCAAs) 30 percent less than in Alternative 1. The impacts to civil aviation would be proportionally less. The Talon High C would not be established under Alternative 3, completely eliminating the impacts of its establishment detailed under Alternative 1.

Talon Low A/B MOAs - Under Alternative 3, the use of Talon Low A and B MOAs would be reduced by 30 percent, when compared to Alternative 1. The impacts to civil aviation would be reduced proportionally.

Cato MOA - Under Alternative 3, the use of Cato MOA would be reduced by 60 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally.

Smitty MOA - Under Alternative 3, the use of Smitty MOA would be reduced by 62 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally.

Lobos High and Low MOAs - Under Alternative 3, the use of proposed Lobos High MOA would be reduced by 67 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally. The proposed Lobos Low MOA would not exist under Alternative 3, so all impacts due to the establishment of proposed Lobos Low MOA in Alternative 2 would be eliminated.

Christa ATCAA - Under Alternative 3, the use of proposed Christa ATCAA would be reduced by 60 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally.

Kendra ATCAA - Under Alternative 3, the use of proposed Kendra ATCAA would be reduced by 67 percent, when compared to Alternative 2. The impacts to civil aviation would be reduced proportionally.

4.2.3.2 Impacts to Airports

Under Alternative 3, the proposed training would be spread across all the airspace areas described in Alternatives 1 and 2; therefore, there would be a reduced impact to any of the airports, especially those located near the proposed low airspace that would not be created under Alternative 3.

The potential impact to airports beneath the proposed Talon MOA under Alternative 3 would be same as those described in Alternative 1 for the following airports: Artesia Municipal Airport, Lea County-Zip Franklin Memorial Airport, Cavern City Air Terminal Airport, Seven Rivers Airport, 2 X 4 Ranch Airport, Champion Ranch Airport, and Pay Jay Nr 1/2. The Talon High C MOA would not be established under this alternative, therefore, the re-routing of civilian traffic approaching the Roswell International Air Center Airport along V-68 described for Alternative 1 would not occur. There would be no impact to the approach or departure procedures at any of the airports in the ROI for the proposed Talon MOA.

The potential impact to airports beneath the proposed Cato and Smitty MOAs, and the proposed Christa and Kendra ATCAAs would be the same as those described under Alternative 2 for the following airports: Lordsburg Municipal Airport, Deming Municipal Airport, Jewett Mesa Airport, Happy Mountain Airport, Magdalena Airport, Rancho Magdalena Airport, Spaceport America, Monte Prieto Ranch Airport, Catron County Heliport, Socorro Municipal Airport, Truth or Consequences Municipal Airport, Adobe Ranch Airport, and Chloride Airport.

Under Alternative 3, the proposed Lobos Low MOA would not be established. Therefore, the potential impacts to Beaverhead Airstrip, Me-Own, and Whiskey Creek described under Alternative 2 would not occur. These airports are located at elevations of 7,378 feet MSL, 7,554 feet MSL, and 6,126 feet MSL, respectively, and would be located beneath the proposed Lobos High MOA under Alternative 3. The proposed Lobos High MOA would begin at 13,500 feet MSL so there would be no impact to these airfields from the proposed Lobos High MOA. Without the proposed Lobos Low MOA, the approach and departure corridors for Grant County Airport would only be overlaid partially with the proposed Lobos High MOA at 13,500 feet MSL and the proposed Kendra ATCAA at FL180, so there would be no impact.

4.2.4 No Action Alternative

Under the No Action Alternative, no new airspace would be created and no airspace would be returned to the NAS. The published hours and days of operations for the existing airspace would not change from baseline conditions. Civilian aircraft operations would continue to dominate the existing area proposed for new SUA and ATCAAs. Management of the airspace and air traffic by Albuquerque Center would be expected to continue as it is currently.

4.3 ACOUSTIC ENVIRONMENT

This analysis quantifies the anticipated noise from aircraft activity within the existing and proposed airspace. The analysis accounts for both subsonic noise and sonic booms from supersonic flight. Refer to **Section 3.3.1.1** (Noise Metrics) for a description of the noise metrics used in this section. The projected DNL and CDNL levels from aircraft operations at POIs are also presented in this analysis and compared to the baseline conditions. The POIs include towns and recreational areas.

DNL and CDNL weight operations occurring during the nighttime period (after 10:00 p.m.) 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. The proposed nighttime operations are expected to occur "after dark" and not normally after 10:00 p.m., but the noise analysis presented in **Appendix F** and summarized in this section models all nighttime operations after 10:00 p.m. as a conservative measure.

The environmental impact methodology for noise impacts presented in this EIS are derived by utilizing the operational data developed as directed by AFI 32-7070, *Air Force Noise Program*, 21 April 2016. Analysis of noise factors in the number and type of operations, aircraft power settings, and other relevant details of the affected environment, the Proposed Action, and alternatives necessary to produce a consistent determination of environmental consequences and anticipated mitigations.

The noise report for this Proposed Action is provided in **Appendix F** (Noise Report), a summary of those results are presented in this section. The noise from the proposed aircraft operations could impact other resource areas such as land use, recreation, socioeconomics, and natural resources. Those impacts are addressed in their respective sections of this document.

Noise Impact Thresholds

The USEPA has identified 55 DNL as a level that protects public health and welfare with an adequate margin of safety (USEPA 1974). This means that 55 DNL is a threshold below which adverse noise effects are usually not expected to occur. 65 DNL is widely used as a noise criterion for airports. It represents a compromise between acceptable noise and economic practicality. According to the Federal Interagency Committee on Urban Noise, noise exposure greater than 65 DNL is considered generally incompatible with residential, public use (i.e., schools), or recreational and entertainment areas (Federal Interagency Committee on Urban Noise 1980). The U.S. Army Public Health Command has recommended land use guidelines for noise sensitive areas at levels over 62 CDNL. At 62 CDNL or less, noise sensitive land uses are generally acceptable (U.S. Army Center for Health Promotion and Preventative Medicine 2005).

The FAA defines a threshold for significant noise impacts in FAA Order 1050.1F as, "*The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the NDL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe."*

In rural and Wilderness Areas, the analysis of effects is vastly different compared to areas near population centers. In these special areas, public concerns can include effects to wildlife, domestic animals, natural soundscapes, and outdoor recreation. Each of these effects can be difficult to assess because of limited research and baseline noise data. Many studies have been conducted on noise impacts to animals. However, if the animal of concern has not been included in any of these studies, biological expertise is required to determine if additional research is required or a surrogate animal can be used for the assessment of impacts. See **Section 4.5** (Natural Resources) for a discussion of noise impacts to wildlife.

Relationship Between Noise and Annoyance

Annoyance, which is based on perception, represents the primary effect associated with aircraft noise. Attitudinal surveys conducted over the past 30 years show a consistent relationship between DNL and the percentages of groups of people who express various degrees of annoyance. Studies of community annoyance to numerous types of environmental noise show that DNL correlates well with effects, and Schultz (1978) showed a consistent relationship between noise levels and annoyance. The Schultz study

has been periodically re-examined and reaffirmed. The updated relationship by Finegold et al. (1994), which does not differ substantially from the original, is the current preferred form, and is shown in **Table 4.3-1**. Also shown in **Table 4.3-1** is the equivalent relationship between annoyance and CDNL from sonic booms (Committee on Hearing Bioacoustics, and Biomechanics 1981).

Table 4.3-1. Relationship of Annoyance to DNL and CDNL

DNL (dBA)	Percent Highly Annoyed	CDNL (dBC)
45	0.83	42
50	1.66	46
55	3.31	51
60	6.48	56
65	12.29	60
70	22.10	65

Source: Finegold et al. 1994.
Legend: CDNL-C-weighted Day-Night Average Sound Level; DNL-Day-Night Average Sound Level; dBA – A-weighted decibel; dBC – C-weighted decibel.

Single Event Metrics

Sections 4.3.1, 4.3.2, and 4.3.3 (Alternative 1: Talon MOA; Alternative 2: Cato, Smitty, and Lobos MOA's and Christa and Kendra ATCAAs; Alternative 3: Talon, Cato, Smitty, and Lobos MOAs) provide the analysis results for subsonic and supersonic noise in terms of their respective cumulative metrics (DNL and CDNL). However, the cumulative metrics don't provide information on the "loudness" of an aircraft flying in the vicinity of an observer. To characterize the sound environment that exists when an aircraft is flying over a particular point on the ground, a number of overflight scenarios were modeled.

The noise metrics used to characterize an overflight include L_{max} and SEL (see **Section 3.3.1.1,** Noise Metrics, for a description of the metrics). Calculating these metrics requires consideration of a variety of aircraft power settings, airspeeds, and flight altitudes. With regard to power settings, the loudest setting would include use of the engine afterburner. Use of the afterburner is limited because of the fuel consumption and is generally only used in the higher altitudes (above FL300). The other power setting included in these scenarios is full power without the afterburner (known as military or "mil" thrust).

Another factor that drastically affects the sound level for 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, three scenarios were developed to quantify the noise levels at various lateral offsets from the overflight ranging from 0 (direct overflight) to 30,000 feet (approximately 5 miles). The following scenarios were modeled to characterize the noise experience from an aircraft overflight at varying altitudes:

- *Scenario 1*: An overflight at 500 feet AGL (the lowest proposed altitude). Both power settings were included (mil thrust and afterburner); however, use of an afterburner at this altitude would be rare. It should be noted that no overflights at this altitude would occur over populated places in accordance with FAA minimum safe altitudes (14 CFR 91.119) or over designated Wilderness Areas or National Parks (FAA Aeronautical Information Manual, paragraph 7-4-6). Under the Proposed Action, aircraft operations between 500 feet AGL and 2,000 feet AGL represent less than 10 percent of the proposed training. Therefore, observers are not expected to experience this scenario routinely but it represents the "loudest" scenario.
- *Scenario 2*: An overflight at 2,000 feet AGL. Both power settings were included (mil thrust and afterburner). The FAA requests that pilots not fly over Wilderness Areas and National

Parks less than 2,000 feet AGL (FAA Aeronautical Information Manual, paragraph 7-4-6); therefore, this scenario would not occur over Wilderness Areas or National Parks beneath the airspace. As stated above, operations between 500 feet AGL and 2,000 feet AGL represent a small percentage of the proposed training.

- *Scenario 3*: An overflight at 10,000 feet AGL. Both power settings were included (mil thrust and afterburner). The majority of the proposed overflights (approximately 80 percent) would be at or above this altitude.

The L_{max} and SEL calculations for these scenarios are provided in **Table 4.3-2.** A graphical representation of the results for the 500 feet overflight (scenario 1) and the 10,000 feet overflight (scenario 3) are provided in **Figures 4.3-1 and 4.3-2**.

Figure 4.3-1 provides a graphical depiction of the L_{max} data for an overflight at 500 feet. The thickness of the orange band on each graph shows the variety of values possible from the 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. Afterburner use at this altitude would be rare. The L_{max} (which is the peak noise level) occurs for about 1/8 of a second. To provide a frame of reference, three lines are shown to illustrate the average noise level for common noise sources: a lawnmower, a vacuum cleaner 10 feet away, and a garbage disposal. As illustrated, the peak noise level (L_{max}) from an F-16 flying at 500 feet altitude would typically be louder than the noise of a lawnmower to an observer within a half mile (if the aircraft is using an afterburner) or within a mile of the overflight (if the aircraft is using military power). An observer over 2 miles from the overflight would experience noise levels below the common noise sources (lawnmower, vacuum cleaner, and garbage disposal).

Figure 4.3-2 provides a graphical depiction of the L_{max} data for an overflight at 10,000 feet. The peak noise level (L_{max}) for an observer within a mile of an overflight at this altitude would be similar to the noise level produced by a vacuum cleaner or garbage disposal.

Table 4.3-2. L_{max} and SEL Values for F-16 Overflights at Different Power Settings, Altitudes and Lateral Offsets[1]

Offset (feet lateral distance)	Aircraft Altitude - 500 feet AGL				Aircraft Altitude - 2,000 feet AGL				Aircraft Altitude - 10,000 feet AGL			
	L_{max}		SEL		L_{max}		SEL		L_{max}		SEL	
	Mil thrust	Afterburner	Mil thrust	Afterburner	Mil thrust	Afterburner	Mil thrust	Afterburner	Mil thrust	Afterburner	Mil thrust	Afterburner
0	108 - 111	117 - 121	118-121	110 - 113	92 - 95	102 - 105	98 - 101	106 - 109	70 - 73	80 - 84	79 - 82	87 - 91
1,000	99 - 102	108 - 111	111-114	104 - 106	91 - 94	100 - 104	97 - 100	105 - 108	70 - 73	80 - 84	79 - 81	87 - 90
5,000	79 - 82	89 - 92	95-99	88 - 90	80 - 82	89 - 92	88 - 91	96 - 99	69 - 71	79 - 82	78 - 80	86 - 89
10,000	66 - 69	76 - 79	85-88	76 - 79	70 - 72	80 - 83	80 - 82	88 - 91	65 - 67	75 - 79	74 - 77	83 - 86
20,000	45 - 47	56 - 59	66-69	57 - 59	57 - 59	67 - 71	69 - 71	77 - 81	57 - 59	67 - 71	67 - 69	76 - 79
30,000	36 - 38	47 - 51	58-62	48 - 51	48 - 50	59 - 62	60 - 62	69 - 73	49 - 51	60 - 64	60 - 62	69 - 73

Legend: AGL – above ground level; L_{max}-maximum sound level; SEL-Sound Exposure Level

Note: [1] A range of values is provided for each metric since the F-16 variant flown out of Holloman AFB has two different engine types. The speed used for these models was 450 knots.

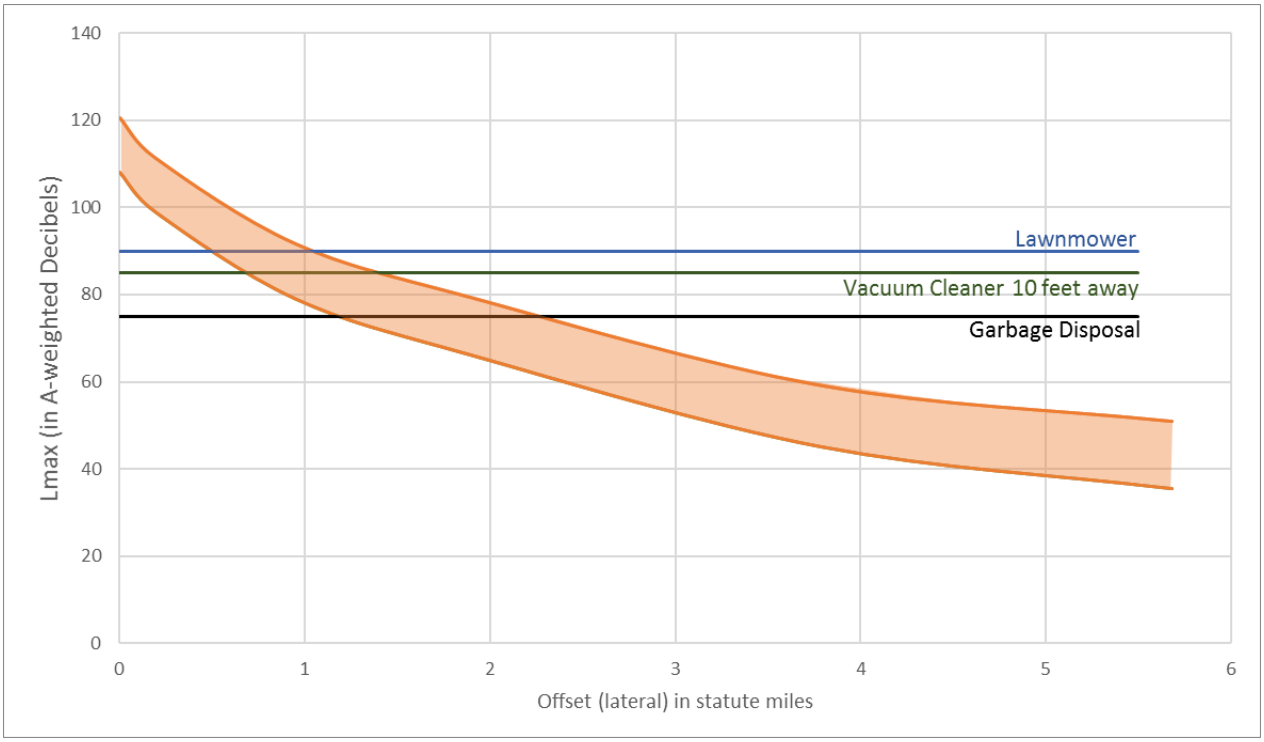


Figure 4.3-1. L_{max} for F-16 Overflight at 500 feet

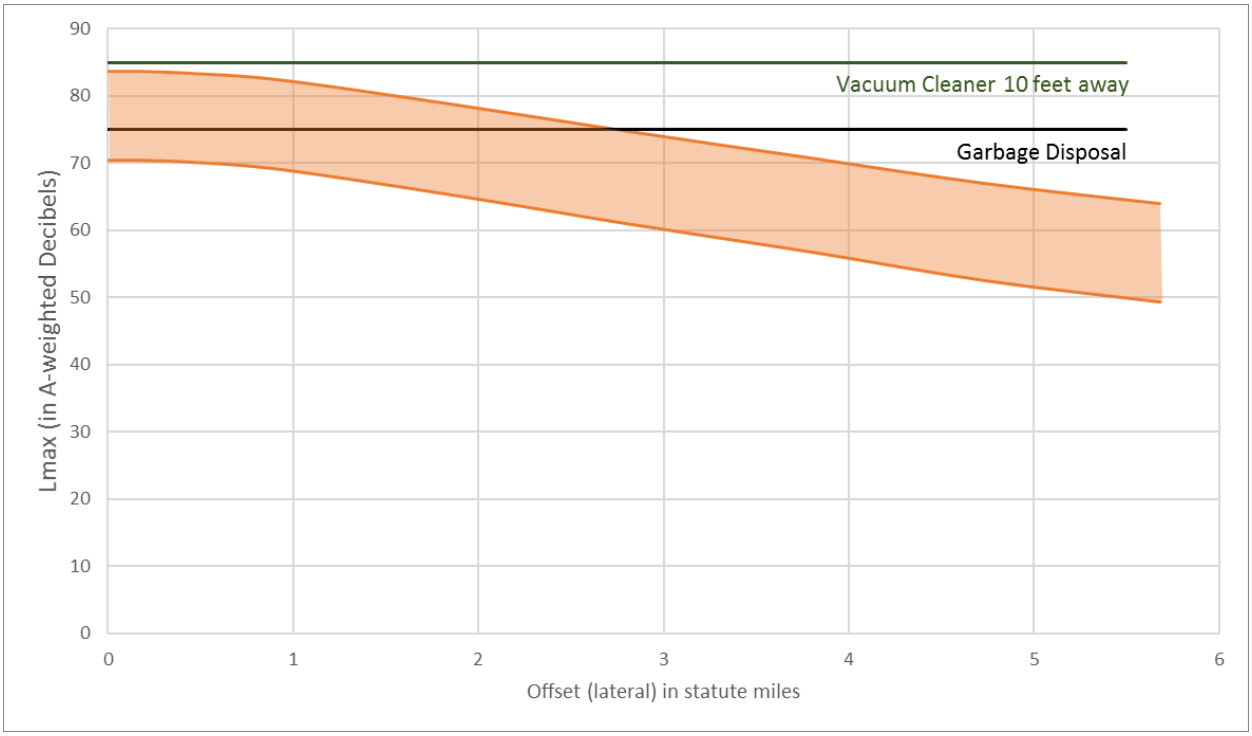


Figure 4.3-2. L_{max} for F-16 Overflight at 10,000 feet

4.3.1 Alternative 1: Talon MOA

4.3.1.1 Subsonic Noise

The projected DNL values that would be attributed to aircraft noise for the various components of airspace associated with Alternative 1 are provided in **Table 4.3-3**. As shown, the greatest projected value would be 57 DNL, with no values exceeding the 65 DNL threshold set forth for land use restrictions. As stated in **Section 3.3.2.1**, the current noise environment has a maximum 54 DNL in the existing Talon Low MOA and a maximum 47 DNL in the Talon High MOAs. Alternative 1 would result in an increase in noise in the proposed low MOAs, with no change for the proposed Talon High A or B MOAs. Within the Talon High B/Low B MOA (aircraft utilizing both areas during training) there would be an increase of 15 DNL (from 43 to 58 DNL). This increase in DNL would likely be noticeable to those exposed, especially if outdoors. However, 58 DNL is still well below the 65 DNL threshold. The proposed Talon High C MOA would also produce an increase from the current DNL since there is currently no SUA in this area. As shown, the greatest projected value would be 57 DNL, with no values exceeding the 65 DNL threshold set forth for land use restrictions and the FAA's significance threshold would not be met.

Table 4.3-3. Projected Noise Levels Attributable to Aircraft Operations in Proposed Talon MOA under Alternative 1

Proposed Airspace Unit	Baseline DNL (dBA)	Projected DNL (dBA)
Talon High A/Low A	54	57
Talon High A	47	47
Talon High B/Low B	43	58
Talon High B	47	47
Talon High C	<35	39

Legend: <-less than; dBA-A-weighted decibel; DNL- Day-Night Average Sound Level; MOA-Military Operations Area.

Table 4.3-4 presents the baseline and projected DNL values attributed to aircraft noise at the 12 POIs beneath or near the proposed Talon MOA airspace.

Table 4.3-4. Baseline and Projected Noise Levels Attributable to Aircraft Operations at Selected POIs Beneath or Near Proposed Talon MOA under Alternative 1

Name	Baseline DNL (dBA)	Projected DNL (dBA)
Carlsbad, New Mexico[1]	40	42
Artesia, New Mexico[1]	40	42
Loving, New Mexico[2]	<35	42
Loco Hills, New Mexico[2]	<35	56
La Huerta, New Mexico[1]	41	42
Hobbs, New Mexico[3]	<35	<35
Roswell, New Mexico[3]	<35	<35
Carlsbad Caverns National Park[2]	<35	<35
Guadalupe Mountains National Forest[3]	<35	<35
Lincoln National Forest[1]	53	56
Living Desert Zoo and Gardens State Park[1]	41	41
Brantley Lake State Park[1]	41	42

Notes: [1]lies beneath existing and proposed Talon MOA; [2]lies beneath proposed Talon MOA; [3]does not lie beneath existing or proposed Talon MOA

Legend: <-less than; dBA-A-weighted decibels; DNL- Day-Night Average Sound Level; MOA-Military Operations Area; POI-Points of Interest.

The modeled subsonic aircraft noise at four of the 12 POIs (Hobbs, New Mexico; Roswell, New Mexico; Carlsbad Caverns National Park; and Guadalupe Mountains National Forest) would have no quantifiable change in DNL under Alternative 1. These four POIs are outside of the existing and proposed airspace and would not be impacted by noise from military training. The greatest change in DNL would occur at Loco Hills, New Mexico, where the estimated DNL from aircraft operations would be 56 DNL. While this represents a large change in DNL value from the baseline conditions, it would be near to the 55 DNL threshold set by USEPA for which adverse noise effects would not be expected to occur. The projected DNL would also be well below the 65 DNL threshold for land use restrictions (Federal Interagency Committee on Urban Noise 1980). However, this much of a change in noise exposure would likely be noticeable. Under Alternative 1, it would be anticipated that less than 6.48 percent of the population would be highly annoyed based on the Schultz (1978) and Finegold et al. (1994) studies (see **Table 4.3-1**).

As discussed in the introduction to **Section 4.3** (Acoustic Environment), the cumulative metrics that are used to regulate noise do not characterize the "loudness" of an overflight that could be experienced by an observer on the ground. The modeled scenarios provide a better description of the potential noise that may be experienced beneath the proposed airspace. It should be noted that populated areas would be avoided by 1,000 feet AGL in accordance with FAA minimum safe altitudes. Wilderness Areas, National Parks and Monuments would be avoided by a minimum of 2,000 feet in accordance with FAA guidelines. Therefore, observers in these areas would not experience the "loudest" of the potential overflights. Observers outside of these areas could experience a range of noise depending on the altitude of the aircraft and their distance from the overflight path (see **Figures 4.3-1 and 4.3-2**).

In summary, it would be anticipated that there would be a perceptible increase to the subsonic noise levels attributed to aircraft activity to some areas beneath the proposed Talon MOA and ATCAA. Within these areas, the level of annoyance for residents and individuals using outdoor recreation areas may increase slightly from the current conditions. There would be no adverse impacts to hearing or health. There would be no land use restrictions related to noise beneath the proposed Talon MOA. Predicted noise levels would not exceed FAA's significance threshold.

4.3.1.2 Supersonic Noise

Supersonic operations already occur within the Talon ATCAA and would continue under Alternative 1. Under Alternative 1, all supersonic F-16 activity would be above FL300, where sonic booms have the least probability of reaching the ground.

As shown in **Table 4.3-5**, the projected CDNL from sonic booms would have no quantifiable change at eight of the 12 POIs. There would be minor increases at the remaining 4 POIs. Supersonic noise levels at the POIs would be less than the 62 CDNL threshold for noise sensitive areas and below the 42 CDNL which is the lowest CDNL with a relationship to annoyance in the Shultz (1978) and Finegold et al. (1994) studies (see **Table 4.3-1**). Supersonic noise levels at or below 42 CDNL would be anticipated to result in 0.83 percent of the general population being highly annoyed (Shultz 1978; Finegold et al. 1994). Noise at this level is difficult to accurately measure and would not be perceptibly different from the baseline conditions. Of the 12 POIs affected by Alternative 1, none would experience a value greater than 38 CDNL from the proposed operations. These levels would not exceed the threshold identified by USEPA that would be harmful to public health nor would the FAA's significance threshold be met.

Table 4.3-5. Baseline and Proposed Supersonic Noise Levels (CDNL) at Selected POIs under Alternative 1		
Name	**Baseline CDNL (dBC)**	**Projected CDNL (dBC)**
Carlsbad, New Mexico[1]	<35	35
Artesia, New Mexico[1]	<35	38
Loving, New Mexico[2]	<35	<35
Loco Hills, New Mexico [2]	<35	<35
La Huerta, New Mexico [1]	<35	36
Hobbs, New Mexico [3]	<35	<35
Roswell, New Mexico [3]	<35	<35
Carlsbad Caverns National Park[2]	<35	<35
Guadalupe Mountains National Forest[3]	<35	<35
Lincoln National Forest[1]	<35	<35
Living Desert Zoo and Gardens State Park[1]	<35	<35
Brantley Lake State Park[1]	<35	38

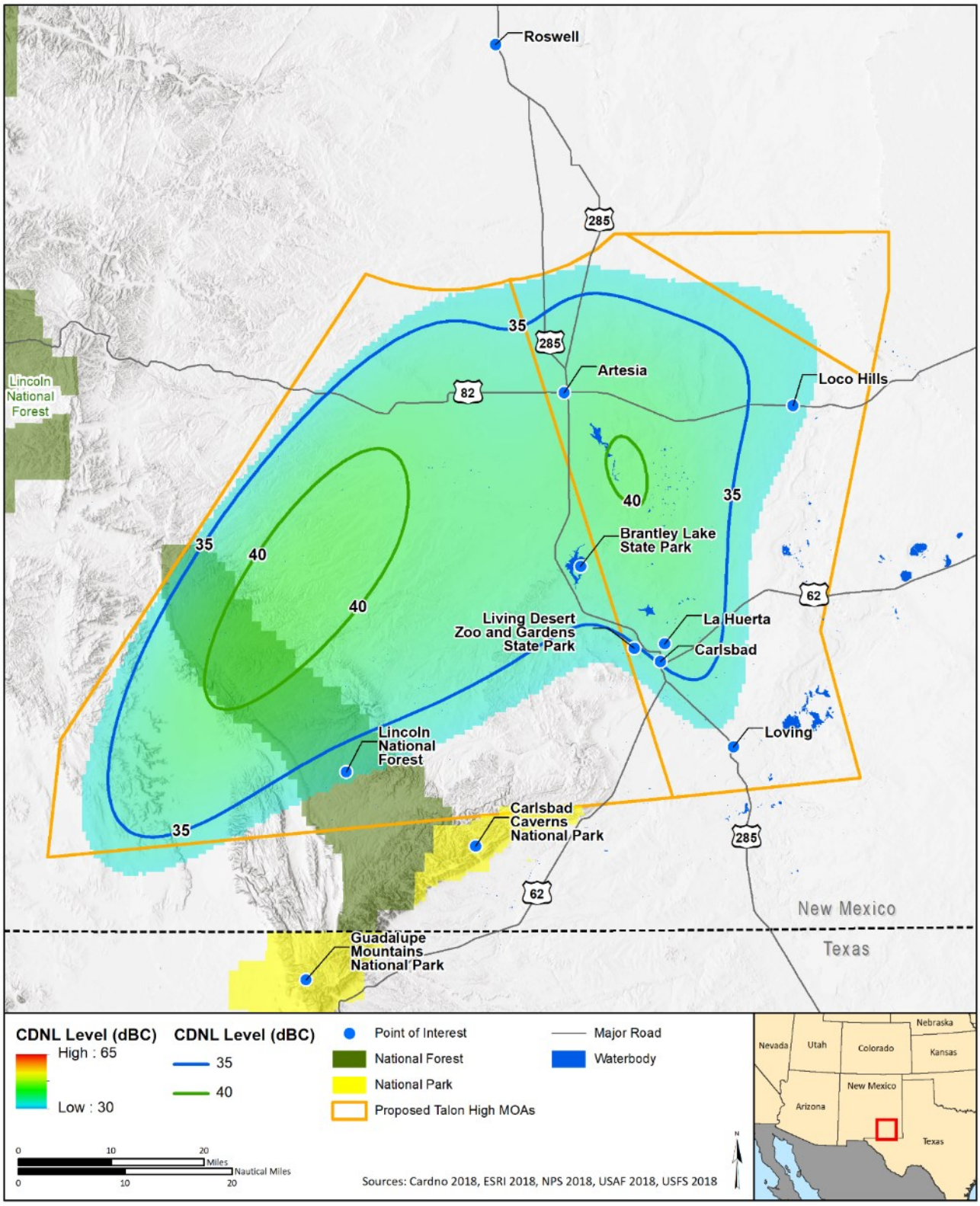
Note: [1]lies beneath existing and proposed Talon MOA; [2]lies beneath proposed Talon MOA; [3]does not lie beneath Talon MOA

Legend: <-less than; CDNL-C-Weighted Day-Night Average Sound Level; dBC-C-weighted decibels; POI-Points of Interest.

Figure 4.3-3 shows the projected CDNL contours in the airspace that would be attributed to the proposed annual supersonic activity under Alternative 1. CDNL values would gradually increase toward the center of the airspace, but would not exceed 42 CDNL. This would be well below the 62 CDNL level that the U.S. Army Public Health Command recommends as a threshold for noise sensitive land uses (U.S. Army Center for Health Promotion and Preventative Medicine 2005). These low values would be due to the relatively low number of supersonic operations, the altitudes proposed for these operations, and the large area of the airspace.

The average peak overpressure under Alternative 1 would be under 1 pound per square foot (psf). At 1 psf, the probability of a window breaking ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). Sonic booms under the Proposed Action would not be expected to damage most structures such as houses and outbuildings. Outdoor structures such as barns, windmills, radio towers, etc., are resilient and routinely subject to wind loads far in excess of sonic boom pressures. Foundations and retaining walls, which are intended to support substantive earth loads, would not be at risk from sonic booms. The Air Force would continue to follow established procedures for claims against the government in cases where damage is claimed to result from sonic booms.

In summary, under Alternative 1, supersonic noise would not have a noticeable change from the baseline. The projected noise from supersonic activity would continue to be below 42 CDNL, which would be unlikely to generate annoyance from the general population (0.83 percent would be annoyed). The supersonic noise associated with Alternative 1 would generate the same level of annoyance as the current supersonic aircraft activity. There would be no adverse impacts to hearing or health, nor would the FAA's significance threshold be met.



Legend: CDNL- C-Weighted Day-Night Average Sound Level; dBC-C-weighted decibel; MOA-Military Operations Area.

Figure 4.3-3. Projected Supersonic Noise Contours under Alternative 1

4.3.2 Alternative 2: Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs

4.3.2.1 Subsonic Noise

The projected DNL values that would be attributed to aircraft noise for the various components of proposed airspace associated with Alternative 2 are provided in **Table 4.3-6**. As shown, the greatest projected value would be 55 DNL, with no values exceeding the 65 DNL threshold set forth for land use restrictions. The greatest change in DNL would occur within the Cato and Smitty West MOAs, with a difference of at least 13 DNL (change from <35 to 48 DNL). This increase in DNL would likely be noticeable to those exposed, especially if outdoors. However, 48 DNL is still well below the 65 DNL threshold for land use restrictions. The FAA's significance threshold would also not be met.

Table 4.3-6. Projected Noise Levels Attributable to Aircraft Operations in Proposed SUA under Alternative 2

Proposed Airspace Unit	Baseline DNL (dBA)	Projected DNL (dBA)
Cato and Smitty MOAs	47	55
Cato and Smitty MOA West[1]	<35	48
Lobos MOA	50	53
Christa ATCAA	50	50
Kendra ATCAA	50	50

Note: [1]Western corner of Cato and Smitty MOAs with altitude floor of 1,600 feet AGL
Legend: <-less than; ATCAA-Air Traffic Control Assigned Airspace; dBA-A-weighted decibel; DNL- Day-Night Average Sound Level; MOA-Military Operations Area; SUA-special use airspace.

Table 4.3-7 presents the baseline and projected DNL values attributed to aircraft noise at the 16 POIs beneath or near the proposed Cato, Smitty, and Lobos MOAs and Christa and Kendra ATCAAs.

Table 4.3-7. Baseline and Projected Noise Levels Attributable to Aircraft Operations in Proposed SUA at Selected POIs under Alternative 2

Name	Baseline DNL (dBA)	Projected DNL (dBA)
Gila Cliff Dwellings National Monument [1]	<35	49
Socorro, New Mexico[2]	<35	<35
Truth or Consequences, New Mexico [2]	<35	<35
Las Cruces, New Mexico [2]	<35	<35
Magdalena, New Mexico [3]	<35	50
Bayard, New Mexico [2]	<35	<35
Old Horse Springs, New Mexico [3]	<35	50
Arenas Valley, New Mexico [1]	<35	47
Silver City, New Mexico [1]	<35	47
Gila Wilderness [1]	<35	49
Elephant Butte State Park[2]	<35	<35
Gila National Forest[1]	49	52
Aldo Leopold Wilderness[1]	<35	49
Apache Kid Wilderness[3]	45	49
Bosque del Apache National Wildlife Refuge[2]	<35	<35
Rio Grande[2]	<35	<35

Note: [1]lies beneath proposed Lobos MOA;
[2]lies outside existing or proposed MOAs;
[3]lies beneath existing and proposed MOAs
Legend: <-less than; dBA-A-weighted decibels; DNL-Day-Night Average Sound Level; POI-Points of Interest; SUA-special use airspace.

Seven of the 16 POIs would remain unchanged under Alternative 2. The highest projected DNL would be 52 DNL within the Gila National Forest (which is an increase from the current 49 DNL). The greatest change in DNL occurs at Magdalena, New Mexico and Old Horse Springs, New Mexico, which would have values of 50 DNL. The current DNL in these areas is <35 DNL, so the increase would likely be noticeable. While this represents a large change in DNL value, all values would be well below the 65 DNL threshold for land use restrictions (Federal Interagency Committee on Urban Noise 1980). The DNL values are also below the USEPA threshold of 55 DNL which indicates adverse noise effects are usually not expected to occur. Under Alternative 2, 1.66 percent of the population would be expected to be highly annoyed at the subsonic noise based on the Schultz (1978) and Finegold et al. (1994) studies (see **Table 4.3-1**), which would represent a slight increase over baseline conditions.

As discussed in the introduction to **Section 4.3** (Acoustic Environment), the cumulative metrics that are used to regulate noise do not characterize the "loudness" of an overflight that could be experienced by an observer on the ground. The modeled scenarios provide a better description of the potential noise that may be experienced beneath the proposed airspace. It should be noted that populated areas would be avoided by a minimum of 1,000 feet in accordance with FAA regulations; and, designated Wilderness Areas, National Parks and Monuments would be avoided by 2,000 feet. Therefore, observers in these areas would not experience the "loudest" of the potential overflights. Observers outside of these areas could experience a range of noise depending on the altitude of the aircraft and their distance from the overflight path (see **Figures 4.3-1 and 4.3-2**).

In summary, the projected DNL within the airspace and at the POIs would not exceed the 65 DNL threshold for land use restrictions. The POIs beneath the proposed Christa and Kendra ATCAAs would not experience a change from the baseline conditions. A perceptible increase to the subsonic noise levels may occur at some of the POIs under the proposed MOAs. Within these areas, the level of annoyance for residents and individuals using outdoor recreation areas may increase from the current conditions. No adverse impacts to hearing and health would be anticipated, nor would the FAA's significance threshold be met.

4.3.2.2 Supersonic Noise

Supersonic operations are approved in the Cato ATCAA, but have not occurred in recent years. Supersonic operations would be new in the areas proposed for the Lobos MOA and Christa and Kendra ATCAAs. All supersonic F-16 activity would be above FL300, where sonic booms have the least probability of reaching the ground. **Table 4.3-8** presents the baseline and projected CDNL attributed to supersonic aircraft activity at the POIs associated with Alternative 2. None of CDNL values would exceed the 62 CDNL threshold for noise sensitive areas. The projected supersonic noise would remain unchanged at five of the 16 POIs. The remaining 11 POIs would have a slight increase in supersonic noise, with the highest estimated value of 40 CDNL. Noise levels from supersonic activity at all of the POIs would be less than 42 CDNL which is the lowest CDNL with a relationship to annoyance in the Shultz (1978) and Finegold et al. (1994) studies (see **Table 4.3-1**). Supersonic noise levels at or below 42 CDNL would be anticipated to result in 0.83 percent of the general population being highly annoyed (Shultz 1978; Finegold et al. 1994). Additionally, the FAA's threshold for significance would not be met. Noise at this level is difficult to accurately measure and would not be perceptibly different from the baseline conditions.

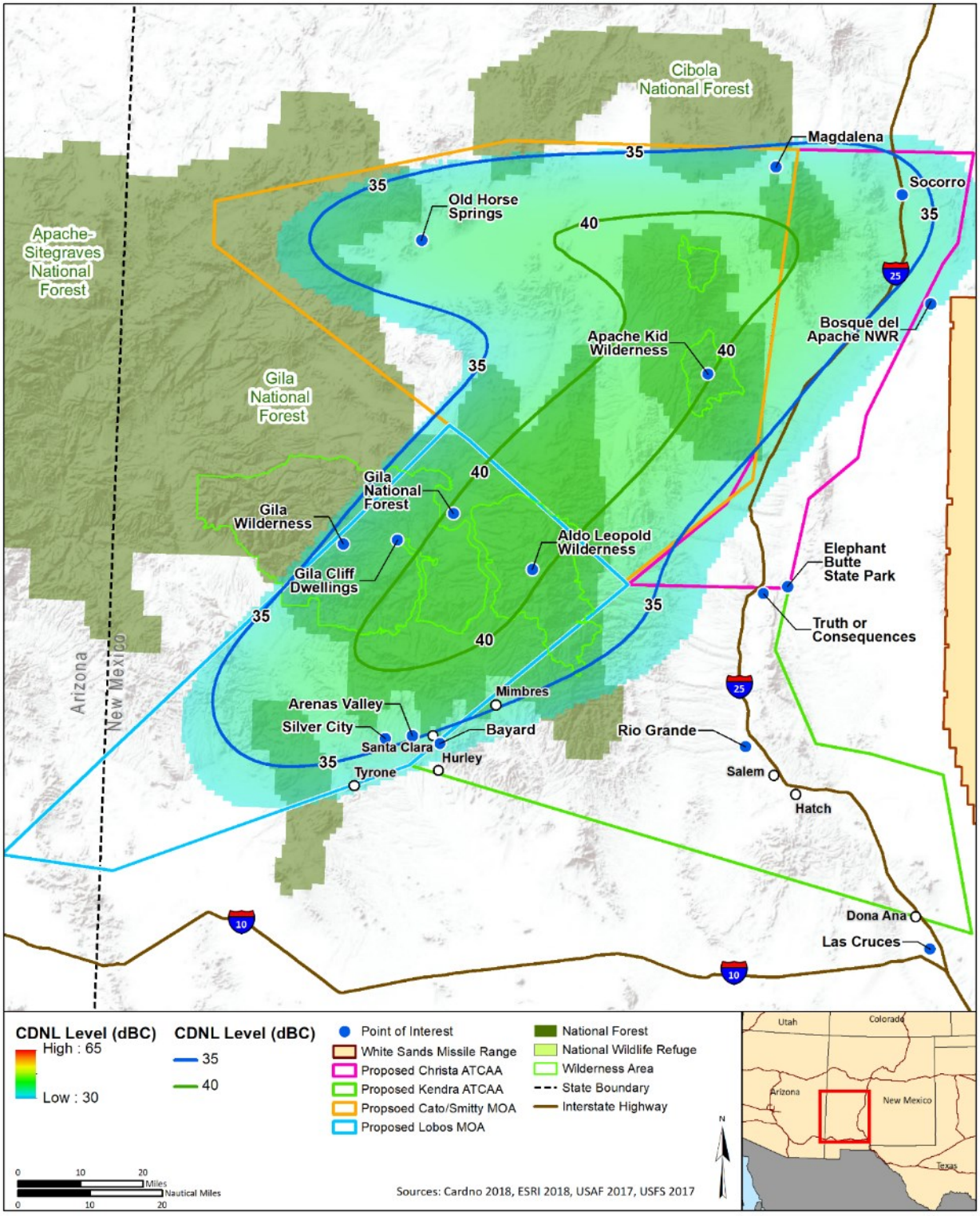
Table 4.3-8. Baseline and Projected Supersonic Noise Levels (CDNL) at Selected POIs under Alternative 2		
Name	**Baseline CDNL (dBC)**	**Projected CDNL (dBC)**
Gila Cliff Dwellings[1]	<35	39
Socorro, New Mexico[2]	<35	36
Truth or Consequences, New Mexico [2]	<35	<35
Las Cruces, New Mexico [2]	<35	<35
Magdalena, New Mexico [3]	<35	37
Bayard, New Mexico [2]	<35	<35
Old Horse Springs, New Mexico [3]	<35	38
Arenas Valley, New Mexico [1]	<35	35
Silver City, New Mexico [1]	<35	36
Gila Wilderness[1]	<35	37
Elephant Butte State Park[2]	<35	<35
Gila National Forest[1]	<35	40
Aldo Leopold Wilderness[1]	<35	40
Apache Kid Wilderness[3]	<35	40
Bosque del Apache National Wildlife Refuge[2]	<35	35
Rio Grande[2]	<35	<35

Notes: [1]lies beneath proposed Lobos MOA;
[2]lies outside existing or proposed MOAs;
[3]lies beneath existing and proposed MOAs

Legend: <-less than; CDNL-C-Weighted Day-Night Average Sound Level; dBC-C-weighted decibels; POI-Points of Interest;.

Figure 4.3-4 shows the CDNL contours in the airspace that would be attributed to the proposed annual supersonic activity under Alternative 2. CDNL values would gradually increase toward the center of the airspace, but would not exceed 42 CDNL. This would be well below the 62 CDNL level that the U.S. Army Public Health Command recommends as a threshold for noise sensitive land uses (U.S. Army Center for Health Promotion and Preventative Medicine 2005). These low values would be due to the relatively low number of supersonic operations, the altitudes proposed for these operations, and the large area of the airspace.

The likelihood of a sonic boom resulting in any structural impact would be negligible, just as under Alternative 1. The average peak overpressure under Alternative 2 would be under 1psf. At 1 psf, the probability of a window breaking ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). Sonic booms would not be expected to damage most structures such as houses and outbuildings. Outdoor structures such as barns, windmills, radio towers, etc., are resilient and routinely subject to wind loads far in excess of sonic boom pressures. Foundations and retaining walls, which are intended to support substantive earth loads, would not be at risk from sonic booms. The Air Force would follow established procedures for claims against the government in cases where damage is claimed to result from sonic booms.



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

Figure 4.3-4. Projected Supersonic Noise Contours under Alternative 2

In summary, supersonic noise under Alternative 2 would increase from baseline conditions since there are no sonic booms contributing to the acoustic environment currently. The projected noise from supersonic activity would be below 42 CDNL, which would be estimated to annoy a small percentage of the general population (0.83 percent would be annoyed). However, since sonic booms do not occur currently, the level of annoyance for residents and individuals using outdoor recreation areas when sonic booms occur may increase slightly from the current conditions. The projected supersonic noise would not be at a level to cause adverse impacts to health and hearing or damage structures, nor would the FAA's threshold significance be me.

4.3.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

4.3.3.1 Subsonic Noise

The baseline and projected DNL values that would be attributed to aircraft noise for the various components of proposed airspace associated with Alternative 3 are provided in **Table 4.3-9**. As shown, the greatest value is 56 DNL which does not exceed the 65 DNL threshold set forth for land use restrictions. The greatest change that would occur under Alternative 3 would be within Talon High B/Low B, with a change of 12 DNL (change from 43 DNL to 55 DNL). This increase in DNL would likely be noticeable to those exposed, especially if outdoors.

Table 4.3-9. Projected Noise Levels Attributable to Aircraft Operations in SUA under Alternative 3

Proposed Airspace Unit	Baseline DNL (dBA)	Projected DNL (dBA)
Talon High A/Low A	54	56
Talon High A Outside Low A	47	47
Talon High B/Low B	43	55
Talon High B Outside Low B	47	47
Cato and Smitty MOAs	47	52
Cato and Smitty MOA West[1]	<35	43
Lobos MOA	50	50
Kendra ATCAA	50	50
Christa ATCAA	50	50

Note: [1]Western corner of Cato and Smitty MOA with altitude floor of 1,600 feet AGL
Legend: <-less than; ATCAA-Air Traffic Control Assigned Airspace; dBA-A-weighted decibel; DNL- Day-Night Average Sound Level; MOA-Military Operations Area; SUA-special use airspace.

Table 4.3-10 shows the baseline and projected DNL values that would be attributed to aircraft noise at the 28 POIs beneath or near the Talon, Cato, and Smitty MOAs and Christa and Kendra ATCAAs.

Table 4.3-10. Baseline and Projected Noise Levels Attributable to Aircraft Operations at Selected POIs under Alternative 3

Name	Baseline DNL (dBA)	Projected DNL (dBA)
Eastern POIs		
Carlsbad, New Mexico	40	40
Artesia, New Mexico	40	40
Loving, New Mexico	<35	40
Loco Hills, New Mexico	<35	53
La Huerta, New Mexico	41	40
Hobbs, New Mexico	<35	<35
Roswell, New Mexico	<35	<35
Carlsbad Caverns National Park	<35	<35

Table 4.3-10. Baseline and Projected Noise Levels Attributable to Aircraft Operations at Selected POIs under Alternative 3 (cont.)

Name	Baseline DNL (dBA)	Projected DNL (dBA)
Guadalupe Mountains National Forest	<35	<35
Lincoln National Forest	53	55
Living Desert Zoo and Gardens State Park	41	39
Brantley Lake State Park	41	41
Western POIs		
Socorro, New Mexico	<35	<35
Truth or Consequences, New Mexico	<35	<35
Las Cruces, New Mexico	<35	<35
Magdalena, New Mexico	<35	45
Bayard, New Mexico	<35	<35
Old Horse Springs, New Mexico	<35	45
Arenas Valley, New Mexico	<35	<35
Silver City, New Mexico	<35	<35
Gila Cliff Dwellings National Monument	<35	<35
Gila Wilderness	<35	<35
Elephant Butte State Park	<35	<35
Gila National Forest	<35	<35
Aldo Leopold Wilderness	<35	<35
Apache Kid Wilderness	<35	39
Bosque del Apache National Wildlife Refuge	<35	<35
Rio Grande	<35	<35

Legend: <-less than; dBA-A-weighted decibels; DNL-Day-Night Average Sound Level; POI-point of interest.

The projected DNL at 20 of the 28 POIs would remain unchanged under Alternative 3. La Huerta and Living Desert Zoo and Gardens State Park both would decrease slightly under Alternative 3. The highest projected DNL value would occur at Lincoln National Forest (55 DNL) which would be a small increase from 53 DNL. As with Alternative 1, the greatest proposed increase in DNL value would occur at Loco Hills, with a projected 53 DNL. While these differences in DNL would likely be noticeable in some areas, they would remain well below the 65 DNL threshold for noise sensitive land use restrictions. Likewise, all of these locations would have DNL values of 55 DNL or less, which is the threshold set by USEPA for which adverse noise effects would not be expected to occur. Under Alternative 3, approximately 3.31 percent of the population would be expected to be highly annoyed based on the highest DNL value (55 DNL) (see **Table 4.3-1**).

As stated in Alternatives 1 and 2, the cumulative metrics that are used to regulate noise do not characterize the "loudness" of an overflight that could be experienced by an observer on the ground. The modeled scenarios provide a better description of the potential noise that may be experienced beneath the proposed airspace. It should be noted that populated areas would be avoided by a minimum of 1,000 feet in accordance with FAA regulations; and, designated Wilderness Areas, National Parks and Monuments would be avoided by 2,000 feet. Therefore, observers in these areas would not experience the "loudest" of the potential overflights. Observers outside of these areas could experience a range of noise depending on the altitude of the aircraft and their distance from the overflight path (see **Figures 4.3-1 and 4.3-2**).

In summary, the projected DNL within the airspace and at the POIs would not exceed the 65 DNL threshold for land use restrictions. As with Alternative 2, the proposed DNL values at POIs beneath the Christa and

Kendra ATCAAs would not change. A perceptible increase to the subsonic noise levels may occur at some of the POIs under the proposed MOAs. Within these areas, the level of annoyance for residents and individuals using outdoor recreation areas may increase slightly from the current conditions. No adverse impacts to hearing and health would be anticipated, nor would the FAA's threshold for significance would not be met.

4.3.3.2 Supersonic Noise

Table 4.3-11 presents the baseline and projected CDNL attributed to supersonic aircraft activity at the POIs associated with Alternative 3. None of CDNL values would exceed the 62 CDNL threshold for noise sensitive areas. Twenty-four of the POIs would have a projected value of 35 CDNL or less. Of the remaining four, the highest value would be 38 CDNL. Noise levels from supersonic activity at all of the POIs would be less than 42 CDNL which is the lowest CDNL with a relationship to annoyance in the Shultz (1978) and Finegold et al. (1994) studies (see **Table 4.3-1**). Supersonic noise levels at or below 42 CDNL would be anticipated to result in 0.83 percent of the general population being highly annoyed (Shultz 1978; Finegold et al. 1994). Additionally, the FAA's significance threshold would not be met. Noise at this level is difficult to accurately measure and would not be perceptibly different from the baseline conditions.

Table 4.3-11. Baseline and Projected Supersonic Noise Levels (CDNL) at Selected POIs under Alternative 3

Name	Baseline CDNL (dBC)	Projected CDNL (dBC)
Eastern POIs		
Carlsbad, New Mexico	<35	<35
Artesia, New Mexico	<35	<35
Loving, New Mexico	<35	<35
Loco Hills, New Mexico	<35	<35
La Huerta, New Mexico	<35	<35
Hobbs, New Mexico	<35	<35
Roswell, New Mexico	<35	<35
Carlsbad Caverns National Park	<35	<35
Guadalupe Mountains National Forest	<35	<35
Lincoln National Forest	<35	<35
Living Desert Zoo and Gardens State Park	<35	<35
Brantley Lake State Park	<35	<35
Western POIs		
Gila Cliff Dwellings	<35	37
Socorro, New Mexico	<35	<35
Truth or Consequences, New Mexico	<35	<35
Las Cruces, New Mexico	<35	<35
Magdalena, New Mexico	<35	<35
Bayard, New Mexico	<35	<35
Old Horse Springs, New Mexico	<35	<35
Arenas Valley, New Mexico	<35	<35
Silver City, New Mexico	<35	<35
Gila Wilderness	<35	<35
Elephant Butte State Park	<35	<35
Gila National Forest	<35	38
Aldo Leopold Wilderness	<35	37

Table 4.3-11. Baseline and Projected Supersonic Noise Levels (CDNL) at Selected POIs under Alternative 3 (cont.)

Name	Baseline CDNL (dBC)	Projected CDNL (dBC)
Apache Kid Wilderness	<35	37
Bosque del Apache National Wildlife Refuge	<35	<35
Rio Grande	<35	<35

Legend: <-less than; CDNL-C-Weighted Day-Night Average Sound Level; dBC-C-weighted decibels; POI-Points of Interest.

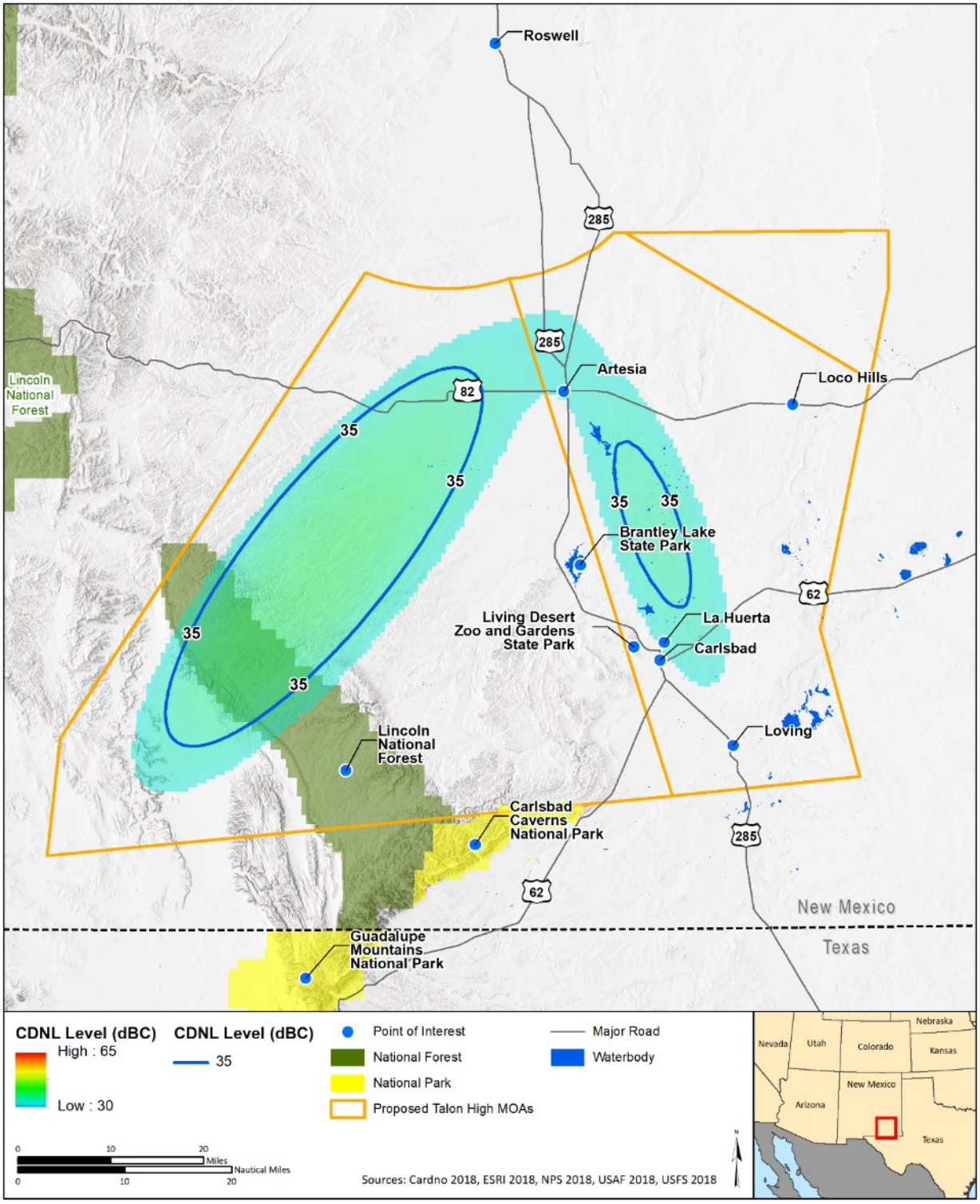
Figure 4.3-5 and Figure 4.3-6 show the CDNL contours in the airspace that would be attributed to the proposed annual supersonic activity associated with Alternative 3. CDNL values would gradually increase toward the center of the airspace, but would not exceed 39 CDNL (at either east or west areas). This would be well below the 62 CDNL level that the U.S. Army Public Health Command recommends as a threshold for noise sensitive land uses (U.S. Army Center for Health Promotion and Preventative Medicine 2005).

These low values would be due to the relatively low number of supersonic operations, the altitudes proposed for these operations, and the large area of the airspace. Overpressures from sonic booms would be similar or less than those described for Alternatives 1 or 2 and would not cause any structural damage concerns.

In summary, under Alternative 3, supersonic noise would not have a noticeable change from the baseline in the east. Some areas in the west would have a slight increase in supersonic noise. The projected noise from supersonic activity would continue to be below 42 CDNL in all areas, which would be unlikely to generate annoyance from the general population (0.83 percent would be annoyed). However, since sonic booms do not currently occur in the west area, the level of annoyance for residents and individuals using outdoor recreation areas when sonic booms occur may increase slightly from the current conditions. There would be no adverse impacts to hearing or health, nor would the FAA's significance threshold be met.

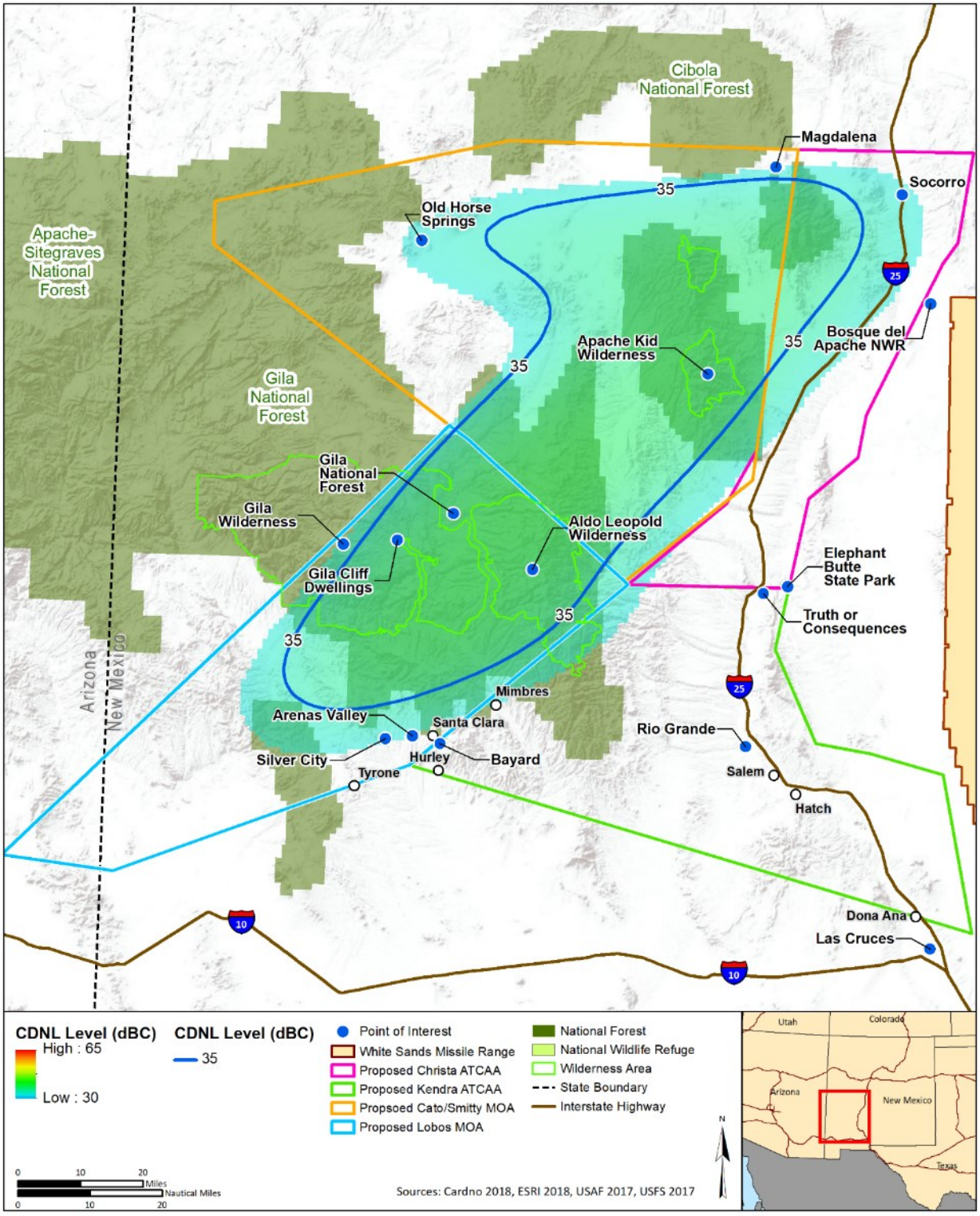
4.3.4 No Action Alternative

Under the No Action Alternative, noise levels would remain the same as the baseline or existing conditions. F-16 operations from Holloman AFB would continue to utilize the current airspace units. There would be no increase in noise levels.



Legend: CDNL-C-weighted Day-Night Average Sound Level; dBC-C-weighted decibels; MOA-Military Operations Area.

Figure 4.3-5. Projected Supersonic Noise Contours under Alternative 3 East



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

Figure 4.3-6. Projected Supersonic Noise Contours under Alternative 3 West

4.4 AIR QUALITY

The environmental impact methodology for both noise and air quality impacts presented in this EIS are derived by utilizing the same operational data developed as directed by AFI 32-7070, *Air Force Noise Program*, 21 April 2016. The air analysis factors in the engine types used in the aircraft, the time spent at or below 3,000 feet AGL, the time spent with the engine operating in Military mode or afterburner mode, and the emission factors associated with those flight modes, and other relevant details of the affected environment, the Proposed Action, and alternatives necessary to produce a consistent determination of environmental consequences and anticipated mitigations. The air quality impacts analysis at the locations evaluated in this EIS has factored in weighted times in each mode of flight operations, that occur at or below the applicable mixing layer, based on the flight profiles developed for the noise impacts analysis, the projected frequency of use of each flight profile, and the percent thrust for the afterburner and military modes of operation documented in the flight profiles. Calculations showing the time weighted average assigned to each flight mode and its percentage of use, consistent with the operational data used throughout this analysis, can be found in **Appendix G**.

To assess emissions from the Proposed Action, the emissions from current F-16 pilot training flights in the MOAs and the use of several MTRs that intersect the existing and proposed MOAs (current operations) were compared to the emissions from the proposed training flights for each alternative on an annual basis. In addition, transient aircraft were also included in the model as described in **Sections 2.8.1.2, 2.8.2.2, and 2.8.3.2** (proposed operations for each Alternative).

The methodology for estimating aircraft emissions involves evaluating the type of activity, the number of hours of operation, the type of engine, and the mode of operation for each type of aircraft. Aircraft emissions were calculated based on the following inputs:

- Aircraft emissions for F-16C aircraft with two engine types (F100-PW-220 and F110-GE-100) and FA-18C (engine model F404-GE-400) were modeled using the Air Force Conformity Applicability Model. Lead is not included as it is not a component of jet fuel.
- Times-in-mode and power settings were assessed applying data used for the noise analysis.
- Flight operations data were the same as those used for the noise analysis.

In addition to aircraft flight emissions, emissions from flare detonation below 3,000 feet AGL were estimated using emission factors published in Chapter 15 of USEPA's Emission Source Guide, AP-42 (USEPA 2009). Flares would not be released below 2,000 feet AGL to prevent fire hazards, therefore, the number of flares released between 2,000 and 3,000 feet AGL are unknown but anticipated to be small. To provide the most conservative estimate for air quality impacts, the total number of flares was estimated to be released between 2,000 and 3,000 feet AGL.

A study conducted by the Desert Research Institute in 2002, The Fate and Distribution of Radio Frequency Chaff (Desert Research Institute 2002), and an independent parallel study conducted by B.W. Cook, Investigation of the Abrasion, Fragmentation, and Re-Suspension of Chaff (referenced in Air Force 2011), addressed the concern of chaff fragmentation into inhalable particles (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 (Air Force 2011). In conclusion, chaff will not be addressed further in this Air Quality analysis.

The USEPA publication "Aircraft Contrails Factsheet" (USEPA 2000) describes the formation, occurrence, and effects of contrails in detail. In short, contrails are formed by a mixture of water vapor in jet aircraft exhaust and particulates either already in the atmosphere, from the jet aircraft exhaust itself, or both. All contrails are line-shaped clouds composed of ice particles that pose no direct threat to public health. These ice particles in contrails do not reach the Earth's surface due to the fact that they fall slowly and conditions in the lower atmosphere cause them to evaporate first. Therefore, contrails do not affect air quality and will not be addressed further in this analysis.

Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 CFR 1508.27. This requires that the significance of an action be analyzed with respect to the setting of the action and be based relative to the severity of the impact. For attainment area criteria pollutants, the project air quality analysis uses the USEPA's Prevention of Significant Deterioration (PSD) permitting threshold of 250 tons per year (TPY) as an initial indicator of the local significance of potential impacts to air quality. It is important to note that these indicators only provide a clue to the potential impacts to air quality. In the context of criteria pollutants for which the proposed project region is in attainment of a NAAQS, the analysis compares the annual net increase in emissions estimated for each project alternative to the 250 TPY PSD permitting threshold. The PSD permitting threshold represents the level of potential new emissions below which a new or existing minor non-listed stationary source may acceptably emit without triggering the requirement to obtain a permit. Thus, if the intensity of any net emissions increase for a project alternative is below 250 TPY in the context of an attainment criteria pollutant the indication is the air quality impacts will be insignificant for that pollutant.

4.4.1 Alternative 1: Talon MOA

4.4.1.1 Criteria Pollutant Emissions

Current flight activities below 3,000 feet AGL for both the F-16C training activities and the transient aircraft result in approximately 81 hours of flight time. Under Alternative 1, flight time would increase to reflect a new annual total of 727 hours. All of the counties within the Talon Low A and B MOAs are in attainment with the NAAQS and do not require a General Conformity analysis. The proposed annual emissions were screened against the PSD threshold values as comparative thresholds or indicators for criteria pollutants (250 tons per year).

Table 4.4-1 provides estimated air emissions of criteria pollutants for the current aircraft operations and flares, the proposed aircraft operations and flares under Alternative 1, and the comparative threshold. A Record of Air Analysis (ROAA) for Alternative 1 is located in **Appendix G** (Air Quality Supporting Documents), along with detailed air emission calculations.

Table 4.4-1. Current and Alternative 1 Annual Emission Estimates

Activity	Total Annual Emissions in Tons					
	VOCs	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Current Operations	0.43	6.03	13.16	0.61	0.77	0.59
Alternative 1 Operations	4.23	47.22	112.61	5.00	4.77	3.96
Net Change	**3.81**	**41.19**	**99.45**	**4.40**	**4.00**	**3.37**
Comparative Threshold	250	250	250	250	250	250
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Legend: CO-Carbon monoxide;; NO_x-Nitrogen oxides; PM_{10} - particulate matter less than or equal to 10 microns; $PM_{2.5}$ - particulate matter less than or equal to 2.5 microns; SO_2-Sulfur dioxide; VOCs-Volatile Organic Compounds.

Criteria pollutant emissions would increase with the proposed aircraft activity, though the proposed net increases would be less than the comparative thresholds used as a guide for assessing significance. The criteria pollutant emissions associated with Alternative 1 would not alter the attainment status of Chaves, Eddy, or Otero Counties and would not be categorized as significant. While the emissions specific to the Talon Low A and B MOAs are not separately accounted for, the portion of all emissions that could be attributed to this one area is small and therefore would not adversely impact visibility in the National Parks located near the Talon Low A and B MOAs.

4.4.1.2 Greenhouse Gas Emissions

GHG emissions were calculated based on all of the annual flight hours for the year for the F-16C and the transient aircraft (represented with the F/A-18), regardless of altitude. The average sortie is estimated at one hour without refueling and so this was used as the average time for a sortie. The current flight time (current operations) for all sorties is estimated at 1,554 hours. Under Alternative 1, the total flight time would increase to 7,667 hours. **Table 4.4-2** provides the GHG emissions that would be anticipated from the current and Alternative 1 operations and indicates the proposed net change. An additional 125,518 tons of GHG emissions would be the equivalent of adding an additional 24,525 passenger vehicles onto roads, driving 11,500 miles per year on average.

Table 4.4-2. Current and Alternative 1 Annual GHG Emission Estimates

Total Annual Emissions in Tons	
Activity	**CO_2e**
Current Operations	39,381
Alternative 1 Operations	164,899
Net Change	**125,518**

Legend: CO_2e-carbon dioxide equivalent; GHG-greenhouse gas.

4.4.2 Alternative 2: Cato, Smitty, and Lobos MOAs

4.4.2.1 Criteria Pollutant Emissions

Current flight activities below 3,000 feet AGL for both the F-16C training activities and the transient aircraft result in approximately 81 hours of flight time. Under Alternative 2, annual flight time below 3,000 feet AGL would increase to 560 hours. All of the proposed areas are in attainment with the NAAQS with the exception of Greenlee County, Arizona and Grant County, New Mexico. These counties would be within the proposed Lobos Low MOA region and are maintenance areas for SO_2. For this reason, the SO_2 emissions for Alternative 2 are compared to the General Conformity *de minimis* threshold (100 tons per year) for SO_2 to assess significance. All other proposed criteria pollutant emissions were screened against the applicable General Conformity threshold values as comparative thresholds or indicators for criteria pollutants (250 tons per year).

Table 4.4-3 provides estimated air emissions of criteria pollutants for the current aircraft operations and flares, the proposed aircraft operations and flares under Alternative 2, the comparative threshold, and the SO_2 *de minimis* threshold. A Record of Conformity Analysis for SO_2 and a ROAA for the remaining criteria pollutants under Alternative 2 is located in **Appendix G** (Air Quality Supporting Documents), along with detailed air emission calculations.

Table 4.4-3. Current and Alternative 2 Annual Emission Estimates

Activity	Total Annual Emissions in Tons					
	VOCs	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Current Operations	0.43	6.03	13.16	0.61	0.77	0.59
Alternative 2 Operations	43.26	36.35	86.71	3.85	3.68	3.05
Net Change	**2.84**	**30.32**	**73.55**	**3.25**	**2.91**	**2.47**
Comparative Threshold	250	250	250	NA	250	250
Exceed Threshold?	**No**	**No**	**No**	NA	**No**	**No**
Conformity *de minimis* Threshold	NA	NA	NA	100	NA	NA
Exceed Threshold?	NA	NA	NA	**No**	NA	NA

Legend: CO-Carbon monoxide;; NO_x-Nitrogen oxides; PM_{10} - particulate matter less than or equal to 10 microns; $PM_{2.5}$ - particulate matter less than or equal to 2.5 microns; SO_2-Sulfur dioxide; VOCs-Volatile Organic Compounds.

Criteria pollutant emissions would increase with the proposed aircraft activity, though the proposed net increases would be less than the comparative thresholds used as a guide for assessing significance. The SO_2 emissions associated with the Proposed Action would not exceed the General Conformity *de minimis* threshold for Grant County, New Mexico or Greenlee County, Arizona. Based on this analysis, General Conformity does not apply. The estimated criteria pollutant emissions associated with Alternative 2 would not alter the attainment status of Sierra, Catron, Socorro, or Hidalgo Counties in New Mexico or Graham County in Arizona, and would not be categorized as significant. While the emissions specific to the Smitty Low and Lobos Low MOAs are not separately accounted for, the portion of all emissions that could be attributed to these areas is small and therefore is not likely to adversely impact visibility in the Class I areas located near them. Specifically, these include Galiuro Wilderness in Graham County Arizona; Gila Wilderness in Catron and Grant Counties in New Mexico; and Bosque del Apache Wilderness in Socorro County.

4.4.2.2 Greenhouse Gas Emissions

GHG emissions were calculated based on all of the annual flight hours for the year for the F-16C and the transient aircraft (represented with the F/A-18), regardless of altitude. The average sortie is estimated at one hour without refueling; and so, this was used as the average time for a sortie. The current flight time (current operations) for all sorties is estimated at 1,554 hours. Under Alternative 2, the total flight time would increase to 6,439 hours. **Table 4.4-4** provides the GHG emissions that would be anticipated from the current and Alternative 2 operations and indicates the proposed net change. An additional 102,525 tons of GHG emissions would be the equivalent of adding an additional 20,033 passenger vehicles onto roads, driving 11,500 miles per year on average.

Table 4.4-4. Current and Alternative 2 Annual GHG Emission Estimates

Total Annual Emissions in Tons	
Activity	**CO_2e**
Current Operations	39,381
Alternative 2 Operations	141,907
Proposed Net Change	**102,525**

Legend: CO_2e-carbon dioxide equivalent GHG-greenhouse gas.

4.4.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

4.4.3.1 Criteria Pollutant Emissions

Under Alternative 3, annual flight time below 3,000 feet AGL would increase to reflect a new annual total of 669 hours. All of the areas within the areas beneath the proposed Talon and Smitty low MOAs are in attainment with the NAAQS, so no General Conformity analysis is required (Alternative 3 does not include the proposed Lobos Low MOA). The proposed annual emissions were screened against the PSD threshold values as comparative thresholds or indicators for criteria pollutants (250 tons per year).

Table 4.4-5 provides estimated air emissions of criteria pollutants for current operations and flares, the proposed aircraft operations and flares under Alternative 3, and the comparative threshold. A ROAA for Alternative 3 is located in **Appendix G** (Air Quality Supporting Documents), along with detailed air emission calculations.

Table 4.4-5. Current and Alternative 3 Annual Emission Estimates

	Total Annual Emissions in Tons					
Activity	**VOCs**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Current Operations	0.43	6.03	13.16	0.61	0.77	0.59
Alternative 3 Operations	3.90	43.48	103.64	4.61	4.39	3.65
Net Change	**3.47**	**37.45**	**90.48**	**4.00**	**3.63**	**3.06**
Comparative Threshold	250	250	250	250	250	250
Exceed Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

Legend: CO-Carbon monoxide;; NO_x-Nitrogen oxides; PM_{10} - particulate matter less than or equal to 10 microns; $PM_{2.5}$ - particulate matter less than or equal to 2.5 microns; SO_2-Sulfur dioxide; VOCs-Volatile Organic Compounds.

Criteria pollutant emissions would increase with the proposed aircraft activity, though the proposed net increases for all pollutants would be less than the comparative thresholds used as a guide for assessing significance. The criteria pollutant emissions associated with Alternative 3 would not alter the attainment status of Chaves, Eddy, Otero, Sierra, Catron, or Socorro Counties in New Mexico and would not be categorized as significant. While the emissions specific to the Talon Low and Smitty MOAs are not separately accounted for, the portion of VOC and NO_x emissions that could be attributed to each of these areas is modest and therefore would not likely adversely impact visibility in the Federal Class I areas located near the Talon Low and Smitty MOAs.

4.4.3.2 Greenhouse Gas Emissions

GHG emissions were calculated based on all of the annual flight hours for the year for the F-16C and the transient aircraft (represented with the F/A-18), regardless of altitude. The average sortie is estimated at one hour without refueling; and so, this was used as the average time for a sortie. Under Alternative 3, the total flight time would increase to 7,435 hours. **Table 4.4-6** provides the GHG emissions that would be anticipated from current and Alternative 3 operations and indicates the proposed net change. An additional 122,997 tons of GHGs would be the equivalent of adding an additional 24,033 passenger vehicles onto roads, driving 11,500 miles per year on average.

Table 4.4-6. Current and Alternative 3 Annual GHG Emission Estimates

Total Annual Emissions in Tons	
Activity	**CO_2e**
Current Operations	39,381
Alternative 3 Operations	162,379
Proposed Net Change	**122,997**

Legend: CO_2e-carbon dioxide equivalent; GHG-greenhouse gas.

4.4.4 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB in support of F-16 pilot training. Emissions associated with baseline operations would continue in all existing airspace areas.

4.5 NATURAL RESOURCES

Determination of the significance of potential impacts to biological resources is based on: 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, 2) the proportion of the resource that would be affected relative to its occurrence in the region, 3) the sensitivity of the resource to proposed activities, and 4) the duration of ecological ramifications. Impacts to natural resources would be significant if species or habitats of special concern would be adversely affected over relatively large areas or disturbances would cause reductions in population size or distribution of a species of special concern. This analysis focuses on wildlife and special-status species that occur or potentially occur beneath the MOAs, which could be impacted by noise from the Proposed Action and alternatives. This project has been entered into the USFWS Information for Planning and Consultation (IPaC) system to initiate consultation with USFWS (Consultation Codes: AZ - 02EAAZ00-2019-SLI-0001; NM - 02ENNM00-2019-SLI-0001).

A Biological Assessment will be prepared for this action and provided to USFWS for concurrence to complete the consultation process. **Appendix H** (USFWS Consultation Correspondence) provides copies of the consultation correspondence to date.

Many animal species use sound to communicate, to detect prey and avoid predation. Noise can mask communication, cause behavioral changes, interfere with daily cycles, and can cause stress. Increased noise levels reduce the distance and area over which animals can perceive important acoustic signals (Barber et al. 2009). The potential for external noise to mask these important signals is of greater concern for continuous and near continuous noise sources (e.g., compressors, busy highways, etc.) than for intermittent brief noise exposures such as military jet overflight. Such secondary effects of noise vary widely with species, environmental variables, as well as the types, durations and sources of noise (Manci et al. 1988; NPS 2011). Primary effects, such as eardrum rupture or temporary and permanent hearing threshold shifts, are unlikely given the noise levels produced by aircraft overflights. Most of the effects of noise are mild enough to be undetectable as variables of change in population size or growth (Bowles 1995).

Other potential impacts associated with noise may include stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Smith et al. 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci et al. 1988; Radle 2007; NPS 2011); and that, response of unconfined wildlife and domestic animals to aircraft overflight under most circumstances has minimal biological significance.

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed-wing [jets] versus rotary-wing [helicopters]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith et al. 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species. Pepper et al. (2003) suggest that many past studies were inconclusive and based on relatively small sample sizes; and that, more work is needed to determine if noise adversely impacts wildlife. Research into the effects of noise on wildlife often presents conflicting results because of the variety of factors and variables that can affect and/or interfere with the determination of the actual effects that human produced noise is having on any given animal (Radle 2007).

A 1997 review revealed that the noise produced by an aircraft plays a minor role in disturbance to animals when the animal cannot see the aircraft. This was illustrated in examples of nearly soundless paragliders causing panic flights (Kempf and Hüppop 1997). This research indicated that aircraft noise can cause startle responses; but, the severity of response depends upon the animal's previous exposure to the noise source and does not result in severe consequences. These authors felt that aside from the rare panic flights causing accidents, negative consequences of aircraft noise on individuals and populations are not proven (Kempf and Hüppop 1997).

The Air Force has conducted many studies that define a startle response as the sequence of events that occurs when an animal is surprised, including behavioral responses (muscular flinching, alerting, and running) and physiological changes (e.g., elevated heart rate) (Air Force 1994). The startle is a natural

response that helps animals avoid predators. If the behavioral component of the startle is uncontrolled, particularly if the animal runs or jumps without concern for its safety, it is often called a panic. Completely uncontrolled panics are rare in mammals (Air Force 1994).

Although the concerns listed above have been raised in the literature and examples have been documented, studies of unconfined wildlife and domestic animals to overflight by military jet aircraft at 500 feet AGL or higher have not shown measurable changes in population size or reproductive success at the population level or other significant biological impact under normal conditions.

4.5.1 Alternative 1: Talon MOA

Proposed pilot training within the proposed Talon MOA could potentially disturb wildlife residing beneath the existing and proposed airspace. Disturbance could be caused by the visual observation of the aircraft, aircraft noise, and the use of chaff and flare. As detailed in **Section 4.3** (Acoustic Environment) the training within the proposed Talon MOA would contribute minor increases to the average acoustic environment. The proposed Talon MOA would support a variety of proposed training activities (i.e., various aircraft speeds and maneuvers within high and low altitudes); and, the resulting noise would be spread across a vast area (over 2 million acres). As such, the proposed training would not create a consistent, significant noise source in any one location. The average annual DNL throughout the airspace from all of the aircraft operations would range from less than 35 to 57 DNL (see **Table 4.3-2**).

While it would not be expected that a single location would be subjected to regular or continuous high levels of noise, there would be the possibility that a location would be subjected to a low-level overflight and animals beneath such a flight would experience a high level of intermittent noise. As shown in **Section 4.3** (Acoustic Environment), the estimated noise that would be experienced by an animal would be significantly reduced the further away the animal was from the direct aircraft path. In the most extreme scenario an animal could experience a peak noise level (L_{max}) as high as 120 dB for a duration of 0.8 seconds. This would only occur from an overflight at 500 feet AGL using maximum power with an afterburner passing directly above the animal and is not expected to occur with any sort of regularity or frequency for a given location. The majority of the proposed operations would occur above 10,000 feet AGL, which would have a peak noise level (L_{max}) of 85 dB for a duration of 0.8 seconds from an aircraft passing directly above the animal. Acute exposures to noise (i.e., those that are brief and occasional) damage hearing at levels over 140 to 150 dB in the frequency range heard best by humans. Guidelines that protect human hearing apply to many terrestrial mammals because they are based on studies of laboratory animals (Bowles 1995). Therefore, the proposed low-level overflights are not expected to result in hearing damage to animals since a direct overflight would not result in noise levels over 140 dB.

Continuous, intense noise exposure has caused health effects in laboratory experiments, but extensive experiments with intermittent noise does not (Bowles 1995). This is because animals' ears recover between the intermittent exposures. Intense noise can damage the underlying membranes, supportive tissue, and nervous tissue of animals' ears, but ruptures and breaks in the bones surrounding the ear are always the result of impact injuries (i.e., hitting the head). "Bleeding ears" result from ruptures of the tympanic membrane, which occurs from abrupt changes in static pressure; animals do not develop bleeding ears from noise exposure (Bowles 1995).

Since the Proposed Action would include supersonic flight, sonic booms would occur within the Talon MOA. As described in **Section 4.3** (Acoustic Environment), given the high altitude proposed for supersonic activity, sonic booms would be less likely to reach the ground and would not be a continuous noise source

within the Talon MOA. Sonic booms would not contribute significantly to the overall noise environment (less than 42 CDNL within the MOA, see **Section 4.3.1.2**, *Supersonic Noise*).

Potential impacts to natural resources (wildlife, domestic animals, and special-status species) within the Talon MOA are described in **Sections 4.5.1.1** (Wildlife) **through 4.5.1.3** (Special-Status Species).

4.5.1.1 Wildlife

Potential Effects from Aircraft Noise

Animal species differ greatly in their responses to noise and thus the potential impact to animals from aircraft noise would vary. Below is a summary of studies of the effects of aircraft noise on mammals and birds. Based on estimated noise levels, the proposed pilot training in the proposed Talon MOA would be expected to have minor impacts to wildlife inhabiting land beneath the proposed airspace.

Mammals. Sound levels above 90 dB may impact mammals and may be associated with a number of behaviors such as retreat from the sound source, freezing, or a strong startle response (Manci et al.1988). Early studies of terrestrial mammals showed that noise levels of 120 dBA could damage mammals' ears, and levels of 95 dBA could cause temporary loss of hearing acuity. It has been speculated that repeated aircraft overflight (e.g. surveillance flights along a pipeline) could affect large carnivores such as grizzly bears by causing changes in home ranges, foraging patterns, and breeding behavior (Dufour 1980). These possible effects have not been borne out in subsequent studies, and Bowles (1995) indicated that acute exposure to noise only damaged an animals' hearing at levels above 140 dB. Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters indicated a stronger reaction to helicopters. Wolves were less disturbed by helicopters than wild ungulates, while individual grizzly bears showed the greatest response of any animal species observed (Manci et al. 1988). However, response to overflight by grizzly bears varied from individual to individual (Dufour 1980).

Wild ungulates appear to be much more sensitive to noise disturbance than domestic livestock (Manci et al. 1988; Weisenberger et al. 1996; Bleich et al. 1990, 1994). Behavioral reactions may be related to the past history of disturbances by such things as humans and aircraft. Minor behavioral reactions would include turning to orient toward the aircraft. Moderate responses to disturbance may be nervous behaviors, such as trotting a short distance. Escape behavior would represent a typical severe response, but it is rarely observed in response to overflights above 500 feet AGL (Bowles 1995; Dufour 1980).

Although few studies have been conducted on the response of wild ungulates to sonic booms, these disturbances appear to have little to no adverse effects. Workman et al. (1992) studied the physiological and behavioral responses of captive pronghorn, elk (*Cervus elaphus*), and bighorn sheep to sonic booms. All three species exhibited an increase in heart rate that lasted for 30 to 90 seconds in response to their first exposure to a sonic boom. Behaviorally, the animals responded to their first exposure to a sonic boom by running a short distance (less than 30 feet reported for elk). After successive sonic booms, the heart rate response decreased greatly and the animals remained alert, but did not run. The authors suggested the animals became habituated in response to successive exposures.

Bats. The Brazilian free-tailed bat is a wildlife species of particular interest because it roosts in great numbers at Carlsbad Caverns National Park, just south of the existing and proposed Talon MOA and forages great distances from the cave. These bats are migratory, using the cave from March through October. Their exit from the cave and nighttime foraging would temporally overlap slightly with nighttime operations (only 10 percent of the annual proposed operations would occur after dark), specifically those operations

that would occur within the low MOAs that are within the altitude range for foraging (the bats forage up to 9,800 feet). Their response to aircraft noise would be similar to responses described for other mammals and would likely include startle or alerting to the noise source (Dufour 1980). Another concern would be masking of echolocation pulses that could disrupt flight or foraging. A study on New Zealand long-tailed bats found that low-level aircraft activity did not mask echolocation pulses since the aircraft noise was most intense at less than 10 kilohertz (kHz); and, bat echolocation pulses are 40 kHz. There were no statistically significant differences in mean bat activity during and after overflights compared with pre-aircraft activity (Le Roux and Waas 2012). It should be noted that the size of the colony at Carlsbad Caverns fluctuates regularly. These fluctuations represent natural responses of the colony to factors such as seasonal food availability and local and large-scale weather patterns. The size of a count on any given night does not necessarily reflect a population estimate, and the pattern of decline widely reported may not be as severe as thought (Hristov et al. 2010). The proposed nighttime operations within Talon MOA would create a noise disturbance for the bats, however, the disturbance is expected to be minor and temporary.

Birds. In comparison to humans, birds typically hear less well over a narrower frequency bandwidth (Dooling and Popper 2007). The majority of the published literature on bird hearing focuses on terrestrial birds and their ability to hear in air. A review of 32 terrestrial and marine species reveals that birds generally have greatest hearing sensitivity between 1 and 4 kHz, and very few can hear below 20 Hz (Beason 2004). Most concerns related to the effects of noise on birds involve the masking of communications among members of the same species, reducing the detectability of biologically relevant signals including the sounds of predators and prey, and temporarily or permanently decreasing hearing sensitivity (Dooling and Popper 2007). In a study of ovenbirds, Habib et al. (2007) found chronic noise exposure near compressor stations affected pairing success, attributable by masking and distorting the song of breeding males on territories. In birds, hearing loss is difficult to characterize since birds regenerate hair cells even after substantial losses that can result in temporary threshold shifts (Bowles 1995).

Raptors. In a literature review of raptor responses to aircraft noise, Manci et al. (1988) found that most raptors did not show a negative response to overflights. When negative responses were observed, they were predominantly associated with rotor-winged aircraft or jet aircraft that were repeatedly passing within 0.5 miles of a nest. Ellis et al. (1991) performed a study to estimate the effects of low-level military jet aircraft and mid- to high altitude sonic booms (both actual and simulated) on nesting peregrine falcons and seven other raptors (common black hawk, Harris' hawk, zone-tailed hawk, red-tailed hawk, golden eagle, prairie falcon, bald eagle). Re-occupancy and productivity rates were within or above expected values for self-sustaining populations. In a 1997 helicopter overflight study, Mexican spotted owls did not flush from a nest or perch unless a helicopter was as close as 330 feet (Delaney et al. 1997). Researchers in Colorado found that Mexican Spotted Owl responses to F-16 overflights were often less significant than responses to naturally occurring events such as thunderstorms. Similarly, Delaney et al. (1997) found that Mexican spotted owls quickly returned to normal day-roosting behavior after being disturbed by helicopters. A 6-year study within the Gila National Forest found that low-level aircraft overflight had no effect on occupancy of Mexican Spotted Owl activity centers and found no correlations among measures of aircraft exposure and nesting success (ACC 2008).

Waterfowl and Other Waterbirds. Manci et al. (1988) noted that aircraft can be particularly disturbing to waterfowl. The USFWS Waterfowl Management Handbook (Korschgen and Dahlgren 1992) lists "loud noise" caused by aircraft as the top disturbance category for waterfowl. Several studies showed that migratory waterfowl (e.g., ducks and geese) expend more energy when exposed to repeated aircraft

overflights, at least in the short-term (Bowles 1995). Waterfowl are sensitive to disturbance because of their aggregation into large flocks during their migration and overwintering. When at rest, the flocks are typically in water bodies or wetlands exposed to the open sky and subject to aerial and ground predation. Taking flight is their defense against either type of predation. Waterfowl flocks seem to be as sensitive as their most responsive individual in the flock, so that larger flocks would have a greater chance of responding than small flocks (Bowles 1995).

A variety of studies cited in Bowles (1995) indicated that migratory waterfowl exposed to overflights by light aircraft and helicopters did not habituate completely to overflight. Due to the danger to aircraft and aircrews posed by potential collisions with waterfowl and other flocking birds, BASH has received much attention by the military. BASH programs exist at every installation where there is an active flying mission and areas where low-level aircraft flight training takes place (e.g., MTRs). BASH programs identify locations of seasonal concentrations of waterfowl and provide guidance for pilots with regard to elevational or lateral separation from these sites at specific seasons and times of day to avoid or minimize the potential for collision. This avoidance in turn reduces the potential for disturbance of migratory waterfowl concentrations by military aircraft overflight. See **Section 4.10** (Safety) for additional discussion on BASH with respect to safety concerns.

Potential Effects from Chaff and Flare

No toxicological effects from chaff on terrestrial organisms have been observed, even when subject to higher concentrations than would occur under the Proposed Action (Air Force 2011). Air Force chaff filament size is approximately 0.04 inches 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). As provided in **Table 3.1-2,** *Potential Chaff Distribution,* approximately 0.5 grams of chaff would be expected to be distributed per acre of land beneath the proposed Talon MOA. Similarly, the land beneath the proposed Talon MOA would average one piece of residual material per approximately 22 acres (see **Table 3.1-3,** *Potential Chaff and Flare Residual Material)*. 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; Air Force 2011). Inhalation or ingestion of chaff filaments or fragments with adverse effects to wildlife, livestock, or humans is unlikely.

Biological effects of residual flare materials would be comparable to the effects described for chaff residual materials. 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 (Air Force 2011).

Wildlife inhabiting land beneath airspace would have a very remote possibility of being struck by a clump of undeployed chaff, dud flare, or residual materials. Of all of these, dud flares pose the greatest concern

because of their weight; however, given the reliability rate of flares it is highly unlikely for an animal to be struck by a dud flare. Undeployed chaff and residual materials weigh so little, and create so much drag in comparison to the weight, no serious injury would be anticipated. In addition, the wide distribution of these items throughout the airspace would mean a physical strike would be extremely remote.

The possibility of a wildfire from flare usage impacting wildlife habitat would be remote considering the release altitude under the Proposed Action. Flares would not be released below 2,000 feet AGL and are designed to burn completely within the first 400 feet of descent. The risk of wildfires from flare usage would be mitigated by operational constraints, including the prohibition of flares during periods of "Very High" or "Extreme" National Fire Danger Ratings. During periods of "High" fire danger, aircraft would not use flares below 18,000 feet MSL.

4.5.1.2 Domestic Animals

Potential Effects from Aircraft Noise

Behavioral reactions to jet aircraft noise in domestic animals vary with each species, however, observations of livestock exposed to sonic booms have generally consisted of startle reactions that were considered minimal (Manci et. al. 1988). In a study of the effects to the anatomy of swine ears from aircraft noise, animals exposed to trials of aircraft noise of 120 dB to 135 dB showed no injury to the gross anatomy of the ear or the organ of corti compared to a control group (Dufour 1980). In another study nursing sows, baby pigs, and adult pigs during mating were observed to show initial alarm followed by indifference at noise sources from 104 to 120 dB (Defour 1980). These researchers considered that swine were able to tolerate and even become accustomed to noise up to at least 120 dB (Dufour 1980). It is expected that domestic animals and livestock beneath the proposed airspace would have a behavioral reaction to an overflight but the intensity of that reaction would vary greatly with the species and other environmental conditions at the time of the overflight. These studies indicate that these animals would habituate to the noise over time if it occurred with some regularity and such noise would not have a long-term impact. Animals experiencing an overflight for the first time would likely alert or startle, but it is not expected that this would have a detrimental impact to the animal's overall health. Given the volume of proposed airspace, no single location is expected to be subjected to repeated or continuous overflights or sonic booms.

A horse's range of hearing is greater than that of a human and their ears can pick up a sound at a lower volume and greater distance than would be picked up by humans (The British Horse Society, no date). Horses are prey animals so their typical response to danger is flight (The British Horse Society, no date). Horses have been observed to show fright responses, such as jumping or galloping around, to jet aircraft (Dufour 1980). According to The British Horse Society (no date), a horse's reaction to a sudden noise is typically freezing followed by spinning or running away from the noise source. When a horse is in "flight" mode, it can be difficult for the rider or handler to maintain control of the horse or the rider could be knocked off the horse. Horses can often habituate or become used to a noise, but this varies greatly depending on the individual horse's temperament and training. Their reaction is usually strongest when the noise resembles that of a predator, that is, a quiet rustling would elicit a stronger response than a high speed train (The British Horse Society, no date).

In a study of pregnant mares exposed to aircraft noise, it was found that the mares habituated to the noise after a few exposures. All of the mares showed flight posture after the first noise exposure but at no time did any of them strike or run into stall walls. Since the mares in this study were kept in stalls during the noise exposure events, it was speculated that in a large, open environment the response would have been

stronger (galloping farther distance or faster). Since all of the mares habituated to the noise, it was recommended that new mares remain in familiar stalls until their reaction to overflights could be gauged and they become habituated (LeBlanc et.al. 1991).

Horseback riding is a common practice beneath the existing and proposed airspace. The primary concern with respect to horses would be the safety of the rider or handler in the event a horse startles and bolts to such a degree that the rider is thrown from the horse or the horse injures itself. Overflights above Wilderness Areas, where horseback riding is a common recreational passtime, would be limited to no less than 2,000 feet AGL and would not experience the "loudest" overflight (that is, a direct overflight of 500 feet AGL). A direct overflight at this altitude would still create a high level of noise (see **Section 4.3**, *Acoustic Environment*), but the duration of the noise event would be short (several seconds). While it is quite probable that a horseback rider may experience an overflight, it is not expected that this would be a regular situation given the volume of airspace proposed for training. It is assumed that a horse would startle and possibly spin or bolt in response to an overflight, although the response would vary greatly with each individual animal.

Potential Effects from Chaff and Flare

A 1972 study found no evidence of toxicity in calves fed chaff (Air Force 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 (Air Force 1997). Since chaff distribution is expected to be minimal 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 (Air Force 2011). The potential effects of flares and flare residual materials to domestic animals would the same as those described for wildlife (see **Section 4.5.1.1**, *Wildlife*).

4.5.1.3 Special-Status Species

The potential impacts associated with the proposed training activities to special-status species would be the same as those described in **Section 4.5.1.1**, *Wildlife*. As described in **Section 4.5.1.2**, *Potential Effects from Chaff and Flare*, there have been no observed effect of chaff on terrestrial organisms, even when subject to higher concentrations than would occur under the Proposed Action. Birds have not been documented using chaff filaments or residual materials as nesting material or food. The possibility of a wildfire from flare usage would be remote considering the reliability of flares, the proposed release altitude, and the fire restrictions that would be implemented as part of this Proposed Action. Therefore, the use of chaff and flare would not affect threatened or endangered species.

The potential impact to threatened and endangered species would be disturbance from aircraft noise. The five threatened or endangered bird species that potentially occur beneath the proposed Talon MOA would not be expected to be significantly affected by the noise associated with the proposed training. In accordance with Section 7 of the ESA, the Air Force will consult with USFWS on the Proposed Action to gain their concurrence with the effects determinations made in the Biological Assessment. A summary of the potential impacts from aircraft noise is provided below for each species.

Interior Least Tern

The only known breeding population of Interior Least Terns in the vicinity of the proposed Talon MOA is at Bitter Lake National Wildlife Refuge. The refuge is near Roswell, New Mexico approximately 20 miles from the northern border of the proposed Talon High B and C MOAs. The projected average subsonic noise within the Talon High B and C MOAs would be 47 and 39 DNL, respectively. The proposed F-16 training is not expected to change the current average noise at Roswell, New Mexico under Alternative 1 (see Section 4.3.1.1, Subsonic Noise). Similarly, the sonic boom activity is not expected to change the noise environment at Roswell, New Mexico. Terns breeding at the refuge would not experience a direct overflight since they would be outside of the proposed MOA. Therefore, disturbance to the terns from the proposed operations would be very unlikely. The Proposed Action would have no effect on Interior Least Terns.

Mexican Spotted Owl

The Mexican Spotted Owl inhabits the southern portion of the Lincoln National Forest outside of the boundary of the proposed Talon MOA, but could occur in parts of the forest beneath the MOA. Owls located beneath the proposed Talon Low A MOA could experience low-level overflights of 500 feet AGL. In a 1997 helicopter overflight study, Mexican spotted owls did not flush from a nest or perch unless a helicopter was as close as 330 feet (Delaney et al. 1997). Researchers in Colorado found that Mexican Spotted Owl responses to F-16 overflights were often less significant than responses to naturally occurring events such as thunderstorms. Similarly, Delaney et al. (1997) found that Mexican spotted owls quickly returned to normal day-roosting behavior after being disturbed by helicopters. A 6-year study within the Gila National Forest found that low-level aircraft overflight had no effect on occupancy of Mexican Spotted Owl activity centers and found no correlations among measures of aircraft exposure and nesting success (ACC 2008). Movement and flight as a behavioral response to overflights has been treated as a potential concern since it exposes the owl, chicks, or eggs to predation. However, the results of the 6-year study showed that Mexican Spotted Owl flights in response to military jet overflights were so rare that the rate could not be distinguished from normal rates of flight. In fact, females were never observed flushing from nests in response to military jets or other low-flying aircraft. Observations during this study confirmed that flight and flushing responses are close-range defensive responses (ACC 2008). Given these studies, Mexican spotted owls beneath the proposed Talon MOA could be disturbed from low-level F-16 training activity, but the impact would be temporary and minor. The Proposed Action may affect, but is not likely to adversely affect Mexican Spotted Owls.

Northern Aplomado Falcon

There have been limited occurrences of Northern Aplomado Falcons from an experimental, non-essential population in the vicinity of the proposed Talon MOA. While considered rare, falcons beneath the airspace could be disturbed from the proposed F-16 training. In a literature review of raptor responses to aircraft noise, Manci et al. (1988) found that most raptors did not show a negative response to overflights. When negative responses were observed, they were predominantly associated with rotor-winged aircraft or jet aircraft that were repeatedly passing within 0.5 miles of a nest. Ellis et al. (1991) performed a study to estimate the effects of low-level military jet aircraft and mid- to high altitude sonic booms (both actual and simulated) on nesting peregrine falcons and seven other raptors (common black hawk, Harris' hawk, zone-tailed hawk, red-tailed hawk, golden eagle, prairie falcon, bald eagle). Re-occupancy and productivity rates were within or above expected values for self-sustaining populations. Based on these studies, the potential

impact to any falcons occurring beneath the Proposed Talon MOA would be temporary and minor. The Proposed Action may affect, but is not likely to adversely affect Northern Aplomado Falcons.

Piping Plover

The Piping Plover has only been known as a very rare migrant in New Mexico, with potential to occur in Chaves and Eddy Counties, including one reported observation at Avalon Lake, north of Carlsbad, New Mexico and beneath the boundaries of the existing Talon MOA. Though there are no studies of the effects of noise on piping plovers, the potential impacts from aircraft noise are expected to be the same as those described above for birds: masking of intraspecific communications, reduced detectability of predators, and with exposure to high noise levels, temporary hearing shifts. Volume II of the *Draft Revised Recovery Plan for the Wintering Range of the Northern Great Plains Piping Plover and Comprehensive Conservation Strategy for the Piping Plover in its Coastal Migration and Wintering Range in the Continental United States* (USFWS 2015) provides an overview of threats to wintering piping plovers including a review of the impacts of military activities including training, and aircraft operations, to wintering piping plovers and their habitats. It concludes that current threats to wintering and migrating piping plovers posed by military activities appear minimal. Based on the rare occurrence of piping plovers beneath the proposed Talon MOA, and the low likelihood of a direct overflight, the potential for impacts would be low and in the event an overflight occurred, masking would be temporary and minor. The Proposed Action would have no effect on Piping Plovers.

Southwestern Willow Flycatcher and Yellow-billed Cuckoo

The southwestern willow flycatcher and yellow-billed cuckoo have the potential to occur beneath the proposed Talon MOA. Both species nest in riparian vegetation along rivers and streams throughout the arid southwest. Though there are no studies of the effects of noise on these species, the potential impacts from aircraft noise are expected to be the same as those described above for birds: masking of intraspecific communications, reduced detectability of predators, and with exposure to high noise levels, temporary hearing shifts. Noise disturbance, particularly from recreationists, is listed among the threats to the southwestern willow flycatcher and is often accompanied by other impacts such as vegetation damage and removal, increased incidence of fire, increased spread of invasive plant species, and increases in predation (USFWS 2002). The same potential for disturbance applies to yellow-billed cuckoo, which also breed in riparian habitat where recreation is common. Though increases in noise are expected to occur as a result of the Proposed Action in parts of the land beneath Talon MOA, noise levels would remain generally low and exposure would be distributed over a large area and episodic rather than chronic. Any masking that would occur would be temporary and minor and is not expected to result in impacts to breeding success of these species. Based on the nature of the noise that would result from the modification of the Talon MOA, and the low likelihood of a direct overflight, the potential for impacts to these species would be low. In the event a direct overflight did occur, impacts are expected to be temporary and minor. The Proposed Action may affect, but is not likely to adversely affect Southwestern Willow Flycatchers or Yellow-billed Cuckoos.

4.5.2 Alternative 2: Cato, Smitty, and Lobos MOAs

Proposed pilot training within the proposed Cato, Smitty, and Lobos MOAs could potentially disturb wildlife residing beneath the existing and proposed airspace in the same manner as described under Alternative 1. Since the floors of the Christa and Kendra ATCAAs are 18,000 feet MSL, no disturbance to wildlife or special-status species beneath these areas would be anticipated. The proposed increases to the average acoustic environment would be minor and were detailed in **Table 4.3-6** in **Section 4.3** (Acoustic

Environment). Similar to Alternative 1, the proposed Cato, Smitty, and Lobos MOAs would support a variety of proposed training activities (i.e., various aircraft speeds and maneuvers within high and low altitudes) and the potential noise would be spread across a vast area (over 3 million acres). As such, the proposed training would not create a consistent, significant noise source in any one location. The predicted average annual DNL throughout the airspace from all of the aircraft operations would range from 48 to 55 DNL (see **Table 4.3-6**).

As described in Alternative 1, while it would not be expected that a single location would be subjected to regular or continuous high levels of noise, there would be the possibility that a location would be subjected to a low-level overflight and animals beneath such a flight would experience a high level of noise. As shown in **Section 4.3** (Acoustic Environment), the estimated noise that would be experienced by an animal would be significantly reduced the further away the animal was from the direct aircraft path. In the most extreme scenario an animal could experience a peak noise level (L_{max}) as high as 120 dB for a duration of 0.8 seconds. This would be very rare and would only occur from a low-level overflight (500 feet AGL) using maximum power with an afterburner passing directly above the animal. The majority of the proposed operations would occur above 10,000 feet AGL, which would have a peak noise level (L_{max}) of 85 dB for a duration of 0.8 seconds from an aircraft passing directly above the animal.

Since the Proposed Action would include supersonic flight, sonic booms would be likely within the Cato, Smitty, and Lobos MOAs. As described in **Section 4.3** (Acoustic Environment), given the high altitude proposed for supersonic activity, sonic booms would not be a continuous noise source within these MOAs nor would they contribute significantly to the overall noise environment.

4.5.2.1 Wildlife

The potential impacts to wildlife from aircraft noise and use of chaff and flares would be the same as those described for Alternative 1 in **Section 4.5.1.1** (Wildlife) and **Section 4.5.1.2** (Domestic Animals). The pilot training in the proposed Cato, Smitty, and Lobos MOA would be expected to have minor impacts to wildlife inhabiting land beneath the airspace.

4.5.2.2 Special-Status Species

The potential impacts associated with the proposed training activities to special-status species would be the same as those described in **Section 4.5.1.1,** *Wildlife*. As described in **Section 4.5.1.2**, *Potential Effects from Chaff and Flare*, there have been no observed effect of chaff on terrestrial organisms, even when subject to higher concentrations than would occur under the Proposed Action. Birds have not been documented using chaff filaments or residual materials as nesting material or food. The possibility of a wildfire from flare usage would be remote considering the reliability of flares, the proposed release altitude, and the fire restrictions that would be implemented as part of this Proposed Action. Therefore, the use of chaff and flare would not affect threatened or endangered species.

Critical habitat has been designed for three of the threatened and endangered species potentially affected by the Proposed Action (Mexican Spotted Owl, Southwestern Willow Flycatcher, and Yellow-billed Cuckoo). The Proposed Action would not alter or otherwise affect critical habitat beneath the airspace. As described in previous sections of this EIS, chaff filaments and residual materials from chaff and flare use would not be concentrated in any one area to a degree that would have an impact to ground or water resources. The Proposed Action does not include any ground disturbance activities that would remove

critical habitat or diminish its availability or quality. Therefore, the Proposed Action would have no effect on critical habitat.

The potential impact to threatened and endangered species would be disturbance from aircraft noise. The six threatened or endangered bird species and three mammals that potentially occur beneath the proposed Cato, Smitty, and Lobos MOAs would not be expected to be significantly affected by the noise associated with the proposed training. In accordance with Section 7 of the ESA, the Air Force will consult with USFWS on the Proposed Action to gain their concurrence with the effects determinations made in the Biological Assessment**.** The potential impacts to the bird species and the effects determinations would be the same as those described in **Section 4.5.1.3**, *Special-Status Species*. A summary of the potential impacts from aircraft noise to the three mammals is provided below.

Mexican wolf

The Mexican wolf in the vicinity of the proposed Cato, Smitty, and Lobos MOAs is an experimental, non-essential population. While wolves have been frightened by low altitude flights that were 25 to 1,000 feet AGL, they have been found to adapt to aircraft overflights and noise as long as they were not being hunted from aircraft (Dufour 1980). Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters indicated a stronger reaction to helicopters. Wolves were less disturbed by helicopters than wild ungulates, while individual grizzly bears showed the greatest response of any animal species observed (Manci et al. 1988). Fright is not a recognized cause of abortions in clinical studies involving thousands of animals. Spontaneous noise induced abortions do not occur in well-established pregnancies (Bowles 1995). If a noise arouses an animal (i.e., gets their attention, wakes them, or increases their activity), the increased activity has the potential to affect the animals metabolic rate. The increased activity could deplete energetic reserves. A few studies have documented increases in activity after aircraft approaches, but the response was fairly mild, such as starting a few steps or walking away slowly from the site of the disturbance (Bowles 1995). Given the available information, the potential impact to the Mexican wolf from the proposed operations would be temporary and minor. The Proposed Action may affect, but is not likely to adversely affect Mexican wolves.

Jaguar

The very northern edge of the Borderlands Secondary Area of the Northwestern Recovery Unit for the jaguar overlaps the lower southwest corner of New Mexico, approximately 12 miles from the proposed Lobos MOA (USFWS 2018). It would be extremely rare for a jaguar to be beneath the airspace, however, if one were to occur the potential impacts from noise would be similar to those described for the Mexican wolf. There are no studies or data on jaguar responses to jet overflights. The Proposed Action would have no effect on jaguars.

Mexican long-nosed bat

Bat responses to overflights would be the same as those described for other mammals. Startle or fright is typically the immediate behavioral reaction to transient, unexpected noise in mammals (Dufour 1980). A field study was done to determine if aircraft noise altered the evening activity of New Zealand long-tailed bats. In this study the low altitude aircraft activity overlapped the evening bat activity near a runway at an international airport. The study found that the aircraft activity did not mask echolocation pulses since the aircraft noise was most intense at less than 10 kHz and bat echolocation pulses are 40 kHz. There were no statistically significant differences in mean bat activity during and after overflights compared with pre-

aircraft activity (Le Roux and Waas 2012). The bat is nocturnal so their potential interaction with the proposed operations would be limited to aircraft operations after dark (approximately 10 percent of the proposed operations). Given the results of the Le Roux and Waas (2012) study and the limited potential interaction with overflights, it is expected that noise disturbance to the bat would be minor and temporary. The Proposed Action may affect, but is not likely to adversely affect Mexican long-nosed bats.

4.5.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

Alternative 3 includes the same geographic locations (and associated wildlife) as Alternatives 1 and 2. While the increases to the average acoustic environment would be slightly different, ranging from 43 to 56 DNL (see **Table 4.3-10 in Section 4.3**, Acoustic Environment), the potential impacts to wildlife and domestic animals associated with aircraft noise and chaff and flare usage would be similar to those described in **Sections 4.5.1 (**Alternative 1: Talon MOA) **and 4.5.2** (Alternative 2: Cato, Smitty, and Lobos MOAs). Likewise, the potential impacts to special-status species would be similar to those described in **Sections 4.5.1.3 and 4.5.2.2**. Under Alternative 3, the Lobos Low MOA would not be established. Therefore, the potential noise disturbance to the wildlife and special-status species that occur beneath the Lobos Low MOA would not be exposed to low-level overflights. The lowest overflights in this area would be limited to 13,500 feet MSL which would have much less noise than what was addressed in Alternative 2.

4.5.4 No Action Alternative

Under the No Action Alternative, there would be no airspace modifications in the vicinity of Holloman AFB in support of F-16 pilot training. Training of F-16 aircrews stationed at Holloman AFB would continue to utilize WSMR airspace and other MOAs in the vicinity of Holloman AFB to the extent practicable. Therefore, no impacts to natural resources would be expected under the No Action Alternative.

4.6 LAND MANAGEMENT

Land use is affected by changes that alter, detract, or eliminate use or enjoyment of a place. Since the Proposed Action would not involve any ground disturbance, the primary effect of project implementation on land use would be associated with noise generated by aircraft operations within existing and proposed airspace. Acoustic Environment is discussed in detail in **Section 4.3**. Impacts to Recreation are discussed in **Section 4.7** and the socioeconomic impacts are discussed in **Section 4.8**.

FAA regulations specify minimum altitude and avoidance distances aircraft must adhere to when flying over specific types of structures, settlements, or categories of land. In accordance with FAA avoidance rules (14 CFR 91.119), aircraft must 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. Outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet. Low altitude avoidance and noise sensitive areas for the proposed airspace would be charted and published by the FAA and/or identified in the local flight instructions for pilots. Pilots would be instructed to avoid these locations by horizontal and vertical distances to enhance flight safety, noise abatement, and environmental sensitivity. Even with these avoidance distances, there would be a potential for perceptible increases in noise levels for some rural residents to occur.

According to the Federal Interagency Committee on Urban Noise, exposure to noise levels in excess of 65 DNL is incompatible with residential, public use, and recreation. Noise and overflight exposure changes

were evaluated at POIs including population centers, Wilderness Areas, and parks. Some of these are discussed below. For a detailed discussion, see **Section 4.3** (Acoustic Environment).

4.6.1 Alternative 1: Talon MOA

Nearly 1.6 million acres including Brantley and Avalon Reservoirs, Living Desert Zoo and Gardens, and the towns of Carlsbad, Artesia, La Huerta, Atoka, Happy Valley, and Livingston Wheeler lie beneath the existing Talon MOA, the floor of which would be raised from 300 to 500 feet AGL. The noise exposure at all of the these locations would remain below the 65 DNL threshold.

The configuration of Talon MOA proposed under Alternative 1 would overlie an additional 1.17 million acres, primarily non-Federal lands, including the town of Loving, and land managed by the BLM in addition to smaller areas of the Lincoln National Forest and the extreme northern boundary of Carlsbad Caverns National Park (see **Table 4.6-1**).

Table 4.6-1. Lands Underlying the Proposed Expanded Configuration of Talon MOA under Alternative 1

Lands underlying new Talon MOA configuration Alternative 1	Area (acres)
Non-Federal Lands	487,402
BLM	656,152
Lincoln National Forest	23,128
Carlsbad Caverns National Park	3,329
Total	**1,170,011**

Note: Acreages are derived from multiple data sources and so are approximate.
Legend: BLM-Bureau of Land Management; MOA-Military Operations Area.

As shown in **Table 4.3-2** (**Section 4.3,** Acoustic Environment), no areas beneath the configuration of Talon MOA proposed under Alternative 1 would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels from military aircraft would be experienced beneath the proposed Talon MOA. **Table 4.3-4** (**Section 4.3**, Acoustic Environment) shows projected noise levels at identified POIs including managed lands and towns. No change in noise exposure from aircraft would occur at Carlsbad Caverns National Park. The communities of Loco Hills and Loving lie beneath the expanded boundaries of Talon MOA and would experience noise (56 and 42 DNL, respectively) from proposed aircraft operations within the MOA. The Lincoln National Forest lies beneath the existing and proposed boundaries of Talon MOA, and would experience a slight increase in noise from aircraft operations, from 53 to 56 DNL. While these levels would be perceptible, they would be well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term. Therefore, it would be expected that land use patterns beneath the Talon MOA proposed by Alternative 1 would remain unchanged.

4.6.2 Alternative 2: Cato, Smitty, and Lobos MOAs

More than 2.25 million acres of land underlie the existing configuration of the Cato and Smitty MOAs. These lands are primarily non-Federal, including the town of Magdalena, or are managed by the BLM or USFS, including the Cibola, Gila, and Apache-Sitgreaves National Forests and the Withington Wilderness within the Cibola National Forest.

The proposed configuration of the Cato and Smitty MOAs under Alternative 2 would overlie an additional 297,442 acres of lands, primarily non-Federal land and larger areas of the Cibola and Gila National Forests, including the Apache Kid and Aldo Leopold Wildernesses. Approximately 180,000 acres of the Apache-Sitgreaves National Forest that lie under the current configuration of the Cato and Smitty MOAs would not underlie the area proposed to be returned to the NAS (See **Table 4.6-2**).

Table 4.6-2. Lands Underlying the Existing and Proposed Configurations of Cato and Smitty MOAs under Alternative 2

Lands underlying Cato and Smitty MOAs		Area (acres)		
		Existing	Proposed	Change
Non-Federal Lands		890,990	1,062,328	171,338
USFS	Cibola National Forest	389,230	456,612	67,382
	Withington Wilderness (within Cibola National Forest)	1,406	18,815	17,409
	Apache Kid Wilderness (within Cibola National Forest)	0	44,671	44,671
	Gila National Forest	214,579	440,991	226, 412
	Aldo Leopold Wilderness (within Gila National Forest)	0	3,657	3,657
	Apache-Sitgreaves National Forest	374,257	193,957	-180,300
BLM	Socorro Field Office	384,242	321,230	-63,012
	Las Cruces District	0	9,885	9,885
Total		**2,254,704**	**2,552,146**	**297,442**

Note: Acreages are derived from multiple data sources and so are approximate.
Legend: BLM-Bureau of Land Management; MOA-Military Operations Area; USFS-U.S. Forest Service.

The proposed Lobos MOA would overlie a total of nearly 1.5 million acres of federally-managed land, including nearly 1 million acres of the Gila National Forest that includes the Aldo Leopold and Gila Wildernesses, lands managed by the Las Cruces District and Safford Field Offices of the BLM, and the Gila Cliff Dwellings National Monument. Additionally more than 1.1 million acres of non-Federal land lie beneath the proposed Lobos MOA including the communities of Silver City, Santa Clara, Arenas Valley, and Tyrone (See **Table 4.6-3**).

Table 4.6-3. Lands Underlying the Proposed Lobos MOA under Alternative 2

Lands Underlying the Proposed Lobos MOA		Area (acres)
Non-Federal Lands		1,151,976
USFS	Gila National Forest	476,038
	Aldo Leopold Wilderness (within Gila National Forest)	177,228
	Gila Wilderness (within Gila National Forest)	325,086
BLM	Las Cruces District	304,065
	Safford Field Office	62,340
NPS	Gila Cliff Dwellings National Monument	463
Total		**2,497,197**

Note: Acreages are derived from multiple data sources and so are approximate.
Legend: BLM-Bureau of Land Management; MOA-Military Operations Area; NPS-National Park Service; USFS-U.S. Forest Service.

The proposed Christa and Kendra ATCAAs would overlie a total of more than 1.35 million acres of federally-managed land including nearly more than 230,000 acres of the USFS land that includes the Aldo Leopold Wilderness, lands managed by the Las Cruces District and Socorro Field Offices of the BLM, The Bosque del Apache National Wildlife Refuge, the BOR-managed Elephant Butte and Caballo Reservoirs, and the Jornada Experimental Station. Additionally approximately 387,000 acres of non-managed land lie beneath the proposed ATCAAs, including the following locations with populations greater than 500: Hurley, Bayard, Mimbres, Hatch, Doña Ana, Radium Springs, Salem, Placitas, Las Cruces, and Truth or Consequences (see **Table 4.6-4**). The floor of these ATCAAs would be 18,000 feet MSL, consequently underlying lands such as the towns of Truth or Consequences and Socorro and managed lands like Bosque del Apache National Wildlife Refuge and Elephant Butte and Caballo Reservoirs would not experience any perceptible increase in noise above background levels.

Table 4.6-4. Lands Underlying the Proposed Christa and Kendra ATCAAs under Alternative 2

Lands Underlying the Proposed Christa and Kendra ATCAA		Area (acres)
Non-Federal Lands		387,812
USFS	Cibola National Forest	70,699
	Gila National Forest	138,761
	Aldo Leopold Wilderness (within Gila National Forest)	20,826
BLM	Socorro Field Office	233,519
	Las Cruces District	740,862
USFWS	Bosque del Apache National Wildlife Refuge	41,763
BOR	Elephant Butte and Caballo Reservoirs	37,596
USDA	Jornada Experimental Station	64,442
Total		**1,736,280**

Note: Acreages are derived from multiple data sources and so are approximate.
Legend: ATCAA-Air Traffic Control Assigned Airspace; BLM-Bureau of Land Management; BOR-Bureau of Reclamation; USDA-U.S. Department of Agriculture; USFS-U.S. Forest Service; USFWS-U.S. Fish and Wildlife Service.

As shown in **Table 4.3-6,** no areas beneath the configuration of Cato, Smitty, and Lobos MOAs or the Christa and Kendra ATCAAs proposed under Alternative 2 would be exposed to a noise level in excess of 65 DNL, though some noticeable increases in noise levels would be experienced beneath the proposed airspace.

Table 4.3-7 shows projected noise levels at identified POIs, including managed lands and towns, all of which would be below 52 DNL. While these levels would be perceptible, they would be well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term. Therefore, it would be expected that land use patterns beneath the Cato, Smitty, and Lobos MOAs and the Christa and Kendra ATCAAs proposed by Alternative 2 would remain unchanged.

4.6.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

Alternative 3 includes expanding Talon MOA similarly to what is proposed in Alternative 1, as well as incorporating the changes proposed to Cato and Smitty MOAs, and establishing the Lobos MOA and Christa and Kendra ATCAAs as proposed in Alternative 2 (See **Tables 4.6-1, 4.6-2, 4.6-3, and 4.6-4**). However, there would be a few differences. First, the configuration of Talon MOA proposed by Alternative

3 would not include Talon High C, resulting in approximately 150,000 fewer acres of BLM and non-Federal land lying beneath the Talon MOA proposed by Alternative 3 (see **Table 4.6-5**).

Table 4.6-5. Lands Underlying the Proposed Expanded Configuration of Talon MOA under Alternative 3

Agency and Managed Lands		Existing	Proposed	Change
Non-Federal Lands		567,366	997,069	429,703
BLM	Total	1,354,201	2,318,468	964,267
USFS	Lincoln National Forest	202,306	225,434	23,128
NPS	Carlsbad Caverns National Park	0	3,329	3,329
Total		**1,585,312**	**2,605,526**	**1,020,214**

Note: Note: Acreages are derived from multiple data sources and so are approximate**.**
Legend: BLM – Bureau of Land Management; MOA-Military Operations Area; NPS – National Park Service; USFS – U.S. Forest Service.

In addition to the change in proposed configuration of Talon MOA, the proposed 10,000 annual flights would be divided among the Talon MOA to the east of Holloman AFB and the Cato, Smitty, and Lobos MOAs to the west, resulting generally in dispersal over a larger area and less frequent exposure to overflight noise on lands beneath all airspace. However, there would be no low component to the Lobos MOA; and therefore, low-level flights in the west would be concentrated in the Cato and Smitty MOAs. As shown in **Table 4.3-9**, no areas beneath the configuration of Talon, Cato, Smitty, and Lobos MOAs and the Christa and Kendra ATCAAs proposed under Alternative 3 would be exposed to a noise level in excess of 65 DNL, though some increases in noise levels, similar to those experienced under Alternatives 1 and 2, would occur. **Table 4.3-10** shows projected noise levels at identified POIs, including managed lands and towns. The highest levels of noise resulting from the proposed operations would be experienced in Loco Hills, which does not lie beneath the current configuration of Talon MOA (53 DNL), and in the Lincoln National Forest (from 53 to 55 DNL). While these levels would be perceptible, they would be well below the threshold of 65 DNL considered to be incompatible with residential and recreational land uses. Additionally, due to the size of the airspace, single event noise-related impacts in these areas associated with direct aircraft flyovers would be infrequent, temporary, and short-term. Therefore, it would be expected that land use patterns beneath the Talon, Cato, Smitty, and Lobos MOAs and the Christa and Kendra ATCAAs proposed by Alternative 3 would remain unchanged.

4.6.4 No Action Alternative

If the No Action Alternative were selected, the airspace changes proposed would not be made and land use conditions would remain the same as those described in **Section 3.6** (Land Use). No impacts to land use would occur.

4.7 Recreation Resources

4.7.1 Alternative 1: Talon MOA

Under Alternative 1, the Talon MOA would be reconfigured and expanded. There are numerous recreational opportunities under the Talon MOA that occur on both public and private land. The Lincoln National Forest, Carlsbad Caverns National Park, Guadalupe Ridge Trail, Carlsbad Caverns Trail, Brantley Lake State Park, and Living Desert Zoo and Gardens are located under the proposed Talon MOA. The proposed airspace modifications would not alter, prohibit, or otherwise limit the public's access to these

recreational areas beneath the MOA. The proposed pilot training would generate noise within the MOA, which could detract from the public's enjoyment of these outdoor recreational areas. Numerous studies of park visitors demonstrate that some visitors, particularly to backcountry areas, report that their enjoyment and experience is affected by noise from a number of sources including rotary and fixed-wing aircraft, snowmobile and other vehicle noise as well as loud talking and other visitor sounds. In addition, that these experiences are influenced by a number of factors including the type of experience (overlook, front country or back country), whether an individual had visited previously, whether a visitor had taken a flight tour, and whether children were in the party (Rapoza et al. 2015; U.S. Department of Transportation 2014; Manning et al. 2009).

Recreational users of some of the lands under the airspace would experience slight noise increases, but the projected noise would not be considered incompatible with recreational land uses (see **Section 4.3.1**, Alternative 1: Talon MOA). Military training in the proposed Talon MOA would be dispersed throughout the MOA and individual training events would be relatively short in duration (lasting approximately 30 minutes to an hour). Operations within the Talon MOA would mostly occur between 7:00 a.m. and 10:00 p.m., Monday through Friday. Some activity would occur at night (approximately 10 percent of the operations); therefore, people camping on land beneath the airspace would have the potential to hear aircraft after dark. Many of the recreational areas beneath the proposed Talon MOA are under the existing Talon MOA and are currently subjected to pilot training activity.

The introduction of sonic booms in a quiet environment would be noticeable, but the noise generated by the booms would be minimal (see **Section 4.3**, Acoustic Environment). The sonic boom, if heard, would be a sudden and startling noise that could adversely impact the experience of recreational users.

4.7.2 Alternative 2: Cato, Smitty, and Lobos MOAs

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, the Lobos MOA would be established, and the Christa and Kendra ATCAAs would be created. There are numerous recreational opportunities under these MOAs and ATCAAs that occur on both public and private land. The Cibola National Forest, Gila National Forest, Apache-Sitgreaves National Forest, and Gila Cliff Dwellings National Monument are located under the proposed Cato, Smitty, and Lobos MOAs. Elephant Butte State Park, Bosque del Apache NWR, and the Rio Grande are located under the proposed Christa and Kendra ATCAAs. The proposed airspace modifications would not alter, prohibit, or otherwise limit the public's access to these recreational areas beneath the MOAs or ATCAAs. The proposed training would generate noise within the MOAs, which could detract from the public's enjoyment of these outdoor recreational areas as described for Alternative 1.

Recreational users of the lands under the ATCAAs would not experience an increase in noise from aircraft activity (see **Section 4.3.2**, Alternative 2: Cato, Smitty, and Lobos MOAs, and Christa and Kendra ATCAAs). The recreational users of lands under the MOAs would experience slight noise increases, but the projected noise would not be considered incompatible with recreational land uses. Activity in the MOAs and ATCAAs would be dispersed throughout the airspace and individual training events would be relatively short in duration (lasting approximately 30 minutes to an hour). Operations within the MOAs would mostly occur between 7:00 a.m. and 10:00 p.m., Monday through Friday. Some activity would occur at night (approximately 10 percent of the operations); therefore, people camping on land beneath the airspace would have the potential to hear aircraft after dark. Some of the recreational areas beneath the proposed MOAs are under the existing Cato and Smitty MOAs, and are currently subjected to training activity.

As described in Alternative 1, the introduction of sonic booms in a quiet environment would be noticeable, but the potential for sonic booms and the potential noise impacts associated with the booms would be minimal (see **Section 4.3**, Acoustic Environment). The sonic boom, if heard, would be a sudden and startling noise that could adversely impact the experience of recreational users.

4.7.3 Alternative 3: Talon, Cato, Smitty, and Lobos MOAs

The recreational areas beneath the airspace in Alternative 3 are the same as those described in Alternatives 1 and 2. As shown in **Section 4.3.3** (Alternative 3: Talon, Cato, Smitty, and Lobos MOAs), the potential noise impacts under Alternative 3 would be less than the potential noise impacts under Alternatives 1 and 2, and none of the projected noise levels would be considered incompatible with recreational uses. The proposed airspace modifications would not alter, prohibit, or otherwise limit the public's access to the recreational areas beneath the MOAs. The proposed pilot training would generate noise within the MOAs which could detract from the public's enjoyment of these outdoor recreational areas as described in Alternatives 1 and 2.

4.7.4 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB. Therefore, there would be no change to resources under the No Action Alternative.

4.8 SOCIOECONOMICS

4.8.1 Impacts Common to All Action Alternatives

4.8.1.1 Population

The Proposed Action would not result in an increase in personnel at Holloman AFB or within the region. Therefore, the population within the ROI would remain unchanged from that presented for each alternative in **Section 3.8** (Socioeconomics).

4.8.1.2 Housing

There are a number of factors that affect property values that make estimating impacts difficult. Factors directly related to the property, such as size, improvements, and location of the property, as well as current conditions in the real estate market, interest rates, and housing sales in the area, are more likely to have a direct impact on property values. Several studies have analyzed property values as they relate to military and civilian aircraft noise. In one study, a regression analysis of property values as they relate to aircraft noise at two military installations was conducted (Fidell et al. 1996). This study found that, while aircraft noise at these installations may have had minor impacts on property values, it was difficult to quantify that impact. Other factors, such as the quality of the housing near the installations and the local real estate market, had a larger impact on property values. Therefore, the analysis was not able to predict the impact of aircraft noise on the property values of two comparable properties.

Another study examined and summarized the results of 33 studies that attempted to quantify the impact of noise on property values (Nelson 2003). It concluded that aircraft noise has the potential to adversely impact property values, specifically, property values could be discounted between 0.5 and 0.6 percent per decibel when compared to a similar property that is not affected by aircraft noise. Additionally, the data indicate that noise effects on property value increases for noise levels above 75 DNL. As illustrated in **Section 4.3** (Acoustic Environment), the noise associated with training is lower than that associated with an active

runway (i.e., an installation). Also the noise exposure is distributed across a vast area and no single location would be expected to receive a consistently high exposure to noise. The highest DNL expected at any of the municipalities under any of the Action Alternatives is 56 DNL which is much lower than the 65 DNL threshold established for land use restrictions and significantly lower than 75 DNL which has been indicated to affect property values. Given the low expected DNL values and the distribution of the training activity across such a large area, it would not be expected that the Proposed Action would have any quantifiable impacts to the existing housing values within the ROI.

4.8.1.3 Economic Impacts

Data from the USFS National Visitor Use Monitoring Program, including visitation and visitor spending are provided in **Section 3.8.2.3,** *National Forest Visitor Spending***.** These data also indicate that an average of 57 percent of visitors to the four National Forests within the region of influence, travel more than 50 miles for their visits. Noise analysis results presented in **Section 4.3** (Acoustic Environment) indicate that the Proposed Action would not result in significant increases in noise and that the average noise resulting from the Proposed Action would not be at a level that would be considered incompatible with recreational land uses (greater than 65 DNL). Though studies show that noise from a number of sources, including aircraft, can affect visitor experience and enjoyment (see Section **4.7.1**), it is not clear how such experience affects visitation. While it is possible that noise could reduce visitation, potentially reducing contributions to local economies, there is no way to predict the exact impact that the presence of military aircraft may have on National Forest visitation and the economic impact cannot be quantified.

4.8.2 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB. Therefore, there would be no change to socioeconomic conditions under the No Action Alternative.

4.9 ENVIRONMENTAL JUSTICE

The analysis of environmental justice considered the minority and low-income populations and children underlying the affected airspace under the Proposed Action. Changes in the noise environment were the primary consideration in the analysis, and as such, determinations are made as to whether changes in the noise environment would adversely affect the health or environment of populations living in the areas identified in the affected environment (see **Table 3.9-1**).

4.9.1 Impacts Common to All Action Alternatives

No significant impacts were identified in association with any resource areas that would be anticipated to adversely impact the health or environment of minority or low-income populations or children living under the areas affected under any of the alternatives. Noise levels in the airspace would remain below 65 DNL. Because there would not be significant impacts that would adversely affect minority or low-income populations or children, there would be no impact to environmental justice.

4.9.2 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB. There would be no impacts to the health or environment of minority or low-income populations or children; therefore, there would be no impact to environmental justice.

4.10 SAFETY

Numerous Federal, civil, and military laws and regulations govern operational safety at Holloman AFB. Individually and collectively these laws and regulations prescribe measures, processes, and procedures required to ensure safe operations and to protect the public, military, and property. Elements of the Proposed Action with a potential to affect safety were evaluated to determine the degree to which such elements increase or decrease safety risks.

4.10.1 Impacts Common to All Action Alternatives

4.10.1.1 Ground Safety

Under the Proposed Action, the ground operations and maintenance procedures conducted by Holloman AFB personnel would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, Technical Orders, and Air Force Occupational Safety and Health standards. There would be no aspects of the Proposed Action that would be expected to create new or unique ground safety issues or create additional risk. Any ground safety emergency that involves a life-flight transporting time-critical patients or donated organs receive priority status through any airspace unit when the pilot provides a call sign to the air traffic controller. FAA Order JO 7110.65X, *Air Traffic Control*, states that operational priority is given to civilian air ambulance flights when verbally requested. Priority to life-flight status would not change with implementing the Proposed Action. Military training in the affected airspace would be stopped during such an event. Operations within the proposed MOAs would not be expected to create any ground safety issues.

Crash Response

Holloman AFB has the capability to provide crash response; and this capability would remain in place under this airspace proposal. In the unlikely event of a crash within the proposed airspace area, local first responders would likely be first on the scene given the distance from Holloman AFB. Holloman AFB crash response would continue to follow standard procedures and plans as described in **Section 3.10** (Safety). There would be no changes to crash response procedures from implementation of the Proposed Action.

It is impossible to predict the precise location of an aircraft accident. Major considerations in any accident are loss of life and damage to property. The aircrew's ability to exit from a malfunctioning aircraft is dependent on the type of malfunction encountered. The probability of an aircraft crashing into a populated area is extremely low, but it cannot be totally discounted. Several factors are relevant: the ROI and immediate surrounding areas have relatively low population densities; pilots of aircraft are instructed to avoid direct overflight of population centers at very low altitudes; and, finally, the limited amount of time the aircraft is over any specific geographic area limits the probability that impact of a disabled aircraft in a populated area would occur.

Should a mishap occur, response and recovery operations could necessitate such activities as the use of motorized vehicles and excavation to contain contamination. This type of activity is normally prohibited in Wilderness Areas. When responding to a crash site, the Air Force would consult with the appropriate land use manager to minimize direct damage and coordinate actions. Due to the myriad factors in such an occurrence, detailed steps cannot be foreseen. Each crash response would be considered on a case by case basis to minimize the intrusiveness to the maximum extent practicable, consistent with national security considerations and the need to protect life and property from further risk.

Secondary effects of an aircraft crash include the potential for fire (discussed below) and environmental contamination (discussed in **Section 4.12.1.1**, *Aircraft Hazardous Materials*).

Mishap Fire Risk and Management

The extent of secondary effects from a crash or mishap is situationally dependent, and is therefore difficult to quantify. The regional terrain that would be overflown under this proposal is diverse. For example, should a mishap occur, highly vegetated areas during a hot, dry summer would have a higher risk of experiencing extensive fires than would more barren and rocky areas during winter. Land within the proposed MOAs would continue to be managed for fire risk by local owners and agencies that manage that land. F-16 operations currently occur within airspace associated with Holloman AFB and have not presented an increased fire risk nor has the base's aircraft activity been the cause of a fire. The proposed operations would be similar in nature to the existing operations and would not constitute a novel or increased fire risk for the land under the MOAs.

Since 1992, there have been 1,066 recorded fire incidents within the proposed Talon MOA footprint. Of the 1,066 fires, 28 percent were classified as "miscellaneous", 25 percent were unidentified, and 21 percent were caused by lightning (Short 2017). Within the proposed Cato, Smitty, and Lobos MOAs, lightning has been the predominant cause of wildfires since 1992, accounting for 90 percent of fires in this area and 75 percent of fires in the proposed Lobos MOA (Short 2017). No fires from aircraft mishaps or pilot training activities were recorded in the USFS data (Short 2017).

4.10.1.2 Flight Safety

As stated in **Section 3.10** (Safety), the Class A mishap rate for the F-16 is 3.43 per 100,000 flying hours over the lifetime of the F-16 platform. The type of training proposed would be the same as what is performed currently, and there would be no aspect of the Proposed Action that would increase the accident rate; however, the increase in sortie numbers could slightly elevate the number of accidents overall.

A Class A mishap can also result in metal debris on the ground. The extent of the debris field depends upon the aircraft accident. Both for reconstructing the cause of the accident and for restoring the accident site as much as possible, the Air Force would make every effort to locate, document, and then clean up debris resulting from any accident.

As aircraft move through the air, they create vortices from their wing tips. These vortices, collectively called wake turbulence, form as the air passes both over and under the wing tips. The pressure differential caused by the passing of air over and under the wings generates lift with the lowest pressure above the wing and the highest pressure under it. Due to this differential, a "rollup" of the airflow occurs behind the wing causing swirling air to trail from the wing tips. The rollup process produces a wake consisting of a counter-rotating vortex extending from each wing tip (FAA 2014). Aircraft begin to generate vortices as soon as the nose wheel lifts off the surface of the runway; vortex generation ends as soon as the nose wheel touches down during landing.

A complex set of variables and conditions influence the behavior and persistence of vortices. These variables include aircraft weight and size, wing span, wind and weather conditions, atmospheric turbulence, flight mode, altitude, G-forces, and airspeed. The vortex characteristics of any given aircraft can also be changed by extension of flaps or other wing-configuring devices. Aircraft weight and airspeed tend to form the most influential factors, with slow and heavy aircraft generating stronger vortices. Smaller fighter aircraft, like the F-16, tend to produce minimal vortices that dissipate rapidly (Air Force 2011).

Vortices commonly descend behind an aircraft to an altitude of about twice the aircraft's wingspan. For an F-16, that distance would measure about 85 feet. Studies by the Air Force (Air Force 2006) demonstrate that vortices generated by large aircraft such as B-1Bs and B-52s flying at 500 feet AGL descend and dissipate rapidly and pose no threats to persons, objects, or structures on the ground. Given these results for larger, heavier aircraft, it would be unlikely that F-16s using the proposed MOAs would generate vortices of sufficient strength or duration to reach the ground and pose a safety risk.

Bird/Wildlife-Aircraft Strike Hazard

Under the Proposed Action, F-16 aircrews would operate in the same general airspace environments of New Mexico as they do currently. As such, the overall potential for bird aircraft strikes would not be anticipated to be statistically different with implementation of any of the alternatives. F-16 aircrews operating in the MOAs would be required to follow applicable procedures outlined in the Holloman AFB BASH Plan (Holloman AFB 2015). Adherence to this program has minimized bird aircraft strikes. When safety procedures identify an increased risk, limits are placed on low altitude flights and some types of training (e.g., multiple approaches, closed pattern work). While Alternatives 2 and 3 do include airspace that overlies a relatively small area that is a National Wildlife Refuge, this area is under the proposed ATCAA, where operations would be above 18,000 feet MSL. Therefore, there would be limited potential for additional mishaps from bird/wildlife strikes at the altitudes that would be used under these alternatives. Furthermore, special briefings are provided to pilots whenever the potential exists for greater bird-strike risks within airspace.

Obstructions, Airfields, and Restricted Areas

Appendix I (Air Obstruction Analysis) consists of an obstruction analysis of the proposed airspace reconfigurations. The only vertical obstructions that exist that intrude into the 500 foot AGL floor exist within the proposed Talon airspace. Four vertical obstructions exist within the proposed Talon Low MOAs, with three occurring in the Talon Low B and one occurring within Lincoln National Forest in the Talon Low A MOA (See **Appendix I,** Air Obstruction Analysis).

There are 24 identified airfields that exist within the proposed airspace as well. As for overflight restrictions, Holloman AFB would maintain the 1,600-foot minimum altitude that is currently observed in the western portion of the Smitty MOA. Similarly, Wilderness Areas, National Parks, and National Monuments would be avoided by 2,000 feet AGL within the proposed MOAs. Populated areas would be avoided by 1,000 feet AGL.

Nothing within the obstruction analysis would create an adverse impact to safety under the Proposed Action. Vertical obstructions would be noted and avoided as they currently are in existing areas where obstructions intrude into proposed airspace. Restricted areas and airfields would also be noted and standard outlined safety protocols for avoidance and separation of aircraft for safety would be observed, in accordance with FAA procedures.

4.10.1.3 Chaff and Flares

Chaff

RR188 training chaff would be the only type of chaff authorized for use under the Proposed Action. 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. Should any issues arise, Albuquerque Center would

coordinate with controllers at Holloman AFB, and dispensing chaff would cease. Therefore, potential safety issues related to aircraft and FAA tracking systems would not be anticipated.

The use of chaff could possibly interfere with weather surveillance radar (Air Force 2011). The Air Force uses RR188 chaff to reduce, but not eliminate, chaff caused echoes to weather and other radars. Chaff particles suspended in weather systems could give inaccurate information regarding precipitation or severe weather conditions. Meteorologists can usually accurately identify chaff from rainfall on radar, but automated systems may not (U.S. General Accounting Office 1998). 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).

Safety issues for people underneath or immediately adjacent to the proposed MOAs would stem from the probability of chaff residual material striking an individual on the ground. Data on this issue are difficult to obtain; however, there have been no reports of any person being injured from falling chaff residual material. Chaff residual material consists of a 1-inch square plastic piece only 1/8-inch thick. The individual end cap weighs approximately 0.114 ounces. Previous analysis indicates that if a person on the ground were hit by an ejected end cap, the impulse impact would be 0.003 pound-seconds and be similar to being struck by a piece of hail (Air Force 2011). The impact required to cause brain injury is 0.10 pound-seconds (Air Force 1997). As shown in **Table 3.1-3**, chaff and flare residual materials would be very widespread (1 piece of residual material per 22 acres under Alternative 1 and 1 piece of residual material per 70 acres under Alternative 2) making the probability of these materials impacting a person on the ground extremely unlikely. Therefore, the safety risk to people under or immediately adjacent to the MOAs in which chaff is dispensed would be minimal.

Arfsten et al. reviewed scientific data 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 (Arfsten et al. 2002). See **Section 4.12.1.2**, *Chaff and Flares*, for additional discussion on the toxicity of chaff and flares.

Flares

Under this proposal, flares would be dispensed in the proposed MOAs during training operations. Once flares are deployed, the end cap and piston of the flare falls to the ground. The end cap weighs approximately 0.16 ounces, creating the potential to generate an impact momentum of 0.010 pound-seconds (Air Force 1997). If an end cap struck a person on the ground, the momentum generated would be far below that required to cause serious injury. As stated above, the wide distribution of the residual materials would make the probability of these materials impacting a person on the ground extremely unlikely. Therefore, safety risks related to residual flare material would be negligible.

Flares consist of magnesium and Teflon pellets that burn rapidly and completely after being dispensed. The flares have a greater than 99 percent reliability rate for discharging and burning. On extremely rare occasions, however, a flare may not ignite and fall to the earth as a dud flare. A dud flare could seriously injure a person if he or she is either struck by the falling dud or if a dud flare is discovered and mishandled. There is no instance of a dud flare or any flare striking an individual on the ground and the probability of such occurring would be extremely rare (Air Force 2011). Previous analysis has determined the probability of a dud flare striking a person on the ground is correlated with population density (Air Force 2011). To reduce the risk of dud flares striking a person on the ground, flares would not be released over established communities beneath the airspace. Dud flares may be mishandled if discovered on non-DoD lands by the uninformed public; however, since the reliability rate is so high and the geographic distribution of flare

usage would be so large the probability of such an occurrence would be extremely low. Any dud flare found should be treated as Unexploded Ordnance. A dud flare would probably not ignite even in a campfire unless it was on a very hot bed of coals. If a dud flare were shot with a bullet or cut with a power saw, the friction could cause it to ignite.

AFI 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. Under the Proposed Action, additional fire restrictions for flare use would be implemented to reduce the risk of fires. Specifically, flares would not be used at altitudes less than 18,000 feet MSL under "High" fire conditions and flares would not be used at all under "Very High" or "Extreme" fire conditions (see **Table 2.2-5**). There have been no recorded wildfires from flare use in existing MOAs used by Holloman AFB. In addition, the Air Force would inform local fire departments about proper dud flare handling procedures and would cooperate with local agencies for response to flare-related fires. Implementation of these management practices would greatly reduce the risk of fire from flares; therefore, no significant fire-related impacts would be expected from the Proposed Action.

4.10.2 No Action Alternative

Under the No Action Alternative, there would be no reconfiguration or expansion of the existing MOAs. F-16 aircraft would continue to use the existing MOAs as they currently do. Current operations and training activities in the existing MOAs and ATCAAs do not pose a significant safety risk to the public, military personnel, or property. Since these conditions would not change under the No Action Alternative, current operations and training activities would not result in significant impacts.

4.11 CULTURAL RESOURCES

Analysis of potential impacts on cultural resources considers both direct and indirect impacts. Direct impacts may occur by: (1) physically altering, damaging, or destroying all or part of a resource; (2) altering characteristics of the surrounding environment that contribute to resource significance; (3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or (4) neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts can be assessed by identifying the type and location of the Proposed Action and by determining the exact locations of cultural resources that could be affected. Indirect impacts generally result from increased use of an area and are harder to quantify.

Only those NRHP-listed cultural resources that would reasonably be affected by visual (overflights) and noise intrusions are considered under the Proposed Action. These include architectural resources, archaeological resources, and traditional cultural properties. The Proposed Action does not include any ground disturbing activities; therefore, an inadvertent discovery or physical destruction of a resource would not occur.

4.11.1 Impacts Common to All Action Alternatives

4.11.1.1 Archaeological and Architectural Resources

The Proposed Action would result in flights being distributed over a vast area of airspace, most of which would occur above 10,000 feet AGL. It is unlikely that any one location would experience regular or routine overflights (specifically those below 10,000 feet AGL) given the large volume and various altitudes of airspace needed for training. Due to the high altitude of the overflights, small size of the aircraft, high

speeds, and the infrequent occurrence the aircraft would not represent a major visual resource to observers on the ground. Chaff and flares deployed from the aircraft would not pose a visual intrusion for the following reasons: they are small in size (1 inch to no more than 13 inches in length), burn only for a few seconds (flares only), and the relatively high altitude of the flights when deployed would make them virtually undetectable to observers on the ground. The likelihood of residual chaff and flare material to land at archaeological or architectural sites would be very rare and would not have an adverse effect on these resources. Visual intrusion under any of the alternatives would be minimal and would not cause adverse impacts to the settings of these resources.

The Proposed Action would result in supersonic flight within the airspace. Overpressure values are used to provide a description of psf resulting from supersonic flight. At 1 psf, the probability of a window breaking ranges from one in a billion (Sutherland 1990) to one in a million (Hershey and Higgins 1976). At 10 psf, the probability of breakage is between one in a hundred and one in a thousand (Haber and Nakaki 1989). Damage to plaster is in a comparable range 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 (Sutherland 1990). Typical outdoor structures such as buildings, windmills, radio towers, etc., are resilient and routinely subject to wind loads far in excess of sonic boom pressures. Foundations and retaining walls, which are intended to support substantive earth loads, would not typically be at risk from sonic booms below 4 psf.

A sonic boom could occur with every supersonic event; however, not all of these sonic booms would be heard or felt on the ground. No structural damage to NRHP-listed archaeological or architectural resources would be anticipated since the overpressures would not exceed 1 psf. The risk of damaging structures at this level of psf would be very low, one in a billion (Battis 1983; Haber and Nakaki 1989). Some prehistoric archaeological sites could contain natural structures such as rock shelters or caves. These structures often house petroglyphs or pictographs, which are etched or painted onto the rock surfaces. However, studies have found that these types of natural formations are not affected any more by noise vibrations, such as sonic booms, than by natural erosion, wind, or seismic activity (Battis 1983).

Holloman AFB consulted with both the Arizona and New Mexico SHPOs for the Proposed Action. To date, neither SHPO has provided a concern about the Proposed Action or indicated that historic resources would be impacted. See **Appendix J** (NHPA and Native American Graves Protection and Repatriation Act [NAGPRA] Consultation Correspondence) for copies of consultation correspondence.

4.11.1.2 Traditional Cultural Properties

To date, no known traditional cultural properties have been identified through government-to-government consultation for this EIS. It would be expected that none of the alternatives would impact these resources. See **Appendix J** (NHPA and NAGPRA Consultation Correspondence) for copies of consultation correspondence.

4.11.2 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB in support of F-16 pilot training. Training of F-16 aircrews stationed at Holloman AFB would continue to use restricted areas at WSMR and Fort Bliss, and MOAs in the vicinity of Holloman AFB to the extent practicable. The boundaries of Talon, Cato, and Smitty MOAs would remain unchanged and they would

continue to be used as they are currently. There would be no change to cultural resources under the No Action Alternative

4.12 HAZARDOUS MATERIALS

4.12.1 Impacts Common to All Action Alternatives

4.12.1.1 Aircraft Hazardous Materials

Under all Action Alternatives, aircrews would conduct training operations in the proposed airspace areas. There would be the potential for hazardous materials to be introduced into the environment under these areas in the unlikely case of an aircraft mishap. As noted in **Section 3.10.2.2**, *Flight Safety*, the F-16 has a Class A mishap rate of 3.43 per 100,000 flight hours. There have been no recorded mishaps with F-16 aircraft from Holloman AFB. Hazardous materials that could be introduced into the environment in the event of a mishap include jet fuels, ethylene glycol, and hydraulic fluid. In addition to these common materials, the emergency power unit for the single engine F-16 fighter jet uses hydrazine, a highly volatile propellant, to restart the engine in case of emergency. Radioactive materials are used in small quantities for navigation systems, instruments, and some coatings. Composite materials are used in most aircraft in some form.

When an aircraft crashes, it may release hydrocarbons. Those petroleum, oils, and lubricants not consumed in a fire could contaminate soil and water. The potential for contamination is dependent on several factors. The porosity of the surface soils would determine how rapidly contaminants are absorbed. The specific geologic structure in the region would determine the extent and direction of the contamination plume. The locations and characteristics of surface and groundwater in the area would also affect the extent of contamination to those resources.

F-16 aircraft carry a small quantity of hydrazine in a sealed canister that is designed to withstand crash impact damage. Hydrazine is a highly volatile propellant that contains toxic elements. It is carried on the F-16 as part of the emergency power unit. When used for this purpose, hydrazine is completely consumed, and poses no safety hazard. In any crash that is severe enough to rupture the canister, it is most likely that fire would also be involved. In this case, the hydrazine would also burn and be completely consumed. In the unlikely event that the hydrazine should be released but not consumed by fire, impacts on soils and groundwater are likely to be of minor consequence. Hydrazine absorbs water at room temperature. It is incombustible in solution with water at concentrations of 40 percent or less and it evaporates at any given combination of constant meteorological conditions (i.e., temperature, humidity, wind speed, etc.) at a rate slightly slower (approximately 11 percent) than water.

Movement of hydrazine through natural soils has been shown to be slow and limited. Due to its absorption and natural decomposition processes, the probability of released hydrazine significantly contaminating groundwater is considered extremely low. However, if a Class A accident occurred and the hydrazine canister were ruptured, no fire consumed the hydrazine, and quantities of hydrazine were to reach a surface water body, aquatic life in those areas experiencing high concentrations could be significantly impacted.

The Air Force has SOPs in the event of an aircraft mishap to identify potential hazardous materials and situations, protect responding personnel and the environment from immediate hazards, and to provide guidelines for the ultimate cleanup and disposal of the crash residues. Aircraft mishaps are rare, therefore, hazardous material releases from aircraft mishaps under any of the Action Alternatives would be minimal.

4.12.1.2 Chaff and Flares

Chaff

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 (Air Force 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 Air Force 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 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 (Air Force 2011).

Confined aquatic habitats could be affected 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. Water bodies in 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. 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 (Air Force 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 (Air Force 2011).

Flares

The M206 flare proposed for use does not contain lead although some earlier flares had lead in the firing mechanism and some flares still contain chromium in the firing mechanism. In Air Force 2011, a statistical model was used to calculate the emission concentration of lead and chromium with the goal of learning what level of flare emissions or ash would be required to achieve toxic levels of lead or chromium. The model calculated that 1.5 million flares would have to be released below an altitude of 400 feet AGL over a 10,000-acre training range before the level of chromium emissions would become a health risk. No Air Force training range uses this amount of flares annually and the minimum release altitude for flares is 2,000 feet AGL.

There are also trace amounts of boron in the flare pellet. To achieve a toxic level of boron, flare ash from approximately 4,000 flares would need to fall on an acre of land annually. It would be impossible to deposit 4,000 flares on one acre of land. In fact, it would not be possible for a high performance aircraft to

purposefully deposit even one flare on a specific acre of land. Flare ash and flare emissions are not able to result in measurable effects to the environment (Air Force 2011).

The likelihood of finding a dud flare is extremely remote and the likelihood of a dud flare igniting is even more remote. If a dud flare fell in a waterbody, it would deteriorate over time. The chemicals released during deterioration (metallic magnesium) would not be expected to be of sufficient quantity to cause a noticeable reduction in the water quality or impact on aquatic species or the environment (Air Force 2011).

Toxicological studies on flare residual materials indicate that no chemical effects to biological resources would be expected. The amount of magnesium dispersed from flares is too small to result in levels that would be associated with acute exposure (Air Force 1997). The concentration of flare ash residue at any location would be undetectable under normal circumstances due to dispersal of the minimal amount of residue produced by a burning flare deployed in the airspace.

4.12.2 No Action Alternative

Under the No Action Alternative, there would be no SUA modifications in the vicinity of Holloman AFB. Aircrews stationed at Holloman AFB would continue to use restricted areas at WSMR and Fort Bliss, and MOAs in the vicinity of Holloman AFB to conduct F-16 pilot training. The current use of flares would continue in all of the areas already approved for use. As such, there would be no impacts to hazardous materials under the No Action Alternative.

5.0 CUMULATIVE IMPACTS

Cumulative impacts analysis is important for understanding how multiple actions that occur in a particular time and area affect the environment. CEQ regulations stipulate that the cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR 1508.7).

Whereas the individual impacts of one project in a particular area or region may not be considered significant, numerous projects in the same area or region may cumulatively result in significant impacts. Cumulative impacts most likely arise when a relationship exists between a proposed action and other actions occurring in a similar location or during a similar time period. Actions overlapping with or in proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, actions that coincide in time, even partially, have the potential for cumulative impacts.

5.1 PAST, PRESENT AND REASONABLY FORESEEABLE ACTIONS

The first step in assessing cumulative effects involves defining the scope of other actions and their interrelationship with the Proposed Action and alternatives (CEQ 1997). The scope must consider other projects that coincide with the location and timing of the Proposed Action. In this section, past, present, and reasonably foreseeable activities that have occurred, are occurring, or will occur on lands that lie beneath the existing and proposed Talon, Cato, Smitty, and Lobos MOAs and the Christa and Kendra ATCAAs and have the potential to interact with the Proposed Action have been identified.

In identifying past activities for cumulative analysis, agencies are not required to list the individual effects of past actions; rather they can focus "on the current aggregate effects of past actions" without providing details of those actions. CEQ (2005) states that cumulative effects analysis requires "a concise description of the identifiable present effects of past actions to the extent that they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal…may have a continuing, additive, and significant relationship with those effects".

The effects of past and ongoing actions were considered as part of the baseline conditions and were described in the existing environment for each resource. Past and ongoing actions that were evaluated in this cumulative effects analysis including those that have occurred or are occurring in, beneath, or near the airspace affected by the Proposed Action are presented in **Table 5.1-1**. For each of these actions, published environmental and planning documents were reviewed in order to determine their potential to result in cumulative impacts when considered along with the Proposed Action.

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
Air Force Actions				
Proposed Airspace Modifications to Support Units at Holloman AFB, New Mexico EA (Air Force 1997)	EA evaluated the impacts of modifying airspace to support U.S. and German Air Force Units at Holloman AFB including establishing new aerial refueling route, consolidating existing airspace units into a new MTR, and dividing Talon MOA into High East, High West, and Low components.	Past	Yes. Action modified Talon MOA, establishing new Talon High West and Talon Low.	Effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land management, recreation, and safety.
Proposed Expansion of German Air Force Operations at Holloman AFB, New Mexico EIS (Air Force 1998)	Beddown of an additional 30 Tornado aircraft and associated personnel, construction on base and at WSMR target complex, increased day and night operations on MTRs and SUA, establish new target complex on McGregor Range. The German Air Force has recently departed Holloman AFB.	Past	Yes. Aircraft utilized Talon MOA for training until 2017.	Airspace management, acoustic environment, natural resources, land management, recreation, and safety.
EA for Deployment of Chaff and Flares in Military Training Airspace (Phase II) (Air National Guard Readiness Center 2003)	Proposed action in EA was to either continue, reintroduce, or introduce the use of chaff and/or flares in the course of training operations, by ANG and other units, in specific military training airspace.	Past	Yes. Proposed action included Cato MOA as well as Reserve and Morenci MOAs that would be adjacent to Lobos MOA.	Airspace management, acoustic environment, and natural resources.
Transforming the 49th Fighter Wing's Combat Capability, Holloman AFB, New Mexico EA (Air Force 2006)	Evaluated replacing the retiring F-117A and T-38A aircraft with two F-22A squadrons. The action involved increased use of all training airspace including Talon High MOA and use of flares in Talon MOA.	Past	No. The F-22 fleet was consolidated, resulting in the movement of all Holloman AFB F-22s to other locations by 2013.	NA
C-130 Use of VR-176	C-130s from Kirtland AFB fly up to 34 sorties annually along VR-176. Additionally, C-130s associated with the ANG Advanced Tactics Aircrew Course from Missouri fly up to 100 sorties annually in western New Mexico.	Past, Ongoing	Yes. VR-176 overlaps with Cato, Smitty and proposed Lobos MOAs.	Effects captured in baseline conditions for airspace, acoustic environment, natural resources, land management, and safety.

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions (cont.)				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
New Mexico Training Range Initiative, EIS (Air Force 2007)	Evaluated proposal to expand the Pecos MOA to provide more realistic training opportunities.	Past	Yes. Pecos is near proposed airspace.	Airspace Management.
Recapitalization of the 49th Wing Combat Capabilities and Capacities Holloman AFB, New Mexico EA (Air Force 2011)	56 F-16 aircraft were relocated to Holloman AFB to replace F-22A; increased operations in Talon MOA by approximately 950 annual sortie-operations.	Past, ongoing	Yes. Aircraft utilize Talon MOA.	Effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land management, recreation, and safety.
F-35A Training Basing EIS (Air Force 2012)	Proposed beddown of F-35A training mission at one or more of four locations including Holloman AFB.	NA	No. Luke AFB was selected for beddown.	NA
Installation Complex Encroachment Management Action Plan for Holloman AFB: Volume I Action Plan (Air Force 2014)	Identifies potential encroachment issues to identify opportunities to engage stakeholders with goal of preserving mission capability, conserving resources, and maintaining quality of life. Plan identified potential communications interference, airborne noise, and population and urban growth as issues that could affect Talon MOA.	Past, ongoing	Yes. Identifies issues that could impact Talon MOA.	Past and present effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land management, and recreation. Same resources expected to be affected in future.
Replacement of QF-4 with QF-16 Full-Scale Aerial Targets at Holloman AFB, New Mexico EA (Air Force 2015a).	35 QF-4 Full-Scale Aerial Targets were replaced with 35 QF-16s; air-to-air training operations utilize Talon MOA but there was no change of configuration, use, or use of defensive countermeasures.	Past, ongoing	Yes. Aircraft utilize Talon MOA.	Effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land management, recreation, and safety.
CATEX for F-16 Use of Talon MOA and R-5107E and F-5111A/B (Air Force 2015b).	Clarifies F-16 use of Talon Low MOA and restricted airspace that was not specifically defined in "Recapitalization of 49th Wing Combat Capabilities and Capacities" (Air Force 2011). Establishes cap for F-16 aircraft sortie-operations in Talon MOA.	Past, ongoing	Yes. Aircraft utilize Talon MOA.	Effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions (cont.)				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
				management, recreation, and safety.
Interim Relocation of F-16 Squadrons to Holloman AFB, New Mexico EA (Air Force 2017a).	Temporarily relocated two F-16 squadrons (45 aircraft) from Hill AFB to Holloman AFB; air-to-air training operations would utilize Talon MOA.	Past, ongoing	Yes. Aircraft utilize Talon MOA.	Effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land management, recreation, and safety.
Draft EA for Holloman AFB F-16 Use in WSMR R-5111 C/D Airspace (Air Force 2017b)	Proposed use of restricted airspace for expand F-16 pilot training flights for air-to-air combat maneuvers, use of chaff and flare, and supersonic operations	NA	No. Project was canceled.	NA
EA Addressing the Angel Thunder Personnel Recovery/Rescue Training Exercise in the Southwestern United States (Air Force 2017c)	Proposed biannual, 3-week Angel Thunder exercise throughout southwestern U.S. using DoD and non-DoD properties as landing zones, helicopter landing zones, drop zones, ground training sites, and aircraft training sorties.	Past, ongoing	Yes. Includes temporary use of airstrip and helicopter landing zones within Gila National Forest, however, these areas are outside of proposed airspace addressed in this EIS.	Airspace management.
Permanent Beddown of F-16 Squadrons at Holloman AFB, New Mexico (date unknown, action is under development)	Permanent beddown of two F-16 squadrons from Hill AFB. Temporary beddown addressed in previous EA (Air Force 2017a).	Future	Yes. Aircraft utilize Talon MOA.	Effects captured in baseline conditions for airspace management, acoustic environment, natural resources, land management, recreation, and safety.
Adversary Air (Air Force 2019) (expect Final EA July 2020)	Contracted Adversary Air Training Support for Holloman AFB would add 12 aircraft, 15 pilots, and 72 maintainers at Holloman AFB. Aircraft would fly a total of 3,144 additional annual sorties and would employ defensive countermeasures. An estimated 314 sorties and use of less than 200 flares would occur in the Talon MOA.	Future	Yes. Would utilize Beak and Talon MOAs.	Airspace management, acoustic environment, natural resources, land management, recreation, and safety.

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions (cont.)				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
EIS for Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona (date unknown, action is under development)	Proposal to optimize existing MOAs in Arizona to include Sunny, Bagdad, Gladden, Outlaw, Jackal, Reserve, Morenci, Tombstone, Ruby, Fuzzy, and Sells.	Future	Yes. Reserve and Morenci MOAs adjacent to proposed Lobos, Cato, and Smitty MOAs.	Airspace management, acoustic environment, and natural resources.
Other DoD Actions				
Defense Threat Reduction Agency Activities on WSMR Programmatic EIS (Army 2007)	Testing activities utilize WSMR airspace and lands beneath airspace, thereby, reducing availability of airspace to other users.	NA	No. Proposed Action does not affect airspace above WSMR.	NA
Modification of Special Use Airspace Fort Bliss, Texas and New Mexico EA (Army 2012)	EA modified Class G airspace to restricted airspace over the Southern Training Areas at McGregor Range, Fort Bliss.	NA	No. Airspace does not coincide with existing or proposed airspace.	NA
Fighter Aircraft Use of Biggs Army Airfield EA (Army 2014)	Joint Training Operations with Air Force fighter aircraft occurs six times per year at Biggs Army Airfield.	NA	No. Airspace does not coincide with existing or proposed airspace.	NA
WSMR, New Mexico 2046 Strategic Plan (Army 2016a)	Overview of future vision for range personnel, infrastructure, facilities, and processes.	NA	No. Proposed Action does not affect airspace above WSMR.	NA
Fort Bliss Local Flying Area and Local Flying Rules (FB 95-1), Texas and New Mexico EA (Army 2018)	The Local Flying Area for Fort Bliss includes the airspace covered in this EIS. The preferred alternative includes a low-level helicopter training area just southeast of Lobos MOA, near Deming, New Mexico and the use of Talon MOA. Throughout the Local Flying Area, minimum flight altitude would be lowered from 3,000 to 500 AGL.	Ongoing, future	Yes. The Fort Bliss Local Flying Area coincides with airspace affected by the Proposed Action.	Airspace management, acoustic environment, natural resources, land management, recreation, and safety.
High Altitude Mountain Environmental Training Strategy from Fort Bliss (Army 2016b)	Fort Bliss was considering High Altitude Mountain Environmental Training Strategy operations within the Sacramento Ranger District of the Lincoln National Forest where helicopter training could occur at high altitudes in complex mountainous terrain and weather conditions.	NA	No. Project has been canceled.	NA

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions (cont.)				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
Other Actions and Plans				
FAA's NexGen	FAA-led modernization air transportation system by implementing a range of new technologies to improve aircraft routing and monitoring in airspace and on the ground resulting in more efficient use of airspace, reduced delays, fuel costs, emissions, and noise. Program began in 2007 and will have all major components in place by 2025.	Past, ongoing, future	No. Ongoing changes to commercial aviation including routing not expected to affect use of SUA or ATCAAs.	NA
New Mexico Airport System Plan Update 2009 (New Mexico Department of Transportation 2009)	Plan provides a general summary of the needs of New Mexico's 51 publically owned public use airports.	NA	No. Specific activities and projects are not identified for any airport.	NA
The Southern New Mexico-El Paso Texas Joint Land Use Study (AECOM 2015)	The Joint Land Use Study area encompasses six counties in two states and the three military installations (Holloman AFB, Fort Bliss, WSMR) to address issues of compatibility and create tools to facilitate collaboration on issues affecting land use.	NA	No. Specific activities and projects are not identified.	NA
Comprehensive Plans: • Catron County, New Mexico (2007) • Chaves County, New Mexico (2016) • Eddy County, New Mexico (2008) • Grant County, New Mexico (2017) • Sierra County, New Mexico (2017) • Graham County, Arizona (2016) • Greenlee County, Arizona (2003) • Town of Silver City, New Mexico (2017)	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.	NA	No. Specific activities and projects are not identified.	NA

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions (cont.)				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
BLM Resource Management Plans/EISs: • Carlsbad Field Office (BLM 1988, 1997a, 2008) • Las Cruces District (BLM 2013) • Roswell Field Office (BLM 1997b, 2008) • Socorro Field Office (BLM 2010) • Safford Field Office (BLM 1991, 2017) • Pecos District (BLM 2014)	The BLM develops Resource Management Plans guide appropriate multiple uses of land and provide for management and protection of protected resources.	Past, ongoing	Yes. Management activities occur on BLM-managed lands, which lie beneath all of the existing and proposed MOAs and ATCAAs.	Past and present management captured in baseline conditions for natural resources, land management, recreation, and socioeconomics. Ongoing management expected to impact same resources.
Borderlands Wind Project Plan of Development (New Era Energy 2018)	Proposed commercial wind energy project consisting of 40 turbines in Catron County, on approximately 40,350 acres of land managed by the BLM (Socorro Field Office), New Mexico State Land Office, and private landowners. BLM will prepare an EIS.	NA	No. The proposed development would be located just outside the project area, northwest of the proposed Cato and Smitty MOAs.	NA
USFS Forest Plans/EISs: • Lincoln National Forest (USFS 1986a) • Cibola National Forest (USFS 2016) • Gila National Forest (USFS 1986b)	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.	Past, ongoing	Yes. Management activities occur on USFS-managed lands, which lie beneath all of the existing and proposed MOAs and ATCAAs.	Past and present management captured in baseline conditions for natural resources, land management, recreation, and socioeconomics. Ongoing management expected to impact same resources.

Table 5.1-1. Past, Ongoing, and Reasonably Foreseeable Actions (cont.)				
Action	**Description**	**Timeframe**	**Contribute to Cumulative Impacts**	**Resource Interaction**
Carlsbad National Park: • General Management Plan (NPS 1996) • Resource Protection Plan (NPS 2002) • Karst and Cave Management EA (NPS 2006)	Describe park resources management and protection.	Past, ongoing	Yes. Management activities occur on lands managed as Carlsbad Caverns National Park, the northern boundary of which lies beneath the proposed configuration of Talon MOA.	Past and present management captured in baseline conditions for natural resources, land management, recreation, and socioeconomics. Ongoing management expected to impact same resources.
New Mexico State University Unmanned Aircraft System Flight Test Center (New Mexico State University 2018; FAA 2016)	Aerostar Unmanned Aircraft System operates in Class E and G Airspace within the jurisdiction of the Albuquerque Center and Holloman AFB Radar Approach Control up to 1,500 AGL.	Past, ongoing	Yes. Airspace overlaps with proposed Lobos MOA and ATCAA.	Past and present management captured in baseline conditions.

Legend: AFB-Air Force Base; AGL-above ground level; ATCAA-Air Traffic Control Assigned Airspace; BLM-Bureau of Land Management; CATEX-Categorical Exclusion; DoD-Department of Defense; EA-Environmental Assessment; EIS-Environmental Impact Statement; MOA-Military Operations Area; NA-Non-Applicable; SUA-special use airspace; USFS-U.S. Forest Service; WSMR-White Sands Missile Range.

5.2 ANALYSIS OF CUMULATIVE EFFECTS

In accordance with CEQ guidance, the significance of cumulative effects is described in comparison to the environmental baseline and, where applicable, relative to regulatory standards and thresholds. The following analysis considers how the impacts of the actions in **Table 5.1-1** might affect or be affected by the Proposed Action and alternatives. The analysis considers whether such a relationship would result in potentially significant impacts not identified when the Proposed Action is considered alone.

5.2.1 Airspace Operations and Management

The proposed expansion and creation of new training airspace would contribute cumulatively to training airspace throughout New Mexico. The southern portion of New Mexico has a relatively substantial amount of training airspace (to include restricted areas, MOAs, and MTRs). Other actions such as the New Mexico Training Initiative, the Fort Bliss Local Flying Area, and the proposed Regional SUA Optimization project in Arizona have or would continue to modify airspace areas that have the potential to impact civilian aircraft. The past activities listed in **Table 5.1-1**, have affected the configuration and use of the airspace and the effects of those past actions have been included in the baseline conditions for this Proposed Action.

The proposed establishment of the Lobos MOA and expansion of the Cato and Smitty MOAs would be adjacent to other existing MOAs (Morenci and Reserve MOAs) creating a large contiguous block of airspace. However, all of these MOAs have separate using or scheduling agencies and are treated independently. The potential for operations within the adjacent MOAs to expand into the newly established Lobos, Cato, and Smitty MOAs was captured in the analysis in this EIS as potential transients.

Changes to helicopter operations within the Fort Bliss Local Flying Area would reduce the minimum altitude of helicopter operations from 3,000 to 500 AGL throughout the Local Flying Area, which includes the existing and proposed Talon MOA and part of the proposed Lobos MOA. This action would overlap with the New Mexico State Unmanned Aircraft System Flight Test Center airspace operations that would occur within the Lobos MOA and ATCAA. The proposed F-16 training operations would not be expected to interfere with or affect the helicopter or Unmanned Aircraft System activities. Helicopter operations within the entire Fort Bliss Local Flying Area would typically be approximately 16 sorties per week. These aircraft could operate within the active MOAs using VFR. The Angel Thunder Personnel Recovery/Rescue Training Exercise would take place biannually for three weeks, however, the proposed landing zones within the Gila National Forest for this exercise would not be located beneath the proposed Cato, Smitty, or Lobos MOAs. Therefore, this training activity is not expected to be affected by the proposed F-16 operations. These proposed actions would not generate a significant cumulative impact.

In summary, **the Holloman AFB SUA proposal** would not result in significant adverse impacts when evaluated and considered cumulatively with the other actions. The Air Force and FAA would ensure this outcome by following established operating procedures, conducting all flight operations in compliance with existing regulations and restrictions, and through continued coordination between the Air Force and FAA regarding operations within the airspace.

5.2.2 Acoustic Environment

As shown in **Table 5.1-1**, several actions have changed the aircraft based at Holloman AFB and the operations in the airspace affected by the Proposed Action in the past years. As a result of this and changes in airspace use by other users of the airspace, noise levels have varied. Other activities in the region may

produce localized noise, primarily from ground-based activities such as construction and extractive industry, as well as noise from low-flying civilian and military aircraft and helicopters. Noise levels resulting from military aircraft activities that overlap with the proposed airspace areas are represented in baseline numbers and the anticipated noise levels resulting from the Proposed Action and alternatives include these baseline levels (**Section 4.3**, Acoustic Environment). In addition, the potential transient aircraft that could use the proposed airspace have also been included in the Proposed Action and alternative modeling scenarios presented in this EIS. Noise from other military aircraft, helicopters, and UAS could have an additive effect to the noise environment in the proposed Talon and Lobos MOAs, however, the analyses for the other actions also indicated no significant impact to the acoustic environment. Noise from other sources such as regional commercial aircraft, traffic along highways, oil and gas operations, and construction also contribute to localized noise impacts. The impacts of the Proposed Action and alternatives on the noise environment, when considered with past, ongoing, and reasonably foreseeable activities would not be significant nor would they result in noise exposure considered generally incompatible with Federal Interagency Committee on Urban Noise standards for residential, public use, or recreational and entertainment areas.

5.2.3 Air Quality

Past and ongoing activities have contributed to the attainment status of the counties that lie beneath the proposed airspace. All counties are in attainment, having air quality that meets the NAAQS; however, Grant County, New Mexico and Greenlee County, Arizona are designated as maintenance areas, having recovered from exceeding NAAQS for SO_2. The Proposed Action would not be expected to contribute to significant cumulative effects to air quality or to result in exceedances of the NAAQS, taking into account past, ongoing, and future activities.

GHG emissions would increase, compared to current operations, for all three Alternatives. A comparison of the estimated emissions for the three Proposed Action Alternatives and the No Action Alternative are presented in **Table 5.2-1**.

Table 5.2-1. Annual GHG Emission Estimates for Each Alternative

Total Annual Emissions in Tons	
Alternative	**CO_2e**
No Action Alternative	39,381
Alternative 1	164,899
Alternative 2	141,907
Alternative 3	162,379

Legend: CO_2e-carbon dioxide equivalent; GHG-greenhouse gas.

Implementation of Alternative 1 would result in the largest increase in GHG emissions and implementing Alternative 2 would cause the smallest increase, with the difference between these Alternatives equal to 22,992 tons per year or a difference of 14%.

Climate change impacts on the Proposed Action would likely involve weather and other natural events that could impact training locations and/or training time, such as the increased presence of wildfires and more extensive, violent storms (USEPA 2016).

At this time, climate change presents a global problem caused by increasing concentrations of GHG emissions. While climate change results from the incremental addition of GHG emissions from millions of individual sources, the significance of an individual source alone is impossible to assess on a global scale

beyond the overall need for global GHG emission reductions to avoid catastrophic global outcomes. Therefore, the quantitative analysis of CO_2e emissions in this EIS is for disclosing the local net effects (increase or decrease) of the Proposed Action and alternatives and for its potential usefulness in making reasoned choices among alternatives.

5.2.4 Natural Resources

The proposed pilot training in the SUA proposed by all alternatives could potentially disturb wildlife and special-status species inhabiting areas beneath the airspace. Because the Proposed Action and alternatives involve changes to airspace and no on-ground activities, potential disturbance to animal species resulting from noise and visual observation of aircraft were evaluated. No effects from chaff or flare would be anticipated. The proposed training would contribute only minor increases to the average acoustic environment and would not create a consistent, significant noise source in any location. The analyses in other past and future actions indicated a similar minor impact to natural resources. Post implementation noise levels for this Proposed Action, which would range from less than 35 to 57 DNL, take into account existing use of the SUA and potential transient activity; and so, direct and indirect effects described in Chapter 4 would be inclusive of ongoing and future use of the proposed SUA. As with ongoing operations, there would be the possibility that a location would be subjected to a low-level overflight and animals beneath such a flight would experience a sudden onset of high level noise.

Aside from aircraft operations, wildlife and special-status species beneath the proposed SUA are subject to both land management activities and conservation efforts on Federal lands managed by NPS, BLM, and USFS, which contribute positively and negatively to the overall effects to species. The Proposed Action would not be expected to result in significant cumulative impacts to natural resources.

5.2.5 Land Management

All of the proposed alternatives would add aircraft activity to expanded and proposed SUA, exposing more land to aircraft noise. While noise levels would be perceptible in most locations beneath airspace, they would be well below the threshold of 65 dB considered to be incompatible with residential and recreational land uses. As stated above in **Section 5.2.2** (Acoustic Environment), noise levels from ongoing Air Force activities that overlap with the proposed areas are included in calculations of noise resulting from the Proposed Action and alternatives. No future activities have been identified that would increase noise above the threshold; therefore, land use patterns would be expected to remain unchanged.

5.2.6 Recreation Resources

The proposed airspace modifications would not alter, prohibit, or otherwise limit the public's access to the recreational areas beneath the MOAs. Other actions affecting airspace or use of the area for aircraft activity would have the same conclusion. The proposed pilot training along with other training activities by other DoD units would generate noise within the MOAs or surrounding areas, which could detract from the public's enjoyment of outdoor recreational areas. Noise levels take in to account existing military aircraft operations within the proposed SUAs; and, changes to the existing noise levels would generally be minimal and would not be expected to result in significant impacts to recreation resources.

5.2.7 Socioeconomics

Baseline socioeconomic conditions described in Chapter 3 are influenced by many factors, including those activities identified in **Table 5.1-1**. Land management activities on public lands, such as cattle grazing,

extractive industry, and recreation contribute to local economies directly and indirectly through creating jobs and influencing spending. Jobs related to agriculture, mining, and recreation are among the most common in all counties beneath airspace. DoD actions, which have often involved construction and relocation of aircraft and personnel, can affect economies by affecting local spending and employment as well as demand for housing and services. The effects of past and ongoing actions are captured in the baseline socioeconomic conditions described in Chapter 3. The Proposed Action and alternatives would not be expected to affect population or housing and would have only minor, but unquantifiable, effects on spending based on potential reduced recreational visitation to National Forests beneath the airspace. Other actions that could detract from the enjoyment of recreational areas and indirectly reduce local spending would have a similar minor impact. Therefore, the Proposed Action is not expected to contribute significant cumulative effects.

5.2.8 Environmental Justice

The Proposed Action and alternatives would not result in significant impacts to any resources that would adversely impact the health or environment of minority or low-income populations living beneath existing or proposed airspace. The past and ongoing activities identified contribute to the baseline conditions against which the impacts of the Proposed Action and alternatives were compared. No ongoing or future activities have been identified that would create impacts that would disproportionately or adversely affect minority or low-income populations.

5.2.9 Safety

Training activities to be conducted in the proposed MOAs would not be expected to create any ground safety issues. While all alternatives would increase use of the SUA, the proposed operations would be similar in nature to the existing operations, would not constitute a novel or increased fire risk, and crash response procedures would remain the same. Likewise, other ongoing or planned military training in the area would adhere to safety regulations, reducing the potential for increased safety risks. However, continued increases in military training activity in the area could slightly increase the number of accidents overall. The safety risk to people under or immediately adjacent to the MOAs resulting from chaff and flare use would be negligible and would not contribute to significant cumulative impacts to safety.

5.2.10 Cultural Resources

The Proposed Action would not be expected to contribute to cumulative impacts to cultural resources. No ground disturbing activities would be proposed, no structural damage to NRHP-listed archaeological or architectural resources would be anticipated, and visual intrusion under any of the alternatives would be minimal and would not cause adverse impacts to the settings of cultural resources underlying the airspace. To date, no known traditional cultural properties have been identified through government-to-government consultation for this EIS. It would be expected that none of the alternatives would impact these resources. Other ongoing or planned training activities would have a similar minimal impact to cultural resources and have or would be coordinated with the SHPO to ensure protection of these resources.

5.2.11 Hazardous Materials

Hazardous materials would be introduced into the environment in the case of an aircraft mishap under any of the ongoing or planned military training activities.Mishap impacts would continue to be mitigated by SOPs that identify potential hazardous materials, protect responding personnel and the environment, and

provide guidelines for the ultimate cleanup and disposal of the crash residues. Therefore, impacts to hazardous materials would be minimal and would not be expected to contribute measurably to cumulative effects.

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6.0 OTHER CONSIDERATIONS REQUIRED BY NEPA

This section addresses irreversible and irretrievable commitments of resources, unavoidable impacts from implementing the Proposed Action, and short-term uses versus long-term productivity based on the technical analyses presented in **Section 4.0**, *Environmental Consequences*.

6.1 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA requires that environmental analyses include identification of any irreversible and irretrievable commitments of resources that would be involved if the Proposed Action is implemented. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and fossil fuel) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

The Proposed Action would be limited to the reconfiguration of existing airspace and establishment of new airspace for current and anticipated future F-16 pilot training; no ground disturbing activities would occur. Training operations would involve consumption of nonrenewable resources, such as jet fuel and material used in defensive countermeasures; however, none of these uses would be expected to significantly decrease the availability of minerals or petroleum resources. With no ground disturbing activities, no irreversible or irretrievable effects are expected for natural, land, or cultural resources.

6.2 UNAVOIDABLE ADVERSE IMPACTS

NEPA requires a description of any significant impacts resulting from implementation of a proposed action, including those that can be mitigated to a less than significant level. Avoidance, minimization, or mitigation of adverse effects to natural, cultural, and other environmental resources are implemented to the greatest extent possible and practicable; however, all impacts may not be completely avoided and/or mitigated. Based on the analysis presented in **Section 4.0**, *Environmental Consequences*, implementing the Proposed Action or alternatives would result in the following unavoidable environmental impacts:

- An aircraft mishap could introduce hazardous materials into the environment; mishap impacts would be mitigated by SOPs that identify potential hazardous materials, protect responding personnel and the environment, and provide guidelines for the ultimate cleanup and disposal of the crash residues.
- Wildfires from flare usage could impact wildlife and their habitat. The risk of wildfires from flare usage would be mitigated by operational constraints, including the prohibition of flares during periods of "Very High" or "Extreme" National Fire Danger Ratings. During periods of "High" fire danger, aircraft would not use flares below 18,000 feet MSL.

Chapter 7 describes the best management practices and mitigation measures under consideration for this Proposed Action.

6.3 RELATIONSHIP BETWEEN SHORT-TERM USE OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Choosing one option may reduce future flexibility in pursuing other options or committing a resource to a certain use may eliminate the possibility for other uses of that resource.

The Proposed Action would be limited to the reconfiguration of existing airspace and establishment of new airspace for current and anticipated future F-16 pilot training; no ground disturbing activities would occur. As such, there would be no short-term construction-related impacts or changes to land use as a result of implementing the Proposed Action. The Proposed Action would irreversibly dedicate energy resources (i.e., fuel for planes) for an extended period of time. These resources would not be available for other uses; however, these impacts would be considered negligible, as the resources associated with the Proposed Action are designated for this particular use.

The majority of activities addressed in this EIS would be categorized as long term actions. For example, although the use of training areas for individual training activities may be of short duration, the affected and proposed airspaces would continue to receive repeated use for the foreseeable future. Wildlife and special-status species inhabiting areas beneath the airspace may be temporarily disturbed by the new aircraft activity; however, noise levels would not be anticipated to exceed 57 DNL. The greatest change in DNL would occur at Loco Hills, New Mexico, where the estimated DNL from aircraft operations would be 56 DNL. While this represents a large change in DNL value from the baseline conditions, it would be near to the 55 DNL threshold set by USEPA for which adverse noise effects would not be expected to occur. Implementation of the Proposed Action is not expected to result in the types of impacts that would reduce environmental productivity, affect biodiversity, or permanently narrow the range of beneficial uses of the environment.

Land use below the affected airspace would experience projected DNL levels well below the 65 DNL threshold for land use restrictions. Additionally, with no ground disturbing activities proposed, cultural resources underlying the airspace would not be affected.

7.0 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

7.1 BEST MANAGEMENT PRACTICES

As a Federal agency, the Air Force must adhere to all Federal laws and regulations as noted throughout this EIS. These laws and regulations have been developed in order to reduce the impact on the environment and ensure public safety. In addition, several best management practices are applicable to the Proposed Action that would minimize, reduce, or avoid potential environmental and safety impacts. A summary of those best management practices of most interest to the public is provided in this section.

- Aircraft Operation and Airspace Management
    - As defined in 14 CFR 91.113, *Right-of-Way Rules*, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft. When there is a rule that gives another aircraft the right-of-way, the pilot shall give way to that aircraft and may not pass over, under, or ahead of it unless well clear. Of particular interest for this Proposed Action:
        - An aircraft in distress has the right-of-way over any other aircraft.
        - A balloon has the right-of-way over any other aircraft.
        - A glider has the right-of-way over jet aircraft[8].
        - An aircraft towing or refueling another aircraft has the right-of-way over other engine-driven aircraft.
    - Life Flights and ambulance flights are always given priority in airspace.
- Protection of public safety
    - As defined in 14 CFR 91.119, *Minimum Safe Altitudes,* aircraft must avoid congested areas of a city, town, or settlement or any open-air assemble of people by 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft. Outside of congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet.
    - Chaff and flares would not be used over populated places.
- Reduce Fire Risks
    - Holloman AFB would not use flares in the proposed airspace during periods of "Extreme" or "Very High" fire danger ratings. During periods of "High" fire danger ratings, flares would not be released below 18,000 feet MSL.
    - Flares would not be released below 2,000 feet AGL under any conditions.

7.2 MITIGATION MEASURES

The purpose of mitigation is to eliminate potential negative impacts of an action on affected resources or to reduce an impact to less than significant. CEQ regulations (40 CFR 1508.20) state that mitigation includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.

[8] Per 14 CFR 91.114, A glider has the right-of-way over an airship, powered parachute, weight-shift-control aircraft, airplane, or rotorcraft. This rule has been paraphrased for this EIS.

- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

Mitigation Measures are specific to the Proposed Action and are developed in coordination with the cooperating agencies and other stakeholders for this EIS. The Air Force will prepare a separate Mitigation Plan that details the specific and legally binding Mitigation Measures for the preferred alternative identified in the ROD. The Mitigation Measures currently under consideration include:

- Aircraft Operation and Airspace Management
    - The Talon High C MOA and Bronco 3 MOA would not be activated at the same time to maintain one of the approach corridors to Roswell International Airport.
    - The Magdalena Airport would not be overflown lower than 2,000 feet AGL within a 3 nm radius.
    - Chaff may not be deployed within 60 nm of radar facilities for El Paso Approach or Albuquerque Center.
    - Vertical obstructions that intrude into the 500 feet AGL floor of the proposed MOAs would be identified on nautical charts.
    - The Air Force would pay for a new radio for the FAA to increase radio coverage of the Roswell-Carlsbad corridor.
- Public Safety
    - The Air Force has a claims program for compensating anyone suffering a loss or damage due to training operations. A record of the amount and type of deployed chaff used in the optimized airspace will be maintained at Holloman AFB indefinitely, or until it is determined that such records are no longer needed to support any damage claims related to chaff.
- Communication
    - Since there are numerous Air Force installations in southern New Mexico using training airspace, in an effort to streamline the complaint process for the public, the Air Force has made arrangements that any complaints concerning aircraft overflights, chaff, and flares in areas east of WSMR should be sent to the Holloman AFB Public Affairs Office and in areas west of WSMR should be sent to the Davis Monthan AFB Public Affairs Office. Those contacts are:
        - Davis Monthan AFB Public Affairs
          Website: https://www.dm.af.mil/Contact-Us/Noise-Concerns/
          Telephone number: 520.228.3407
        - Holloman AFB Public Affairs
          Website: https://www.holloman.af.mil/Contact-Us/
          Telephone number: 575.572.7381
- Protection of noise sensitive and important land resources
    - As defined in the FAA Aeronautical Information Manual, pilots are requested to maintain a minimum altitude of 2,000 feet above the surface of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas, and Scenic Riverways administered by the NPS; National Wildlife Refuges, Big Game Refuges, Game Ranges, and Wildlife Ranges administered by the USFWS; and Wilderness and Primitive Areas administered by the USFS.

- The floor of the Smitty MOA in the western corner would continue to be 1,600 feet AGL.

Additional specific Mitigation Measures may be developed during consultations with regulatory agencies for certain affected resources. Mitigation Measures as a result of these consultations will be included once consultations are complete. Ongoing consultations for this Proposed Action include the following:

NHPA. Federal agencies must take into account the effects of their undertakings on historic properties and seek to avoid, minimize, or mitigate adverse effects to these properties (36 CFR 800.1(a)). Section 106 also requires agencies to consult with federally-recognized Indian tribes and other stakeholders with a vested interest in the undertaking. Consultation with the New Mexico and Arizona SHPOs and government-to-government consultation with federally-recognized Indian Tribes and Pueblos has been initiated in accordance with Section 106 of NHPA. To date, neither SHPO has provided a concern about the Proposed Action or indicated that historic resources would be impacted. Similarly, none of the Indian tribes or Pueblos have indicated a concern about the Proposed Action. See **Appendix J** (NHPA and NAGPRA Consultation Correspondence) for copies of NHPA of consultation correspondence.

ESA, MBTA, and BGEPA. Federal agencies must consult with USFWS if they determine their actions may affect: a species listed under the ESA; migratory birds, nests, or eggs; or Bald or Golden eagles. Consultation with USFWS has been initiated for the project (Consultation Codes: AZ - 02EAAZ00-2019-SLI-0001; NM - 02ENNM00-2019-SLI-0001). A Biological Assessment is being prepared for this action and will be provided to USFWS for concurrence. **Appendix H** (USFWS Consultation Correspondence) provides copies of the consultation correspondence.

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Chapter 6: Other Considerations Required by NEPA

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Chapter 7: Best Management Practices and Mitigation Measures

No references are provided in this section.

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APPENDIX A
NOTICE OF INTENT

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40572 Federal Register / Vol. 82, No. 164 / Friday, August 25, 2017 / Notices

ACTION: Notice of intent to issue an exclusive patent license.

SUMMARY: Pursuant to the provisions of agency regulations, the Department of the Air Force announces its intention to grant Sensible Spreader Technologies, LLC, a corporation of New Hampshire having a place of business at 844 Elm Street, Manchester, New Hampshire 03101, an exclusive license in any right, title and interest the United States Air Force has in: In U.S. Patent 8,428,993 entitled ''Method and Apparatus for Risk Identification and Mitigation in Shift Work Fatigue'', issued on April 23, 2013.

FOR FURTHER INFORMATION CONTACT: An exclusive license for this patent will be granted unless a written objection is received within fifteen (15) days from the date of publication of this Notice. Written objections should be sent to: Air Force Research Laboratory, Office of the Staff Judge Advocate, AFRL/RIJ, 26 Electronic Parkway, Rome, New York 13441–4514. Telephone: (315) 330–2087; Facsimile (315) 330–7583.

Henry Williams,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2017–18053 Filed 8–24–17; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for the Special Use Airspace Optimization Project, Holloman Air Force Base, New Mexico

AGENCY: Department of the Air Force, DOD.

ACTION: Notice of intent.

The U.S. Air Force is issuing this notice of intent (NOI) (40 CFR 1508.22) to advise the public of its intent to prepare an Environmental Impact Statement (EIS) to assess the potential environmental consequences associated with modifying existing or creating new special use airspace (SUA), and relinquishing to the National Airspace System (NAS) SUA incompatible for today's Air Force mission. SUA used by Holloman Air Force Base (AFB) dates back more than 30 years ago and was designed to support different aircraft with significantly different mission profiles and performance characteristics than the current aircraft (F–16C/D) flown at Holloman AFB. Optimizing Air Force controlled SUA would provide the scheduling flexibility necessary to conduct multiple, simultaneous training missions needed by the aircrews stationed at Holloman AFB, New Mexico to meet the pilot initial qualification training requirements. Two action alternatives identified as meeting the purpose and need for this proposed action will be analyzed in the EIS. Alternative 1 would reconfigure and expand the existing Talon Military Operations Area (MOA) and associated Air Traffic Control Assigned Airspace (ATCAA). Alternative 2 would modify the existing Cato/Smitty MOA/ATCAA and create a new Lobos MOA to the west of White Sands Missile Range. Each alternative includes aircraft activity down to 500 feet above ground level (AGL), supersonic activity at or above 30,000 feet mean sea level (MSL), and the use of defensive chaff and flares within certain parameters. The resulting SUA would provide adequate volumes of SUA to allow for more efficient and simultaneous training activities that currently occur disjointedly throughout several airspace areas in New Mexico and return sub-optimal airspace to the NAS for use by the public.

A No Action Alternative will be included in the EIS, whereby aircrews at Holloman AFB would continue to utilize existing SUA as it is currently configured. Aircrews would continue to be limited to SUA that was developed for legacy aircraft more than 30 years ago and does not have the optimum volume, proximity to the installation, availability, or other attributes to efficiently support the Holloman AFB flying mission. The analysis of the No Action Alternative will provide a benchmark to enable Air Force decision-makers to compare the magnitude of the environmental effects of the proposed action.

Scoping and Agency Coordination: To effectively define the full range of issues and alternatives to be evaluated in the EIS, the Air Force will determine the scope of the analysis by soliciting comments from interested local, state and federal elected officials and agencies, as well as interested members of the public and others. The public and interested parties can submit their comments through the project Web site *www.HollomanAFBAirspaceEIS.com,* by mailing comments to Holloman Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666, or by attending one of the public meetings. The Air Force will also pursue government-to-government consultations with interested Native American tribes and pueblos.

Public Meeting Dates and Locations: Public scoping meetings will be held in Carlsbad, Truth or Consequences and Las Cruces, New Mexico at the following dates, times, and locations:

Tuesday, September 12, 2017, 6:00 p.m. to 8:00 p.m., Carlsbad Public Library, 101 S. Halagueno Street, Carlsbad, NM 88220.

Wednesday, September 13, 2017, 6:00 p.m. to 8:00 p.m., Truth or Consequences Civic Center, Ralph Edwards Auditorium, 400 W. 4th Avenue, Truth or Consequences, NM 87901.

Thursday, September 14, 2017, 6:00 p.m. to 8:00 p.m., Hilton Garden Inn, 2550 S. Don Roser Dr., Las Cruces, NM 88001.

Although comments can be submitted to the Air Force any time during the EIS process, scoping comments are requested by September 25, 2017 to ensure full consideration in the draft EIS.

SUPPLEMENTARY INFORMATION: The Air Force has preliminarily identified two broad alternatives to optimize existing training airspace at Holloman AFB. While the alternatives are independent of each other, the decision-maker may choose to implement one, both, or none of the alternatives based on the analysis provided in the EIS.

Alternative 1 would evaluate an expansion to the east of Holloman AFB of the Talon MOA and associated ATCAA. The Talon MOA is located in the vicinity of Carlsbad, New Mexico and covers approximately 1,848 square nautical miles. Under this alternative, the dimensions of the existing MOA/ATCAA would be expanded approximately 1,375 square nautical miles generally to the east. The floor of the MOA would be raised to 500 feet AGL from the current 300 feet AGL. Training within the expanded MOA/ATCAA would include supersonic flight at or above 30,000 feet and use of chaff and flares above 2,000 feet AGL.

Alternative 2 would evaluate the area west of Holloman AFB and White Sands Missile Range for reconfiguring and expanding the Cato/Smitty MOA and associated ATCAA and/or creating a new Lobos MOA/ATCAA. The Cato/Smitty MOA is located in the vicinity of Truth or Consequences, New Mexico and covers approximately 2,680 square nautical miles. Under this alternative, the dimensions of the Cato/Smitty MOA would be reconfigured and expanded to the southeast. Reconfiguring this MOA would result in returning the northern portion of the existing Cato/Smitty MOA back to the NAS. The new Lobos MOA/ATCAA would be created south of the reconfigured Cato/Smitty MOA and west of White Sands Missile Range. The proposed floor of the reconfigured

Cato/Smitty MOA and the new Lobos MOA would be 500 feet AGL (2,000 feet AGL over designated wilderness areas as currently observed). Training within the reconfigured and expanded Cato/Smitty and new Lobos MOAs would include supersonic flight above 30,000 feet and use of chaff and flares above 2,000 feet AGL.

FOR FURTHER INFORMATION CONTACT: For questions regarding the proposed action, scoping, and EIS development, contact Holloman AFB Public Affairs Office, at (575) 572–7383 or at: *49WG.PAOffice@us.af.mil.*

Henry Williams,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2017–18069 Filed 8–24–17; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Air Force

U.S. Air Force Scientific Advisory Board; Notice of Meeting

AGENCY: Air Force Scientific Advisory Board, Department of the Air Force.

ACTION: Meeting notice.

SUMMARY: The United States Air Force Scientific Advisory Board plans to hold its Fall Board meeting on September 20, 2017. A Portion of this meeting will be open to the public.

DATES: The meeting date is September 20, 2017, from 8:00 a.m. to 5:00 p.m.

ADDRESSES: The CENTRA Conference Center, 4121 Wilson Blvd., Suite 200, Arlington, VA 22203.

FOR FURTHER INFORMATION CONTACT: The Scientific Advisory Board meeting organizer, Major Mike Rigoni at *michael.j.rigoni.mil@mail.mil* or 703–695–4297, United States Air Force Scientific Advisory Board, 1500 West Perimeter Road, Ste. #3300, Joint Base Andrews, MD 20762.

SUPPLEMENTARY INFORMATION: Under the provisions of the Federal Advisory Committee Act of 1972 (5 U.S.C., Appendix, as amended), the Government in the Sunshine Act of 1976 (5 U.S.C. 552b, as amended), and 41 CFR 102–3.150, the Department of Defense announces the United States Air Force (USAF) Scientific Advisory Board (SAB) Fall Board meeting will take place on 20 September 2017 at the The CENTRA Conference Center, located at 4121 Wilson Blvd., Suite 200, Arlington, VA 22203. The purpose of this Air Force Scientific Advisory Board quarterly meeting is to welcome new members, prepare for Science and Technology Reviews of the Air Force Research Laboratory, and apportion time for Air Force senior leaders to brief the SAB on their most vital S&T issues. The meeting will occur from 8:00 a.m.–5:00 p.m. on Wednesday, 20 September 2017. The session that will be open to the *general public* will be held from 8:00 a.m. to 9:00 a.m. on 20 September 2017. In accordance with 5 U.S.C. 552b, as amended, and 41 CFR 102–3.155, a number of sessions of the Air Force Scientific Advisory Board Fall Board meeting will be closed to the general public because they will discuss classified information and matters covered by Section 552b of Title 5, United States Code, subsection (c), subparagraph (1).

Any member of the public that wishes to attend this meeting or provide input to the Air Force Scientific Advisory Board must contact the Scientific Advisory Board meeting organizer at the phone number or email address listed in this announcement at least five working days prior to the meeting date. Please ensure that you submit your written statement in accordance with 41 CFR 102–3.140(c) and section 10(a)(3) of the Federal Advisory Committee Act. Statements being submitted in response to the agenda mentioned in this notice must be received by the Scientific Advisory Board meeting organizer at least five calendar days prior to the meeting commencement date. The Scientific Advisory Board meeting organizer will review all timely submissions and respond to them prior to the start of the meeting identified in this notice. Written statements received after this date may not be considered by the Scientific Advisory Board until the next scheduled meeting.

Henry Williams,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2017–18060 Filed 8–24–17; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Department of the Air Force

U.S. Air Force Exclusive Patent License

AGENCY: Air Force Research Laboratory Information Directorate, Department of the Air Force, DOD.

ACTION: Notice of intent to issue an exclusive patent license.

SUMMARY: Pursuant to the provisions of agency regulations, the Department of the Air Force announces its intention to grant The Curators of the University of Missouri, a public corporation of Missouri having a place of business at the Office of Technology Management and Industry Relations, 1601 S. Providence Road, #124, Columbia, Missouri 65211, an exclusive license in any right, title and interest the United States Air Force has in: In U.S. Patent Application No. 14/982,030 entitled ''Method for Fast Camera Pose Refinement for Wide Area Motion Imagery'', filed December 19, 2015.

FOR FURTHER INFORMATION CONTACT: An exclusive license for this patent will be granted unless a written objection is received within fifteen (15) days from the date of publication of this Notice. Written objections should be sent to: Air Force Research Laboratory, Office of the Staff Judge Advocate, AFRL/RIJ, 26 Electronic Parkway, Rome, New York 13441–4514. Telephone: (315) 330–2087; Facsimile (315) 330–7583.

Henry Williams,

Acting Air Force Federal Register Liaison Officer.

[FR Doc. 2017–18052 Filed 8–24–17; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF DEFENSE

Office of the Secretary

Government-Industry Advisory Panel; Notice of Federal Advisory Committee Meeting

AGENCY: Office of the Under Secretary of Defense (Acquisition, Technology, and Logistics), Department of Defense (DoD).

ACTION: Federal advisory committee meeting notice.

SUMMARY: The Department of Defense is publishing this notice to announce the following Federal advisory committee meeting of the Government-Industry Advisory Panel. This meeting is open to the public.

DATES: The meetings will be held from 9:00 a.m. to 5:00 p.m. on Wednesday and Thursday, September 6 and 7, 2017. Public registration will begin at 8:45 a.m. on each day. For entrance into the meeting, you must meet the necessary requirements for entrance into the Pentagon. For more detailed information, please see the following link: *http://www.pfpa.mil/access.html.*

Teleconference and direct connect information will be provided by the Designated Federal Officer and support staff at the contact information in the **FOR FURTHER INFORMATION CONTACT** section.

ADDRESSES: Pentagon Library, Washington Headquarters Services,

APPENDIX B
SCOPING AND COORDINATION LETTERS

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B1: MEMBERS OF CONGRESS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Senator John McCain
218 Russell Senate Office Building
Washington, DC 20510

Dear Senator McCain:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on August 24, 2017, initiating the public involvement process. Open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given. Please attend at your convenience.

Tuesday September 12, 2017 6:00 PM to 8:00 PM Carlsbad Public Library 101 S. Halagueno Street Carlsbad, NM 88220	Wednesday, September 13, 2017 6:00 PM to 8:00 PM Truth or Consequences Civic Center Ralph Edwards Auditorium 400 W. 4th Avenue Truth or Consequences, NM 87901	Thursday, September 14, 2017 6:00 PM to 8:00 PM Hilton Garden Inn 2550 S Don Roser Drive Las Cruces, NM 88011

We request your participation and solicit your comments on the Proposed Action. Though comments will be accepted throughout the EIS process, please provide your comments no later than September 25, 2017 to ensure consideration in the Draft EIS. Comments may be submitted at any of the public meetings; on the project website, www.HollomanAFBAirspaceEIS.com; or in writing to: Holloman AFB Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Senator Jeff Flake
413 Russell Senate Office Building
Washington, DC 20510

Dear Senator Flake:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Senator Martin Heinrich
303 Hart Senate Office Building
Washington, DC 20510

Dear Senator Heinrich:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Senator Tom Udall
531 Hart Senate Office Building
Washington, DC 20510

Dear Senator Udall

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

115th US House District
Representative Tom O'Halleran
211 N. Florence St
Casa Grande, AZ 85122

Dear Representative O'Halleran:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

115th US House District
Representative Martha McSally
4400 E. Broadway Blvd
Tuscon, AZ 85711

Dear Representative McSally:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

115th US House District
Representative Michelle Lujan Grisham
400 Gold Avenue SW
Albuquerque, NM 87102

Dear Representative Grisham:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

115th US House District
Represenative Steve Pearce
570 N Telshor Blvd
Las Cruces, NM 88011

Dear Represenative Pearce:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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COMBAT AIRPOWER STARTS HERE

B2: STATE ELECTED OFFICIALS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

State of Arizona
Governor Doug Ducey
1700 W Washington St
Phoenix, AZ 85007

Dear Governor Ducey:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

COMBAT AIRPOWER STARTS HERE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

State of New Mexico
Governor Susana Martinez
490 Old Santa Fe Trail
Room 400
Santa Fe, NM 87501

Dear Governor Martinez

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base H(AFB), New Mexico. Some of the training airspaces used by aircraft assigned to HAFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at HAFB. The Proposed Action would increase efficiencies and provide some scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

AZ House District 14
Representative Becky A. Nutt
1700 W Washington St
Room 122
Phoenix, AZ 85007

Dear Representative Nutt

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (HAFB), New Mexico. Some of the training airspaces used by aircraft assigned to HAFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at HAFB. The Proposed Action would increase efficiencies and provide scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

AZ House District 14
Representative Drew John
1700 W Washington St
Room 342
Phoenix, AZ 85007

Dear Representative John

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (HAFB), New Mexico. Some of the training airspaces used by aircraft assigned to HAFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at HAFB. The Proposed Action would increase training efficiencies and provide scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

AZ Senate District 14
Representative Gail Griffin
1700 W Washington St
Room 213
Phoenix, AZ 85007

Dear Representative Griffin

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (HAFB), New Mexico. Some of the training airspaces used by aircraft assigned to HAFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at HAFB. The Proposed Action would increase training efficiencies and provide scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM House District 32
Representative Candie G. Sweetser
10520 Hermanas Road SW
Deming, NM 88030

Dear Representative Sweetser

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM House District 38
Representative Rebecca Dow
806 Sierra Vista
Truth or Consequences, NM 87901

Dear Representative Dow

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (HAFB), New Mexico. Some of the training airspaces used by aircraft assigned to HAFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at HAFB. The Proposed Action would increase training efficiencies and provide scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM House District 49
Representative Gail Armstrong
P.O. Box326
Magdalena, NM 87825

Dear Representative Armstrong

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM House District 54
Representative James G. Townsend
69 W. Compress Rd.
Artesia, NM 88210

Dear Representative Townsend:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM House District 66
Representative Bob Wooley
4504 Verde Drive
Roswell, NM 88201

Dear Representative Wooley:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM Senate District 28
Representative Howie C. Morales
4285 Swan Street
Silver City, NM 88061

Dear Representative Morales:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Commander

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM Senate District 34
Representative Ron Griggs
2704 Birdie Loop
Alamogordo, NM 88310

Dear Representative Griggs:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

NM Senate District 35
Representative John Arthur Smith
Box 998
Deming, NM 88031

Dear Representative Smith:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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B3: COUNTY ELECTED OFFICIALS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Graham County
Terry Cooper
County Manager
921 Thatcher Blvd.
Safford, Arizona 85546

Dear Mr. Cooper:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Graham County Board of Supervisors
Danny Smith
Chairman
921 Thatcher Blvd.
Safford, Arizona 85546

Dear Chairman Smith:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Greenlee County
Deborah Kay Gale
County Administrator
253 Fifth St.
PO Box 908
Clifton, Arizona 85533

Dear Ms. Gale:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Greenlee County Board of Supervisors
David Gomez
Chairman
253 Fifth St.
PO Box 908
Clifton, Arizona 85533

Dear Chairman Gomez:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Catron County
Kate Fletcher
County Manager
PO Box 507
Reserve, New Mexico 87830

Dear Ms. Fletcher:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Catron County Commissioners
Glyn Griffin
Chairman
PO Box 786
Reserve, New Mexico 87830

Dear Chairman Griffin:

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Chaves County
Stanton Riggs
County Manager
1 St. Mary's Place
Roswell, New Mexico 88203

Dear Mr. Riggs:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Chaves County Commissioners
Robert Corn
Chairman
1 St. Mary's Place
Roswell, New Mexico 88203

Dear Chairman Corn:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Eddy County
Rick Rudometkin
County Manager
101 West Greene Street
Suite 110
Carlsbad, New Mexico 88220

Dear Mr. Rudometkin:

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Commander

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Eddy County Commissioners
Stella Davis
Chairwoman
101 West Greene Street
Carlsbad, New Mexico 88220

Dear Ms. Davis:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Grant
Charlene Webb
County Manager
1400 Highway 180 East
PO Box 898
Silver City, New Mexico 88061

Dear Ms. Webb:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Grant County Commissioners
Brett Kasten
Chairman
1400 Highway 180 East
PO Box 898
Silver City, New Mexico 88061

Dear Chairman Kasten:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Hidalgo County
Bob Hill
County Manager
305 Pyramid St.
Lordsburg, New Mexico 88045

Dear Mr. Hill:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Hidalgo County Commissioners
Marianne Stewart
Chairwoman
305 Pyramid St.
Lordsburg, New Mexico 88045

Dear Chairwoman Stewart:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Otero County
Pamela Heltner
County Manager
1101 New York Avenue
Alamogordo, New Mexico 88310

Dear Ms. Heltner:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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COMBAT AIRPOWER STARTS HERE

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Otero County Commissioners
Susan Flores
Chairwoman
1101 New York Avenue
Alamogordo, New Mexico 88310

Dear Chairwoman Flores:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Sierra County
Bruce Swingle
County Manager
855 Van Patten
Truth or Consequences, New Mexico 87901

Dear Mr. Swingle:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Sierra County Commissioners
Kenneth Lyon
Chairman
855 Van Patten
Truth or Consequences, New Mexico 87901

Dear Chairman Lyon:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Socorro County
Delilah Walsh
Chairwoman
210 Park Street
PO Box 1
Socorro, New Mexico 87801

Dear Chairwoman Walsh:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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101 S. Halagueno Street	Ralph Edwards Auditorium	2550 S Don Roser Drive
Carlsbad, NM 88220	400 W. 4th Avenue	Las Cruces, NM 88011
	Truth or Consequences, NM 87901	

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Socorro County Commissioners
Pauline Jaramillo
Chairwoman
210 Park Street
PO Box 1
Socorro, New Mexico 87801

Dear Chairwoman Jaramillo:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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B4: CITY ELECTED OFFICIALS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

City of Truth or Consequences
Mayor Steve Green
505 Sims
Truth or Consequences, NM 87901

Dear Mayor Green:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

City of Carlsbad
Mayor Dale Janway
101 N. Halagueno
Carlsbad, NM 88221

Dear Mayor Janway:

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

City of Las Cruces
Mayor Ken Miyagishima
700 North Main
Las Cruces, NM 88001

Dear Mayor Miyagishima:

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

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B5: MILITARY STAKEHOLDER

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Major General Michael McGuire
The Adjutant General
Department of Emergency and Military Affairs
5636 E. McDowell Rd.
Phoenix, AZ 85008

Dear Major General McGuire

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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COMBAT AIRPOWER STARTS HERE

Sincerely,



HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Brigadier General Andrew Salas
The Adjutant General
Joint Forces Headquarters
ATTN: 47 Bataan Blvd.
Santa Fe, NM 87508

Dear Brigadier General Salas

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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COMBAT AIRPOWER STARTS HERE

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Sincerely,

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Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Brigadier General Eric L. Sanchez
100 Headquarters Ave
WSMR, NM 88002

Dear Brigadier General Sanchez

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

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Sincerely,

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Commander

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B6: GENERAL DISTRIBUTION MEMORANDUM

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

MEMORANDUM FOR DISTRIBUTION

FROM: 49 WG/CC
490 First Street, Stuie 1700
Holloman AFB NM 88330-8277

SUBJECT: Environmental Impact Statement (EIS) for Special Use Airspace Optimization, Holloman Air Force Base (AFB), New Mexico

1. The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB, New Mexico. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago. This airspace does not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment).

2. The environmental analysis for the Proposed Action is being conducted by the Air Force Civil Engineer Center in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended. The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on August 24, 2017, initiating the public involvement process. Open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given. Please attend at your convenience.

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3. We request your participation and solicit your comments on the Proposed Action. Though comments will be accepted throughout the EIS process, please provide your comments no later than September 25, 2017 to ensure consideration in the Draft EIS. Comments may be submitted at any of the public meetings, on the project website, www.HollomanAFBAirspaceEIS.com, or in writing to: Holloman AFB Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, Virginia (VA) 23666. My point of contact for this project is Ms. Robin Divine. She may be reached at (210) 925-2730, robin.divine@us.af.mil. Thank you for your assistance in this matter.

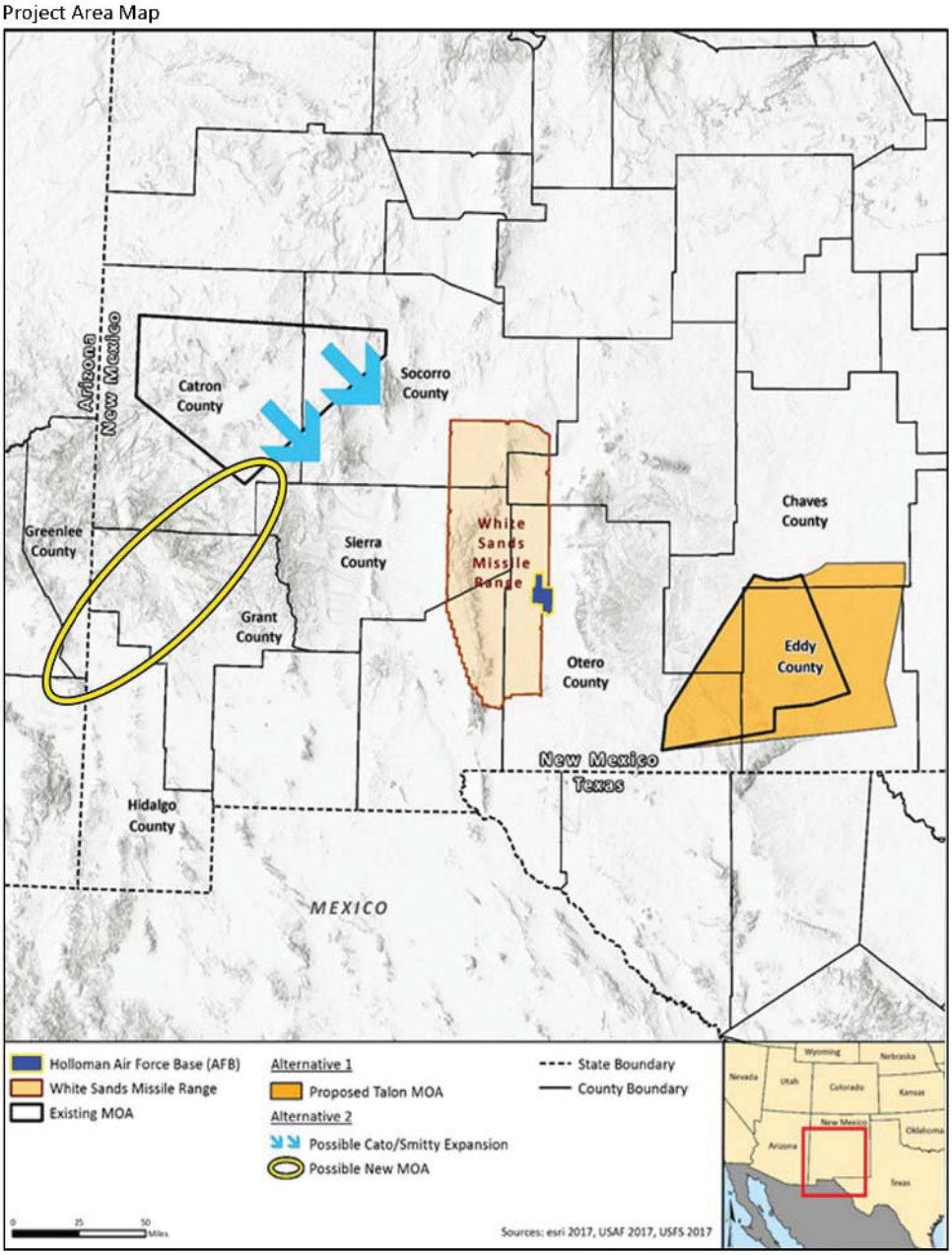
HOUSTON R. CANTWELL
Colonel, USAF
Commander, 49th Wing

1 Attachment: Project Area Map

Combat Airpower Starts Here

Attachment 1

Project Area Map



DISTRIBUTION LIST
General Memorandum Coordination Letter - Scoping

Organization	Point of Contact	
Environmental Protection Agency, Region 6	Ron Curry	*
Environmental Protection Agency, Region 9	Alexis Strauss	*
Apache-Sitgreaves National Forest	Steve Best	*
Cibola National Forest	Elaine Kohrman	*
Gila National Forest	Adam Mendonca	*
Gila National Forest	Black Range Ranger District	*
Gila National Forest	Silver City Ranger District	*
Lincoln National Forest	Travis Moseley	*
Lincoln National Forest	Guadalupe District	*
Carlsbad Caverns National Park	Headquarters	*
Bureau of Reclamation	Albuquerque Office	*
Bureau of Reclamation, Lake Avalon Dam	Jennifer Faler	*
Bureau of Reclamation, Lower Colorado Region	Terry Fulp	*
Bureau of Land Management, State Office	Amy Lueders	*
Bureau of Land Management, Las Cruces District	Bill Childress	*
Bureau of Land Management, Pecos District	Jim Stovall	*
Bureau of Land Management, Roswell Field Office	Chuck Schmidt	*
Bureau of Land Management, Carlsbad Field Office	Kari Vasenden	*
Bureau of Land Management, Socorro Field Office	Mark Matthews	*
New Mexico Environment Department	Office of the Secretary	*
Arizona Department of Environmental Quality	Misael Cabrera	*
Arizona Game and Fish	Larry Voyles	*
New Mexico State Parks	Energy, Minerals, and Natural Resources Department	*
Brantley Lake State Park	Leila Haver	*
Living Desert Zoo and Gardens	David Heckard	*
Elephant Butte Lake State Park	Kay Dunlap	*
Caballo Lake State Park	Saul Baquera	*
Other Stakeholders		
National Business Aviation Association	Heidi Williams	*
Airlines for America	Headquarters	*
Aircraft Owners and Pilots Association	Rune Duke	*
Alamogordo White Sands Regional Airport	Jim Talbert	*
Albuquerque International Sunport	Jim Hinde	*
Artesia Municipal Airport	Lance Goodrich	*
Beaverhead Airstrip	Robert Madell	*
Cavern City Air Terminal	Sherri Chandler	*
Deming Municipal Airport	Wes Hooper	*
Glenwood-Catron County Airport	Kate Fletcher	*
Grant County Airport	Justin Reese	*
Greenlee County Airport	Phil Ronnerud	*
Jewett Mesa Airport	Robert Madill	*
Magdalena Airport	Ambers Guin	*
Reserve Airport	Glyn Griffin	*
Roswell International Air Center Airport	Jennifer Brady	*
Sierra Blanca Regional Airport	David Pearce	*
Socorro Municipal Airport	Jay Santillanes	*

DISTRIBUTION LIST
General Memorandum Coordination Letter - Scoping

Organization	Point of Contact	
Truth or Consequences Municipal Airport	Bill Slettom	*
Whiskey Creek Airport	Brandon Crisp	*

Note: * Sent the General Distribution Letter

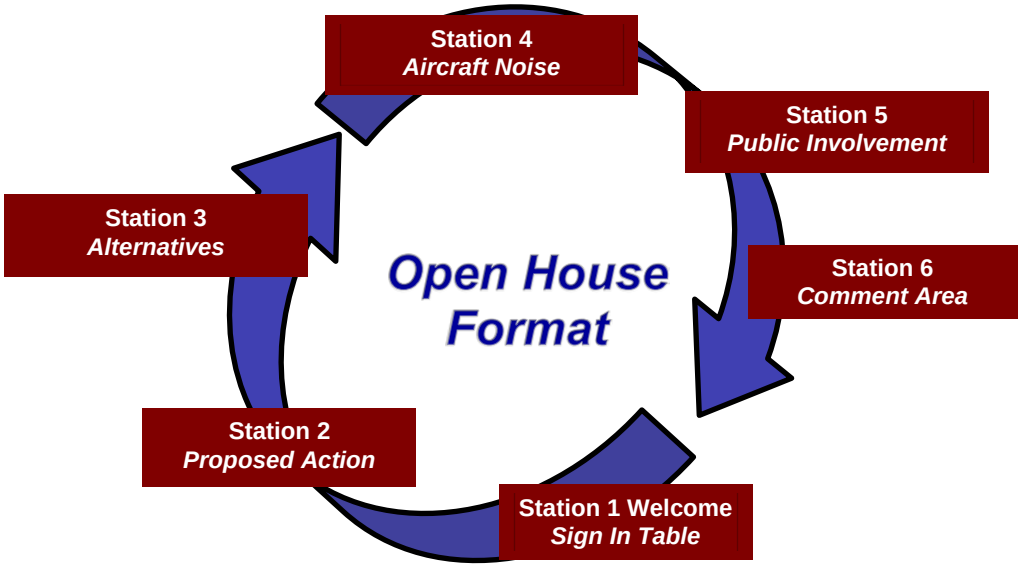
APPENDIX C
PUBLIC INVOLVEMENT

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Environmental Impact Statement for Special Use Airspace Optimization at Holloman Air Force Base, New Mexico

FACT SHEET

The United States (U.S.) Air Force is proposing optimization of special use airspace for Initial Qualification Training of F-16 pilots at Holloman Air Force Base (AFB). To solicit public comments on the proposal, the U.S. Air Force is conducting open house meetings. Attending these meetings and providing comments enables the public to identify issues and concerns for the U.S. Air Force to use in defining the scope of environmental analysis. The meetings, conducted in an open house format without formal presentations, offer poster stations set up throughout the room with pertinent information related to the proposal and alternatives. You are invited and encouraged to speak with any of the U.S. Air Force representatives, ask questions about any concerns, and provide your comments during the open house any time between 6:00 and 8:00 p.m.



The Environmental Impact Analysis Process

On August 25, 2017, the U.S. Air Force initiated scoping by publishing a Notice of Intent (NOI) in the Federal Register. Comments received during the scoping period, along with agency coordination and tribal consultation, will guide analysis and various studies; all of which contribute to preparation of the Draft Environmental Impact Statement (EIS).

Once completed, the Draft EIS is published with its availability announced in the Federal Register and local newspapers. This initiates the official 45-day public comment period for the Draft EIS. At that time, copies of the Draft EIS are sent to federal, state, and local agencies, American Indian Tribes and Pueblos, and to those individuals who have requested a copy. The Draft EIS is also made available at local libraries and on the internet at the project website at: www.HollomanAFBAirspaceEIS.com. Approximately 3 weeks following the Draft EIS publication, the U.S. Air Force will hold hearings where the public will have another opportunity to provide comments and express any concerns about the analyses and findings presented in the document.

Following the 45-day public comment period, the U.S. Air Force will evaluate all substantive comments and address them in the Final EIS. Completion and availability of the Final EIS will be announced in the Federal Register and local newspapers. Copies will be distributed in the same manner as the Draft EIS. After a 30-day waiting period, the U.S. Air Force will make an informed decision on the proposal to optimize training airspace in the vicinity of Holloman AFB, New Mexico. This decision will be documented in a Record of Decision.

Why is Scoping Important?

The U.S. Air Force, like other federal agencies, uses scoping as just one of the tools to obtain public input during the environmental impact analysis process. Public input ensures the U.S. Air Force makes informed decisions about its actions that could potentially affect the environment. The substantive comments received during the scoping period help to identify issues for analysis and to guide the preparation of the Draft EIS.

Although comments are accepted throughout the environmental impact analysis process, the U.S. Air Force encourages submitting comments no later than September 25, 2017 to ensure comments are given full consideration in the Draft EIS.



[1]Indicates opportunities for public involvement

Public Scoping Period

Scoping meetings are being held in Carlsbad, Truth or Consequences, and Las Cruces, New Mexico on the dates and at the locations indicated below:

Tuesday, September 12, 2017	Wednesday, September 13, 2017	Thursday, September 14, 2017
Carlsbad Public Library	Ralph Edwards Auditorium Civic Center	Hilton Garden Inn Las Cruces
101 S. Halagueno Street	400 W. 4th Avenue	2550 S. Don Roser Drive
Carlsbad, NM 88220	Truth or Consequences, NM 87901	Las Cruces, NM 88001

The public has several ways to provide comments: by attending a scoping meeting and filling out a comment sheet, visiting the project website at: www.HollomanAFBAirspaceEIS.com and electronically submitting comments, or by sending them via U.S. Postal service to: Holloman AFB EIS, c/o Cardno, 501 Butler Farm Road, Suite H, Hampton, VA 23666. For more information, please contact Holloman AFB Public Affairs Office/Mr. Tommy Fuller at (575) 572-1831 ext. 5406; or tommy.fuller@us.af.mil.

Again, to ensure full consideration in the Draft EIS, please submit comments by September 25, 2017.

Welcome

to the Public Meeting for Environmental Impact Statement for Special Use Airspace Optimization Holloman Air Force Base, New Mexico









Public Meetings are being held from 6:00 p.m. to 8:00 p.m. in the following locations:

Tuesday, September 12, Carlsbad, NM

Wednesday, September 13, Truth or Consequences, NM

Thursday, September 14, Las Cruces, NM

Environmental Impact Statement for Special Use Airspace Optimization Project at Holloman Air Force Base, New Mexico

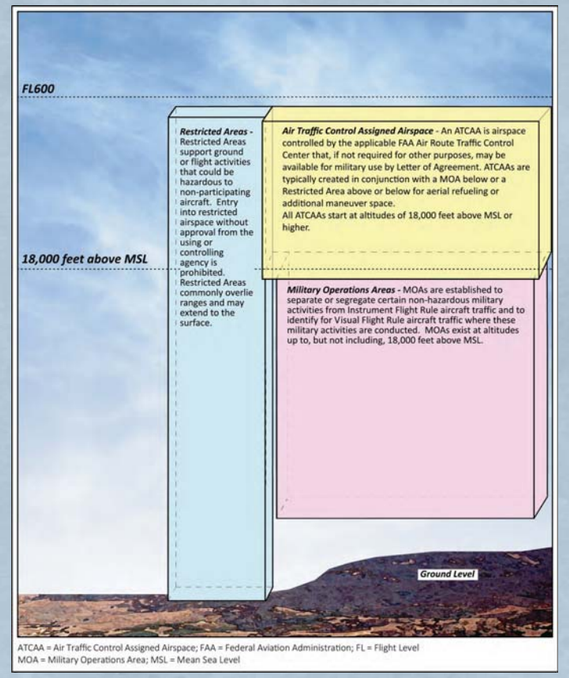
Special Use Airspace (SUA) Utilized by Holloman AFB

Special Use Airspace (SUA) Utilized by Holloman AFB

Holloman AFB completes Initial Qualification Training (IQT) for nearly 300 F-16 pilots annually. The training syllabus requires that pilots be trained using a specific sequence of mission types resulting in less scheduling flexibility than training for pilots assigned to operational units.

IQT requires use of SUA with specific dimensions (area and altitudes). Dimensions are determined by the type of mission being flown and the number of individual aircraft to be flown simultaneously. Competing demands for the use of SUA in the vicinity of Holloman AFB results in training delays. These delays disrupt the progress of the trainees and could result in the inability to complete the IQT program in a timely manner.

IQT missions occur in either a Military Operations Area (MOA) with an overlying Air Traffic Control Assigned Airspace or within a Restricted Area. No changes to Restricted Areas are proposed. MOAs do not limit use by civilian aircraft flying using visual flight rules but alert pilots to be aware of military training in the area.



Types of Training Airspace

Proposed Action

Holloman AFB needs to modify the existing SUA so it fully supports today's aircraft and training requirements. The existing airspace that was developed for legacy aircraft more than 30 years ago does not have the optimum volume, proximity, configuration, or attributes needed to support the current training mission.

Under the Proposed Action, modifications to MOAs would occur, new airspace would be created, and some airspace would be returned to the National Airspace System.

Proposed Aircraft Operations

Up to 10,000 annual sorties are proposed in the modified MOA. Training that includes the use of live ordnance would not change; it will continue to occur in the Restricted Areas currently available and will not be covered in the EIS.

Supersonic flights are those that exceed the speed of sound. F-16 aircraft would employ supersonic flight above Flight Level (FL) 300 (approximately 30,000 feet above mean sea level) during some IQT sorties.

Proposed Operations

	Day (number/percent)	Night (number/percent)	Total	Supersonic
Annual Sorties	9,000 (90%)	1,000 (10%)	10,000	1,000 (10%)

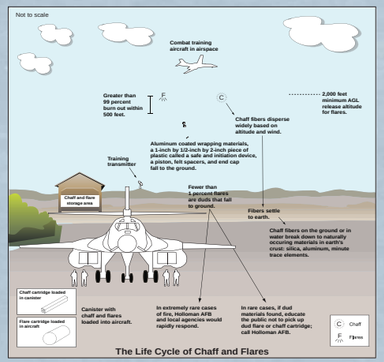
Note: A sortie consists of a single aircraft from takeoff to landing.

Proposed Use of Chaff and Flares

Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by the enemy's air defense systems. A bundle of chaff consists of approximately five million fibers that are cut to reflect radar signals. When released from aircraft the fibers form an electronic "cloud" that breaks the radar signal and temporarily hides the aircraft from radar detection. Flares provide high-temperature heat sources that mislead heat-sensitive or heat-seeking targeting systems. Flares burn for three to four seconds at a temperature in excess of 2,000 degrees Fahrenheit. F-16 aircraft would utilize up to 15,360 each of chaff and flare annually within the proposed airspace.

Proposed Chaff and Flare Use

	Chaff	Flare
Annual Use	15,360	15,360



For more information, please visit the project website at: www.HollomanAFBAirspaceEIS.com

Environmental Impact Statement for Special Use Airspace Optimization Project at Holloman Air Force Base, New Mexico

Alternatives

Alternative Identification Process

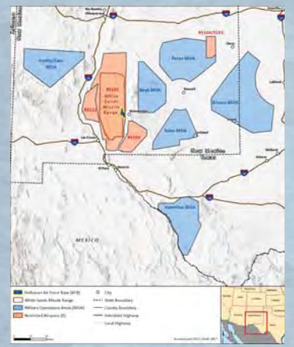
The Air Force developed a set of selection standards for the screening and identification of possible SUA that could be modified in order to optimize IQT training in the vicinity of Holloman AFB. Alternatives carried forward met the following criteria:

- Utilize Air Force Scheduled Airspace
- Maximize Training Time/Minimize Transit Time
- Required Airspace Size and Configuration
- Limit Impacts to Civil Aviation

Summary of Alternative Screening Analysis

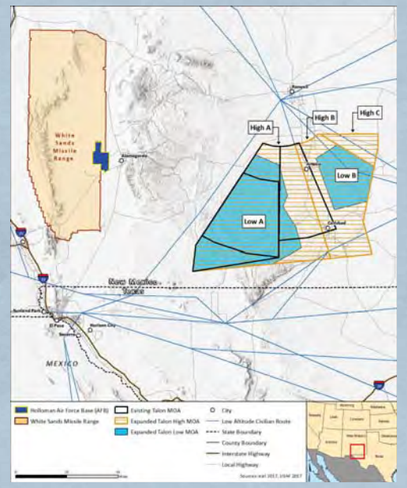
Criteria	Valentine MOA*	Bronco MOA*	Talon MOA	Smitty/ Cato MOA	Beak MOA	Pecos MOA
1. Utilizes Air Force scheduled airspace?	Yes	Yes	Yes	Yes	Yes	Yes
2. Maximizes training time and minimizes travel time?	No	No	Yes	Yes	Yes	Yes
3a. Required size and configuration - meets vertical limits or could be expanded to meet?	Not evaluated	Not evaluated	Yes	Yes	No	Yes
3b. Required size and configuration - meets horizontal limits or could be expanded to meet?	Not evaluated	Not evaluated	Yes	Yes	No	No
4. Expansion would limit impacts to civil aviation?	Not evaluated	Not evaluated	Yes	Yes	No	No
Carry Forward?	**No**	**No**	**Yes**	**Yes**	**No**	**No**

*Valentine and Bronco MOAs exceeded the required travel distance. Since these MOAs were too far to fully support IQT, it was not necessary to evaluate the remaining criteria.



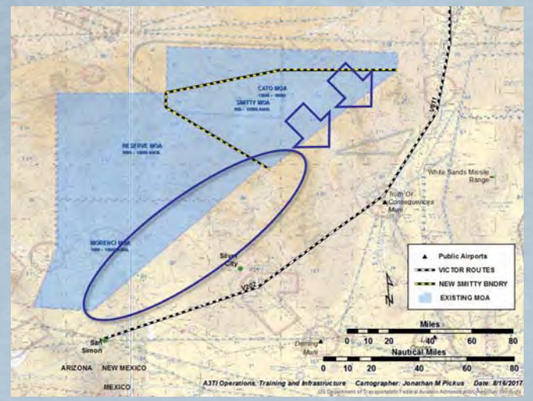
No Action Alternative

Under the No Action Alternative, there would be no airspace modifications in support of IQT missions at Holloman AFB. Aircrews would continue to use existing airspace to the extent practicable. This alternative does not meet the purpose and need but is carried forward in accordance with NEPA regulations.



Alternative 1: Expand Talon MOA

- Reconfigure and expand Talon MOA to the south and east
  - Floor 500 feet AGL
  - Ceiling 18,000 feet above MSL
- Raise floor of existing MOA from 300 feet to 500 feet AGL, return lower 200 feet of airspace to the National Airspace System
- Assign ATCAA above the MOA expanding the usable airspace when requested
- Up to 10,000 sorties annually
- Use of chaff and flares (flares would not be used below 2,000 feet AGL)



Alternative 2: Expand Cato/Smitty MOA and Create Lobos MOA

- Reconfigure and expand Cato/Smitty MOA to the southeast; create new Lobos MOA adjacent to existing Reserve and Morenci MOAs
  - As low as 500 feet AGL
  - Ceiling 18,000 feet above MSL
- Lobos MOA and Cato/Smitty MOA used concurrently as one MOA for IQT
- Return northern portion of Cato/Smitty MOA to National Airspace System
- Assign ATCAA above MOAs expanding usable airspace when requested
- Continue to observe current altitude limitations for overflight of Federal Wilderness Areas
- Up to 10,000 sorties annually
- Use of chaff and flares (flares would not be used below 2,000 feet AGL)

For more information, please visit the project website at: www.HollomanAFBAirspaceEIS.com

Environmental Impact Statement for Special Use Airspace Optimization Project at Holloman Air Force Base, New Mexico

Aircraft Noise

What is Noise?

The words 'noise' and 'sound' both relate to hearing and can be used interchangeably. The difference is we typically refer to 'sound' when discussing something pleasant such as music, and 'noise' when discussing something unpleasant. This "noise" can interrupt an activity, disturb the peace and quiet, interfere with communication, or disrupt sleep.

When is Noise Analyzed?

Noise analysis occurs when the Air Force proposes a change in aircraft type, and/or changes in when, where, and how aircraft fly. Changes in the Special Use Airspace needed to meet training requirements is one such driver. During the analysis process, various noise metrics are used to gauge the significance of changing airspace boundaries and usage. The results help Air Force leaders inform the public of potential noise impacts and assists in the decision-making process for proposed airspace changes.



What is a Sonic Boom?

A Sonic Boom is the sound associated with the shock waves created when an aircraft travels through the air faster than the speed of sound. Sonic booms create a significant amount of sound energy, sounding much like an explosion. The distance to the point on the ground where the boom is heard depends on the altitude, flight path, and size and shape of the aircraft.

How is Noise Modeled?

Computer Models. The Department of Defense uses the NOISEMAP suite of programs to predict noise for exposure from all flight activity and environmental analyses in the United States and its territories.

- ✓ NOISEMAP is used for predicting noise exposure in the airfield environment.
- ✓ Military Operating Area and Range Noise Model (MR_NMAP) is used for predicting noise exposure from aircraft operations in Special Use Airspace.
- ✓ PCBOOM4 is used to predict the sonic boom footprint of individual supersonic flight events that occur in Special Use Airspace.
- ✓ BOOMAP is used for analysis of the cumulative sonic boom environment for air combat maneuvering that includes supersonic flight.

Modeling Input Data. The computer models require several types of data including:

- ✓ Weather, terrain, and elevation data
- ✓ Engine power setting and aircraft speed
- ✓ Type, number and time of day for aircraft operations
- ✓ Duration of aircraft missions for each area
- ✓ Special Use Airspace in use and/or flight patterns
- ✓ Airspace altitude
- ✓ Number of supersonic events and altitudes



For more information, please visit the project website at: www.HollomanAFBAirspaceEIS.com

Environmental Impact Statement for Special Use Airspace Optimization Project at Holloman Air Force Base, New Mexico

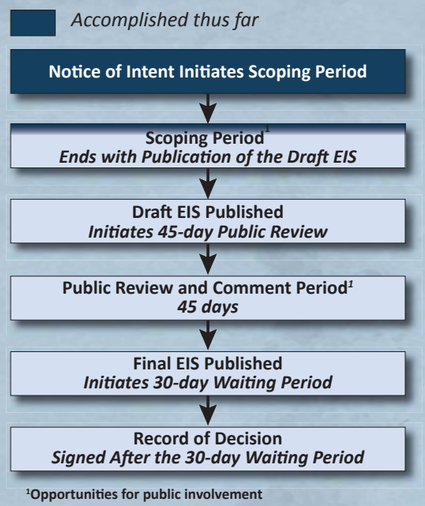
Your Involvement is Part of the Process

Your Participation

Input received today and throughout the scoping comment period assists the Air Force in identifying key environmental issues.

You can be involved by:

- Participating in scoping meetings.
- Identifying community-specific issues and concerns related to this Air Force proposal.
- Ensuring you are on the mailing list to receive future information.
- Submitting comments on the proposed action and the environmental analysis.



Participate Today

Your scoping comments will help shape the proposal and analysis. Comments submitted through any of the methods below are considered equally in the Draft EIS. There are three ways to provide comments:

- Submit written comments here at the meeting,
- Enter comments anytime during the scoping period electronically via the project website at: www.HollomanAFBAirspaceEIS.com, or
- Mail written comments to:

Holloman AFB Airspace EIS
c/o Cardno
501 Butler Farm Road, Suite H
Hampton, VA 23666



Please provide comments by September 25, 2017 to ensure their consideration in the Draft EIS analysis

Comment forms are available at the public meeting and on the project website

Participate in the Future

Your involvement and feedback are essential to helping the Air Force make an informed decision on this proposed action.

- Read and provide substantive comments on the analyses presented in the Draft EIS.
- Participate in the Public Hearings following publication of the Draft EIS.
- Review the Final EIS and Record of Decision.
- Get on the mailing list and/or check the project website at www.HollomanAFBAirspaceEIS.com for updates on the Draft and Final EIS and the Record of Decision.





For more information, please visit the project website at: www.HollomanAFBAirspaceEIS.com

Scoping Meeting
Environmental Impact Statement (EIS) for
Special Use Airspace Optimization at Holloman Air Force Base, New Mexico

Comment Sheet

Location:_____
Date:_____

Please provide us with your comments no later than September 25, 2017 to ensure full consideration in the Draft EIS. Please submit your comments at the meeting, through the website at: **www.HollomanAFBAirspaceEIS.com**, and/or by mailing them to the address below.

Holloman Airspace EIS
501 Butler Farm Rd., Suite H
Hampton, VA 23666

Do you wish to be sent a copy of the Draft EIS on CD? Yes / No

Note: If yes, please provide your address below.
Disclaimer: Your personal information will not be made public.

Please Print

Name: _____

Address: _____

_____

COMMENTS:

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APPENDIX D
AIRSPACE APPENDICES

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D1: AIRPORTS IN REGION OF INFLUENCE

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ACRONYMS AND ABBREVIATIONS

AGL	Above Ground Level
ARTCCs	Air Route Traffic Control Centers
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
ATS	Air Traffic Service
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FL	Flight Level
GA	General Aviation
MOA	Military Operations Area
MSL	Mean Sea Level
NAS	National Airspace System
nm	nautical miles
PDARS	Performance Data Analysis and Reporting System
ROI	Region of Influence
SUA	Special Use Airspace
VFR	Visual Flight Rules
WSMR	White Sands Missile Range

APPENDIX D1: AIRPORTS IN REGION OF INFLUENCE

D1.1 INTRODUCTION

Federal Aviation Administration (FAA) air traffic controllers are responsible for ensuring the safe flight of aircraft through the National Airspace System (NAS). Requirements for reporting airport aircraft operations are detailed in FAA Joint Order 7210.55G, *Operational Data Reporting Requirements.* This Environmental Impact Statement (EIS) uses airport data operations reported to the FAA as the baseline for analyzing the potential effects on aircraft operations at airports located beneath or in close proximity (within 25 nautical miles [nm]) to the existing and proposed Military Operations Area/Air Traffic Control Assigned Airspace (MOAs/ATCAAs). This 25 nm radius defines the Region of Influence (ROI) for each alternative.

There are two types of airports, towered and non-towered, that are further subdivided into Civil Airports that are open to the general 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 general public. Towered airports have an operating control tower in which Air Traffic Control (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.

D1.2 ROI FOR TALON MOA

Figure D.1-1 shows the airports within the Talon MOA ROI. **Table D.1-1** provides information for each of the public and private airports located beneath or in close proximity (within 25 nm) to the existing and proposed Talon MOA. There are no military airports within the ROI for the Talon MOA. Detailed discussions of each publicly owned airport follows the table. The airport operations data provided in **Table D1-1** was obtained from data reported to the FAA for each airport.

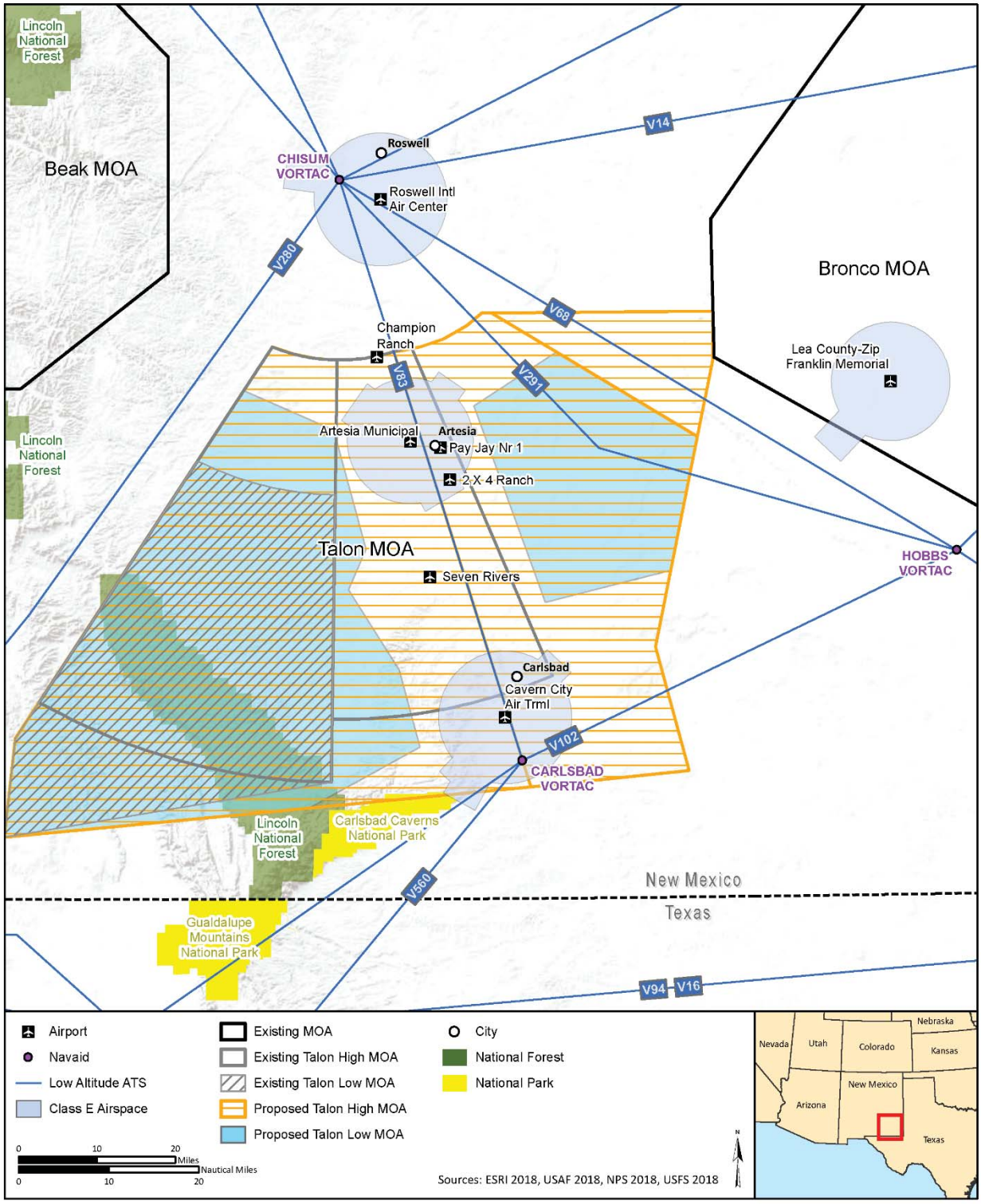


Figure D.1-1. Airports in Talon MOA ROI

Table D1-1. Airports in Talon MOA ROI

Airport Name (Airport Code)	Airport Ownership	Existing Associated Airspace	Proposed Associated Airspace	Based Aircraft	Annual Operations[1]
Artesia Municipal Airport (ATS), Artesia, New Mexico	Public	Talon High East MOA	Talon High A and B MOAs	25 Single Engine 4 Multi-Engine 1 Jet	GA Local = 4,400 GA Itinerant = 7,150 Military = 2,500
Cavern City Air Terminal Airport (CNM), Carlsbad, New Mexico	Public	Talon High East MOA	Talon High A and B MOAs	19 Single Engine 4 Multi-Engine 2 Jet 2 Helicopters	Commercial = 2,669 Air Taxi = 303 Military = 240 GA Local = 1,925 GA Itinerant = 1,725
Lea County-Zip Franklin Memorial Airport (EO6), Lovington, New Mexico	Public	Bronco 3 MOA	Bronco 3 MOA	11 Single Engine 1 Multi-Engine	GA Local = 1,100 GA Itinerant = 1,100
Roswell International Air Center Airport (ROW), Roswell, New Mexico[1]	Public	None	None	35 Single Engine 3 Multi-Engine 3 Jet 2 Helicopter	Commercial = 1,652 Air Taxi = 4,718 Military = 10,282 GA Local = 6,593 GA Itinerant = 2,301
Seven Rivers Airport (62NM), Carlsbad, New Mexico	Private	Talon High East MOA	Talon High A MOA	4 Single Engine 1 Multi-Engine	GA Local = 50 GA Itinerant = 250
2 X 4 Ranch Airport (NM47), Artesia, New Mexico	Private	Talon High East MOA	Talon High B MOA	None Reported	None Reported
Champion Ranch Airport (01NM), Artesia, New Mexico	Private	Talon High East MOA	Talon High A MOA	None Reported	None Reported
Pay Jay Nr 1/2 Heliport (NM45), Artesia, New Mexico	Private	Talon High East MOA	Talon High B MOA	None Reported	None Reported

Source: Skyvector 2019.

Notes: [1]Northern Boundary of the existing and proposed Talon MOA created by an 18 mile arc centered on Roswell Airport's Distance Measuring Equipment (Roswell 18 DME Arc).

Legend: ATS-Air Traffic Service; MOA-Military Operations Area; ROI – Region of Influence; GA – General Aviation

D1.2.1 Public Airports

Artesia Municipal Airport (ATS), is located 3 miles west of Artesia, New Mexico and beneath the northern quadrant of the existing Talon High East MOA. The airport, publicly owned by the City of Artesia, is a non-towered airport with approach/departure services provided by Roswell Approach Control and

Albuquerque ARTCC when Roswell Approach Control is closed. Artesia Municipal 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 Above Ground Level (AGL) within a 7-mile radius of the airport with Class E extensions to the northwest, northeast, and southeast. The majority of the Class E airspace is located below the floor of the existing Talon High East MOA. Artesia has two runways, Runway 13/31 and Runway 04/22 with published approach to runway 13/31. There were 14,050 airport operations reported to the FAA for the 12-month period ending April 5, 2017; 11,550 were local or itinerant general aviation flights (SkyVector 2019).

Cavern City Air Terminal Airport (CNM), is located 5 miles southwest of Carlsbad, New Mexico, just outside of the existing Talon High East MOA and beneath the border of the proposed Talon High A and B MOAs. The airport, publicly owned by the City of Carlsbad, is a non-towered airport with approach/departure services through Albuquerque ARTCC. Flight services are offered by New Mexico Airlines with daily flights scheduled to Alamogordo, El Paso and Albuquerque. The airport is located within Class E airspace that extends upward from 700 feet AGL within a 7-mile radius of the airport. The northern portion of the Class E airspace is located below the floor of the existing Talon High East MOA. Cavern City has four runways, 03/21, 14R/32L, 14L/32R and 08/26 with published approaches to runways 03/21 and 14R/32L. There were 6,682 airport operations reported to the FAA for the 12 month period ending December 31, 2015; 3,650 were local or itinerant general aviation flights (SkyVector 2019).

Lea County-Zip Franklin Memorial Airport (EO6), is located 3 miles west of Lovington, New Mexico. This airport is not located beneath any of the existing or proposed SUA addressed in this EIS; however, it is located beneath the existing Bronco 3 MOA which would be adjacent to the proposed Talon High C MOA. The airport is approximately 48 miles east of the existing Talon High East MOA, and approximately 20 miles from the proposed Talon High C MOA. The airport, publicly owned by Lea County, is a non-towered airport with approach/departure services provided by Fort Worth ARTCC. Flight services are provided by United Express Airlines with flights to Houston, Texas, four days per week. The airport is located within Class E airspace that extends upward from 700 feet AGL within a 7-mile radius of the airport with a Class E extension to the southwest. The airport has two runways, 03/21 and 12/30 with published approaches to runway 03/21. There were 2,200 general aviation operations reported to the FAA for the 12 month period ending April 3, 2017 (SkyVector 2019).

Roswell International Air Center Airport (ROW), is located 3 miles south of Roswell, New Mexico. This airport is located to the north of the existing Talon High East and West MOAs. The airport is not located beneath existing or proposed airspace, but it is located approximately 16 miles to the north of the proposed Talon High B and C MOAs. Roswell International Air Center Airport is publicly owned by the City of Roswell. It is a towered airport with approach/departure services offered from 6:00 a.m. to 9:00 p.m. Albuquerque ARTCC provides these services when airport approach control is closed. The airport offers services to Dallas Fort Worth, Texas, and Phoenix, Arizona, via American Airlines. The airport is located within Class D airspace that extends for five nm, Class E airspace that extends upward from 700 feet AGL within a 10-nm radius of the airport, and a Class E extension to the northwest. The airport has two runways, Runway 03/21 and Runway 17/35. There were 25,546 airport operations reported to the FAA for the 12 month period ending December 31, 2017 (SkyVector 2019).

D1.2.2 Private Airports

Four private airports lie within the ROI for Talon MOA. Aircraft operating from private airports typically fly using VFR and at lower altitudes where radar coverage is limited or non-existent. These private airports are located beneath the existing Talon High East MOA and the proposed Talon High A and B MOAs. As can be seen in **Table D.1-1**, only the Seven Rivers Airport reported operational statistics to the FAA. There were 300 general aviation operations reported for the 12-month period ending February 3, 1987; no updated operations have been reported. PDARS data for these private airports is not available.

D1.3 ROI FOR CATO, SMITTY AND LOBOS MOAS, AND CHRISTA AND KENDRA ATCAAS

Figure D.1-2 shows the airports within the ROI for the Cato, Smitty, and Lobos MOAs, and Christa and Kendra ATCAAs. **Table D1-3** provides information for each of the public and private airports located beneath or in close proximity (within 25 nm) to the existing and proposed Cato, Smitty and Lobos MOAs and Christa and Kendra ATCAAs. Detailed discussions of public owned airports follow the table. Two military airfields, Holloman AFB (HMN) and Stallion AAF (98E) lie within the boundaries of R-5107D; operations from these airfields would not be affected by modification or establishment of SUA to the west of WSMR and are therefore not included in the table.

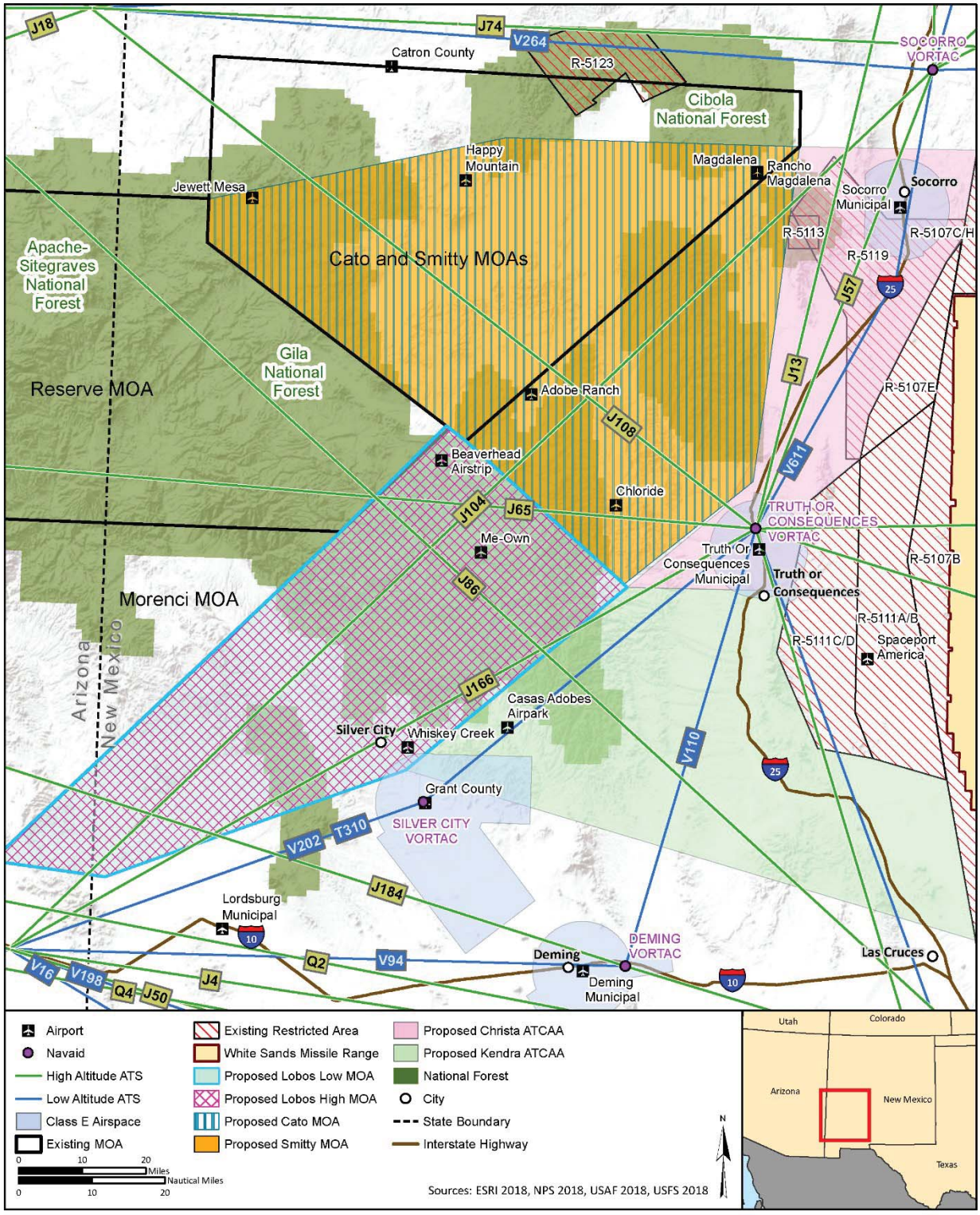


Figure D.1-2. Airports in Cato, Smitty, Lobos MOAs and Christa and Kendra ATCAAs ROI

Table D1-3. Airports in Cato, Smitty, Lobos MOA and Christa and Kendra ATCAAs ROI					
Airport Name	**Airport Ownership**	**Existing Associated Airspace**	**Proposed Associated Airspace**	**Based Aircraft**	**Annual Operations[1]**
Grant County (SVC), Silver City, New Mexico	Public	None	Proposed Lobos MOA and Proposed Kendra ATCAA	15 Single Engine 2 Multi-Engine 1 Helicopter	Commercial = 1,250 Air Taxi = 375 Military = 500 GA Local = 2,000
Lordsburg Municipal (LSB), Lordsburg, New Mexico	Public	None	None	4 Single Engine	Military = 600 GA Local = 1,800 GA Itinerant = 2,400
Whiskey Creek (94E), Silver City, New Mexico	Private [Open to the public]	None	Proposed Lobos MOA	12 Single Engine 3 Multi-Engine 1 Helicopter	GA Local = 300 GA Itinerant = 800
Deming Municipal (DMN), Deming, New Mexico	Public	None	None	17 Single Engine 1 Multi-Engine 1 Jet	Air Taxi = 960 Military = 9,125 GA Local = 6,570 GA Itinerant = 12,000
Truth or Consequences Municipal (TCS), Truth or Consequences, New Mexico	Public	None	Proposed Christa and Kendra ATCAAs	23 Single Engine 5 Ultralights	Military = 1,200 GA Local = 4500 GA Itinerant = 10,000
Socorro Municipal (ONM), Socorro, New Mexico	Public	None	Proposed Christa ATCAA	14 Single Engine 1 Helicopter	Military = 100 GA Local = 2,500 GA Itinerant = 2,000
Catron County Heliport (C54), Quemado, New Mexico	Public	Cato and Smitty MOAs	None	None Reported	GA Itinerant = 12
Jewett Mesa (13Q), (USFS) Apache Creek, New Mexico	Public	Cato and Smitty MOAs	Cato and Smitty MOAs	None Reported	GA Itinerant = 30
Magdalena Airport (N29), Magdalena, New Mexico	Public	Cato and Smitty MOAs	Cato and Smitty MOAs	1-Single Engine	Military = 40 GA Local = 400 GA Itinerant = 500

Table D1-3. Airports in Cato, Smitty, Lobos MOA and Christa and Kendra ATCAAs ROI (cont.)					
Airport Name	**Airport Ownership**	**Existing Associated Airspace**	**Proposed Associated Airspace**	**Based Aircraft**	**Annual Operations[1]**
Beaverhead Airstrip (13NM) (USFS, Gila NF), Silver City, New Mexico	Public (Private Use)	None	Proposed Lobos MOA	None Reported	GA Itinerant = 50
Me-Own Airport (1NM0) (USFS, Gila N.F.) 30 NE Silver City, New Mexico)	Public (Private Use)	None	Proposed Lobos MOA	None Reported	GA Itinerant = 30 (1984)
Casa Adobes Airpark (NM69) Mimbres, New Mexico)	Private	None	Proposed Kendra ATCAA	None Reported	None Reported
Spaceport America (9NM9), 20 miles SE of Truth or Consequences, New Mexico	Private	Restricted Airspace (R5111)	None	2 Jets	None Reported
Rancho Magdalena (NM01), Magdalena, New Mexico	Private	Cato and Smitty MOAs	Cato and Smitty MOAs	None Reported	None Reported
Happy Mountain Airport (NM 41), Pie Town, New Mexico	Private	Cato and Smitty MOAs	Cato and Smitty MOAs	None Reported	None Reported
Chloride Airport (NM51), Chloride, New Mexico	Private	None	Cato and Smitty MOAs	None Reported	None Reported
Monte Preito Ranch Airport (57NM), Claunch, New Mexico	Private	Restricted Airspace (R-5107 C/H)	None	None Reported	Not Reported
Adobe Ranch Airport (NM37), Truth or Consequences, New Mexico	Private	None	Cato and Smitty MOAs	None Reported	None Reported

Source: Skyvector 2019.
Legend: MOA-Military Operations Area; ATCAA-Air Traffic Control Assigned Airspace; GA – general aviation

D1.3.1 Public Airports

Grant County Airport (SVC) is located 10 miles southeast of Silver City, New Mexico and near the southeastern border of the proposed Lobos MOA and near the southern border of the proposed Kendra ATCAA. The airport, publicly owned by Grant County, is a non-towered airport with approach and departure services provided by Albuquerque Center. The airport is located within Class E airspace that extends upward from 700 feet AGL within a 7-mile radius of the airport with Class E extensions to the east and southeast. A portion of their Class E airspace would be located within the proposed Lobos MOA, and a portion would also be below the proposed Kendra ATCAA. Grant County Airport has four runways, 08/26, 17/35, 12/30 and 03/21 with published approaches to Runway 08/26. There were 9,125 airport operations reported to the FAA for the 12-month period ending December 31, 2017; 500 of the operations were associated with military aircraft (SkyVector 2019). Based on analysis of PDARS information, during the 4 months used for data analysis, 237 civilian and 7 military flights departing or arriving at Grant County Airport transited through the airspace associated with the proposed Cato and Smitty MOAs; 764 civilian and 6 military transited through the airspace proposed for Lobos High MOA; and 464 civilian and 7 military flights transit through the airspace associated with Lobos Low MOA (ATAC 2018).

Lordsburg Municipal Airport (LSB) is located one mile southeast of Lordsburg, New Mexico and approximately 15 nm south of the proposed Lobos MOA. The airport, publicly owned by the City Lordsburg, is a non-towered airport with no approach/departure services offered. There is no Class E airspace associated with the airport. The Lordsburg Municipal Airport has one runway, 12/30 with no published approaches. There were 4,800 airport operations reported to the FAA for the 12-month period ending April 12, 2017; 600 of the operations were associated with military aircraft (SkyVector 2019).

Whiskey Creek Airport (94E) is located 4 miles east of Silver City, New Mexico, and would be beneath the proposed Lobos MOA. The airport is privately owned by 94 ECHO LLC, but is open to the public for use. The airport is a non-towered airport without approach/departure services provided by the FAA. The airport is located just outside of Grant County's Class E airspace. There is one runway, 17/35, with no published approaches. The runway is closed to aircraft over 10,000 pounds. There were 1,100 airport operations reported to the FAA for the 12-month period ending March 12, 2017 (SkyVector 2019).

Deming Municipal Airport (DMN) is located two miles southeast of Deming, New Mexico, approximately 20 miles south of the proposed Kendra ATCAA. The airport, publicly owned by the City of Deming, is a non-towered airport with approach/departure services provided by Albuquerque ARTCC. The airport is located within Class E airspace that extends upward from 700 feet AGL within a 7-mile radius of the airport with Class E extensions to the east and southwest. This airport has two runways, 08/26 and 04/22 with published approaches to Runway 04/22 and 08. There were 28,655 airport operations reported to the FAA for the 12-month period ending March 7, 2017; 9,125 of the operations were associated with military aircraft (SkyVector 2019).

Truth or Consequences Municipal Airport (TCS) is located 6 miles north of Truth or Consequences, New Mexico and would be beneath the proposed Kendra ATCAA. The airport, publicly owned by the City of Truth or Consequences, is a non-towered airport with approach/departure services provided by Albuquerque ARTCC. The airport is located within Class E airspace that extends upward from 700 feet AGL within a 7-mile radius of the airport with Class E extensions to the north and southeast. The Class E extension to the southeast lies partially within R-5111C/D. The Truth or Consequences Municipal Airport has five runways, 11/29, 01/19, 15/33 and 07/25 with an RNAV (GPS) and a VOR approach published for Runway 13/31

only. There were 16,700 airport operations reported to the FAA for the 12-month period ending April 8, 2017; 1,200 of the operations were associated with military aircraft (SkyVector 2019).

Socorro Municipal Airport (ONM) is located 3 miles south of Socorro, New Mexico and would be beneath the proposed Christa ATCAA. The airport, publicly owned by the City Socorro, is a non-towered airport with approach/departure services provided by Albuquerque ARTCC. The airport is located within Class E airspace that extends upward from 700 feet AGL within a 7-mile radius of the airport. The Socorro Municipal Airport has two runways, 15/33 and 06/24 with an RNAV (GPS) to Runway 33 and a VOR approach published for Runway 15. There were 4,600 airport operations reported to the FAA for the 12-month period ending April 9, 2017; 100 of the operations were associated with military aircraft (SkyVector 2019).

Catron County Heliport (C54) is located eight miles east of Quemado, New Mexico at the northern edge of the existing Cato and Smitty MOA and within the area proposed for return to the NAS under Alternatives 2 and 3. The heliport, publicly owned by Catron County, is a non-towered heliport with no approach/departure services offered. There is no Class E airspace associated with this heliport. The heliport has one helipad with no published approaches. There were 12 operations reported to the FAA for the 12-month period ending April 9, 2017 (Skyvector 2019).

Jewett Mesa Airport (13Q) is located 10 miles north of Apache Creek, New Mexico and beneath the existing and proposed Cato and Smitty MOAs. The airport, publicly owned by the U.S. Forest Service, is a non-towered seasonally operated airport with no approach/departure services offered. Jewett Mesa Airport is open to the public from May through September and is closed at all other times. There is no Class E airspace associated with this airport. The airport has one runway 06/24; there are no published approaches. There were 30 operations reported to the FAA for the 12 month period ending April 12, 2017 (SkyVector 2019).

Magdalena Airport (N29) is located three miles west of Magdalena, New Mexico near the northeast corner of the existing and proposed Cato and Smitty MOAs. The Smitty MOA excludes airspace 2000 feet AGL and below surrounding the airport. Magdalena Airport, publicly owned by the Village of Magdalena, is a non-towered airport with no approach/departure services offered. There is no Class E airspace associated with this airport. The airport has one runway 02/20; there are no published approaches. There were 940 operations reported to the FAA for the 12-month period ending April 9, 2017; 40 of the operations were associated with military aircraft (SkyVector 2019).

Beaverhead Airstrip (13NM) is located 39 miles north of Silver City, New Mexico to the east of the existing Reserve MOA and to the south of the existing Cato and Smitty MOAs. This airstrip would be beneath the proposed Lobos MOA. Although the U.S. Forest Service, Gila National Forest, publicly owns the airport, it is maintained as a private use airport. There is no Class E airspace associated with this airport. The airport has one dirt runway 12/30; there are no published approaches. There were 50 operations reported to the FAA for the 12-month period ending January 27, 1984; no updated operations have been reported (SkyVector 2019).

Me-Own Airport (1NM0) is located 30 miles northeast of Silver City, New Mexico to the east of the existing Reserve MOA and would be beneath the proposed Lobos MOA. Although the airport is publicly owned by the U.S. Forest Service, Gila National Forest, it is maintained as a private use airport. There is no Class E airspace associated with this airport. The airport has one dirt runway 14/32; there are no published

approaches. There were 30 operations reported to the FAA for the 12-month period ending January 27, 1984; no updated operations have been reported (SkyVector 2019).

D1.3.2 Private Airports

There are seven private airports in the ROI for Cato, Smitty, Lobos MOAs and Christa and Kendra ATCAAs. 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 D.1-3**, none of the private airports reported operational statistics to the FAA. PDARS data for these airports are not available.

D1.4 REFERENCES

ATAC 2017. Holloman Special Use Airspace Modifications, Holloman Air Force Base, October 20.

ATAC 2018. Holloman Addendum Report, September 25.

Skyvector 2019. FAA Airport Data, All airports listed.

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D2: SPECIAL USE AIRSPACE MODIFICATIONS, HOLLOMAN AIR FORCE BASE (ADDITIONAL ALTERNATIVES REPORT ADDENDUM)

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U.S. AIR FORCE

Special Use Airspace Modifications, Holloman Air Force Base

Additional Alternatives Report Addendum

September 25, 2018

Submitted Under
Task Order No. 0005
Contract No. FA8903-16-D-0032

to:

Cardno
501 Butler Farm Road, Suite H
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by:

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1 Introduction

This report contains the results of the airspace traffic analysis conducted as part of the *Special Use Airspace Modifications, Holloman AFB* study. The alternative scenarios in this addendum report are being analyzed to supplement the scenarios previously studied in the Holloman Airspace Analysis. Traffic operations are taken from four months of historical fiscal year 2016 (FY16) data including October 2015, and January, April, and July 2016. The SUAs within the three alternatives are defined below in *Table 1-1*.

Table 1-1: SUAs in Each Alternative

Operating Area	Altitudes		Alt 1	Alt 2	Alt 3
	MOA	ATCAA			
Lobos	13,500' MSL – FL180	FL180 – FL510		X	X
Lobos Low	500' AGL-13,500' MSL	N/A		X	
New Smitty/Cato	500' AGL-FL180*	FL180 – FL510		X	X
Christa	N/A	FL180 – FL510		X	X
Kendra	N/A	FL180 – FL510		X	X
X-Talon High A, B, C	12,500' MSL – FL180	FL180 – FL500	X		X**
X-Talon Low A, B	500' AGL to 12,500' MSL	N/A	X		X

AGL: above ground level; ATCAA: Air Traffic Control Assigned Airspace; FL: flight level; MOA: military operations area; MSL: mean sea level; N/A: not applicable; SFC: surface

* Smitty and Cato were analyzed as one area; the western region of Smitty has a floor of 1,600' AGL

** X-Talon High C is not included in Alt 3; X-Talon ATCAA in Alt 3 does not include the area above High C

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2 Airspace Traffic Analysis

This section documents the results and analyses of the baseline PDARS airspace traffic operations. The airspace traffic analysis consisted of examining historical PDARS radar flight data for the MOAs, and ATCAAs of interest within the study region. PDARS data are presented for four months from FY16: October, January, April, and July.

Section 2.1 presents analyses of existing and proposed operating areas relating to *Special Use Airspace Modifications, Holloman AFB* Environmental Impact Statement (EIS) Alternative 1. *Section 2.2* presents analyses of existing and proposed operating areas relating to EIS Alternative 2. *Section 2.3* presents analyses of existing and proposed operating areas relating to EIS Alternative 3.

2.1 EIS Alternative 1

This section presents analysis for existing and proposed airspace associated with *Special Use Airspace Modifications, Holloman AFB* EIS Alternative 1. These areas include the proposed operating areas of X-Talon High A, X-Talon High B, X-Talon High C, X-Talon Low A and X-Talon Low B MOAs, and X-Talon ATCAA. *Figure 2-1* shows the location of the SUAs in Alternative 1, and their altitudes are defined below:

- Talon Low A, B (500 – 12,500)
- Talon High A, B, C (12,500 – 18,000)
- Talon ATCAA (FL180 – FL510)

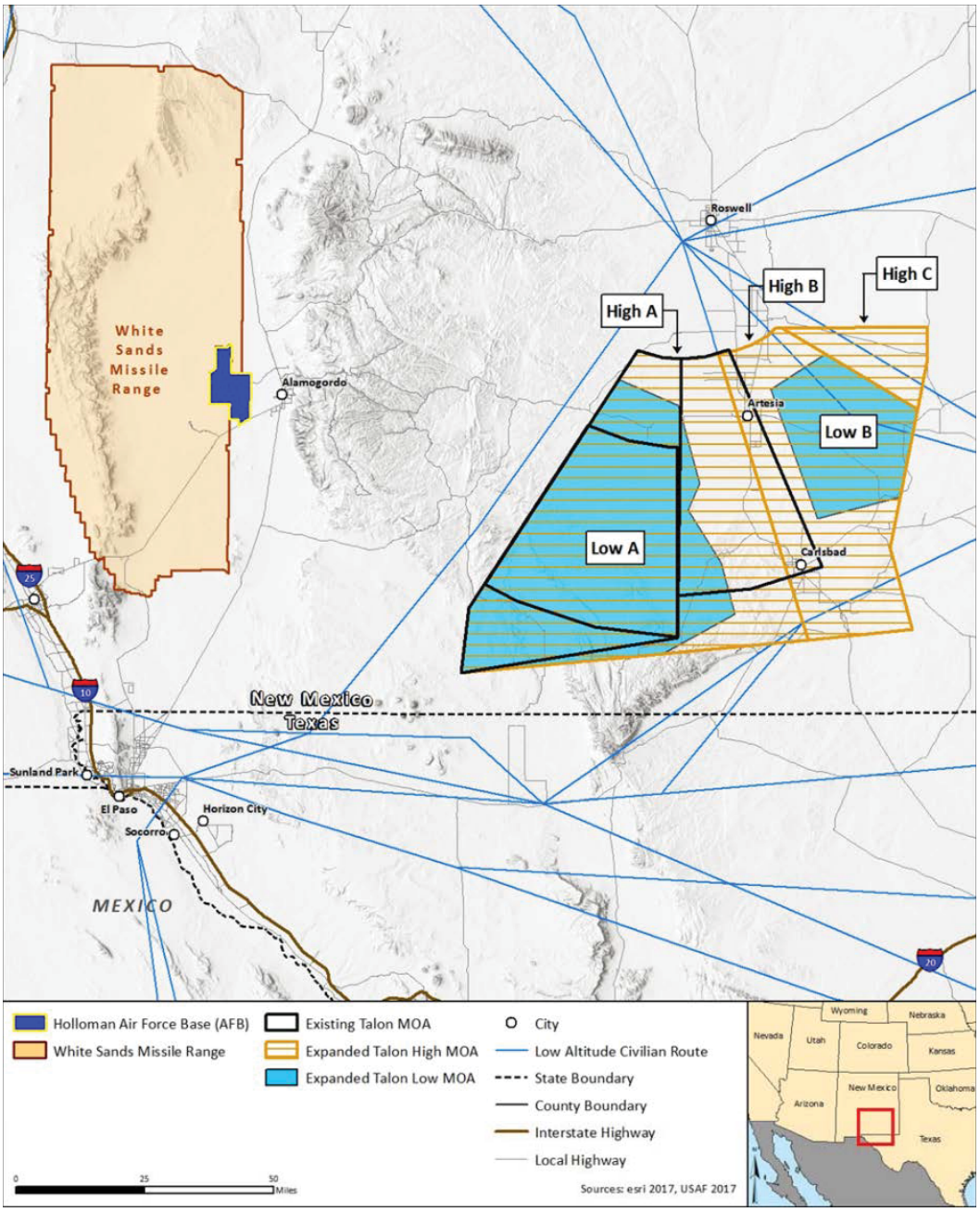


Figure 2-1: Alternative 1 Airspace

2.1.1 X-Talon MOA

Table 2-1 through *Table 2-5* present the baseline PDARS flight counts for X-Talon High A, High B, High C, Low A, and Low B MOAs, broken out by civilian and military user. The majority of flights transiting X-Talon airspace were civilian.

Table 2-1: Monthly Flight Counts FY16 – X-Talon High A MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	185	68.0%	154	70.3%	209	78.9%	206	72.8%
Military	87	32.0%	65	29.7%	56	21.1%	77	27.2%
Total	**272**	**100%**	**219**	**100%**	**265**	**100%**	**283**	**100%**

Table 2-2: Monthly Flight Counts FY16 – X-Talon High B MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	261	88.5%	199	90.5%	221	87.4%	227	95.4%
Military	34	11.5%	21	9.5%	32	12.6%	11	4.6%
Total	**295**	**100%**	**220**	**100%**	**253**	**100%**	**238**	**100%**

Table 2-3: Monthly Flight Counts FY16 – X-Talon High C MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	109	87.9%	53	75.7%	78	72.9%	100	98.0%
Military	15	12.1%	17	24.3%	29	27.1%	2	2.0%
Total	**124**	**100%**	**70**	**100%**	**107**	**100%**	**102**	**100%**

Table 2-4: Monthly Flight Counts FY16 – X-Talon Low A MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	173	72.4%	166	79.4%	188	85.1%	201	80.4%
Military	66	27.6%	43	20.6%	33	14.9%	49	19.6%
Total	**239**	**100%**	**209**	**100%**	**221**	**100%**	**250**	**100%**

Table 2-5: Monthly Flight Counts FY16 – X-Talon Low B MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	184	95.3%	133	93.7%	156	91.2%	227	97.0%
Military	9	4.7%	9	6.3%	15	8.8%	7	3.0%
Total	**193**	**100%**	**142**	**100%**	**171**	**100%**	**234**	**100%**

Table 2-6 through *Table 2-10* present the average and maximum number of daily flight counts in the X-Talon MOAs broken out by civilian and military users. X-Talon High C and X-Talon Low B do not have military counts because there was less than one flight per day through each MOA. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-6: Average and Maximum Daily Flight Counts – X-Talon High A MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	6.0	14	5.0	9	7.0	13	6.6	14
Military	2.8	10	2.1	9	1.9	7	2.5	8

Table 2-7: Average and Maximum Daily Flight Counts – X-Talon High B MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	8.4	16	6.4	15	7.4	17	7.3	16
Military	1.1	6	0.7	4	1.1	5	0.4	2

Table 2-8: Average and Maximum Daily Flight Counts – X-Talon High C MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	3.5	9	1.7	6	2.6	8	3.2	10

Table 2-9: Average and Maximum Daily Flight Counts – X-Talon Low A MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	5.6	12	5.4	12	6.3	12	6.5	14
Military	2.1	10	1.4	6	1.1	4	1.6	5

Table 2-10: Average and Maximum Daily Flight Counts – X-Talon Low B MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	5.9	13	4.3	8	5.2	13	7.3	16

Table 2-11 through *Table 2-18* present flight counts for the X-Talon MOAs by day of week.

Table 2-11: Civilian Flight Counts by Day of Week – X-Talon High A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	14	22	22	31
Monday	28	13	25	29
Tuesday	29	28	30	41
Wednesday	32	29	39	22
Thursday	38	27	35	22
Friday	23	21	29	37
Saturday	21	14	29	24
Total	**185**	**154**	**209**	**206**

Table 2-12: Military Flight Counts by Day of Week- X-Talon High A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	1	1	1	2
Monday	17	6	10	12
Tuesday	18	13	14	17
Wednesday	13	10	12	16
Thursday	17	13	7	17
Friday	19	20	10	13
Saturday	2	2	2	0
Total	**87**	**65**	**56**	**77**

Table 2-13: Civilian Flight Counts by Day of Week – X-Talon High B MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	26	21	21	24
Monday	42	33	29	31
Tuesday	34	45	37	40
Wednesday	44	20	49	23
Thursday	56	32	37	28
Friday	43	28	17	42
Saturday	16	20	31	39
Total	**261**	**199**	**221**	**227**

Table 2-14: Military Flight Counts by Day of Week- X-Talon High B MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	1	0	1	1
Monday	4	2	4	3
Tuesday	5	4	7	0
Wednesday	4	1	8	4
Thursday	8	5	8	2
Friday	12	8	4	1
Saturday	0	1	0	0
Total	**34**	**21**	**32**	**11**

Table 2-15: Civilian Flight Counts by Day of Week – X-Talon High C MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	7	4	6	14
Monday	10	16	5	11
Tuesday	19	9	15	22
Wednesday	18	6	20	8
Thursday	27	4	9	12
Friday	23	12	15	16
Saturday	5	2	8	17
Total	**109**	**53**	**78**	**100**

Table 2-16: Civilian Flight Counts by Day of Week – X-Talon Low A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	13	23	13	29
Monday	18	16	26	18
Tuesday	31	26	25	26
Wednesday	25	24	28	21
Thursday	31	28	38	31
Friday	29	29	35	46
Saturday	26	20	23	30
Total	**173**	**166**	**188**	**201**

Table 2-17: Military Flight Counts by Day of Week- X-Talon Low A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	2	0	2	0
Monday	18	4	6	8
Tuesday	18	9	5	11
Wednesday	9	10	6	11
Thursday	11	11	7	9
Friday	8	8	6	10
Saturday	0	1	1	0
Total	**66**	**43**	**33**	**49**

Table 2-18: Civilian Flight Counts by Day of Week – X-Talon Low B MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	23	14	12	24
Monday	19	20	19	27
Tuesday	22	23	35	34
Wednesday	30	16	22	29
Thursday	45	18	32	31
Friday	28	25	18	42
Saturday	17	17	18	40
Total	**184**	**133**	**156**	**227**

The following tables present flight counts by hour through the X-Talon MOAs.

Table 2-19: Civilian Flight Counts by Hour – X-Talon High A MOA

Hour	Oct	Jan	Apr	Jul
0000	0	3	3	1
0100	2	3	2	1
0200	2	2	3	4
0300	1	4	3	2
0400	4	3	5	2
0500	2	1	4	1
0600	30	2	4	8
0700	4	1	4	7
0800	7	7	12	27
0900	9	20	26	20
1000	5	11	15	13
1100	12	4	13	8
1200	9	10	8	8
1300	10	9	16	5
1400	13	8	9	22
1500	13	19	21	20
1600	11	16	11	7
1700	6	7	16	20
1800	4	5	8	6
1900	5	1	6	4
2000	3	7	4	5
2100	27	3	4	5
2200	2	4	9	7
2300	4	4	3	3
Total	**185**	**154**	**209**	**206**

Table 2-20: Military Flight Counts by Hour – X-Talon High A MOA

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	0
0100	1	1	0	0
0200	0	0	1	0
0300	0	0	1	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	3	6	2	9
0800	13	7	0	4
0900	8	7	4	20
1000	9	7	2	8
1100	9	5	2	10
1200	10	6	3	10
1300	12	5	3	1
1400	6	9	2	4
1500	12	3	12	6
1600	2	5	8	3
1700	0	2	7	0
1800	0	0	1	0
1900	0	1	1	1
2000	0	1	4	0
2100	0	0	3	1
2200	0	0	0	0
2300	1	0	0	0
Total	**87**	**65**	**56**	**77**

Table 2-21: Civilian Flight Counts by Hour – X-Talon High B MOA

Hour	Oct	Jan	Apr	Jul
0000	2	1	5	0
0100	5	1	2	0
0200	0	1	4	3
0300	3	3	3	3
0400	0	2	7	3
0500	5	2	4	6
0600	4	6	6	7
0700	19	13	20	15
0800	16	14	11	13
0900	18	10	17	17
1000	28	23	30	16
1100	24	8	10	16
1200	10	11	14	11
1300	20	13	7	18
1400	16	8	11	32
1500	28	30	25	18
1600	21	19	9	11
1700	12	15	11	10
1800	4	7	7	9
1900	5	3	5	4
2000	2	4	1	2
2100	6	2	4	1
2200	10	3	7	9
2300	3	0	1	3
Total	**261**	**199**	**221**	**227**

Table 2-22: Military Flight Counts by Hour – X-Talon High B MOA

Hour	Oct	Jan	Apr	Jul
0000	0	1	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	1	0	1
0800	4	3	3	2
0900	7	1	3	1
1000	1	3	1	0
1100	6	0	2	1
1200	3	0	2	1
1300	4	2	2	1
1400	0	3	1	3
1500	4	3	7	0
1600	1	2	0	0
1700	1	0	2	0
1800	2	1	2	0
1900	1	0	2	0
2000	0	1	1	0
2100	0	0	2	0
2200	0	0	2	1
2300	0	0	0	0
Total	**34**	**21**	**32**	**11**

Table 2-23: Civilian Flight Counts by Hour – X-Talon High C MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	1	2
0100	3	0	1	0
0200	0	0	0	0
0300	1	0	2	2
0400	1	1	2	1
0500	2	0	1	2
0600	2	2	0	3
0700	3	3	2	8
0800	11	4	7	9
0900	6	2	2	10
1000	10	3	6	5
1100	7	5	5	6
1200	4	2	6	5
1300	6	6	6	7
1400	4	2	8	8
1500	9	3	3	3
1600	6	3	4	5
1700	17	8	10	9
1800	4	2	3	2
1900	4	2	2	6
2000	0	0	2	1
2100	3	2	3	0
2200	5	3	2	4
2300	1	0	0	2
Total	**109**	**53**	**78**	**100**

Table 2-24: Civilian Flight Counts by Hour – X-Talon Low A MOA

Hour	Oct	Jan	Apr	Jul
0000	2	0	3	1
0100	0	1	2	1
0200	2	0	0	0
0300	1	0	0	1
0400	1	0	0	1
0500	1	1	3	2
0600	4	3	20	17
0700	3	16	5	17
0800	10	10	12	18
0900	19	14	7	17
1000	8	18	7	9
1100	14	4	10	7
1200	14	13	13	10
1300	10	10	16	6
1400	11	13	5	9
1500	13	5	8	7
1600	12	10	6	3
1700	22	27	29	30
1800	7	3	5	7
1900	4	4	27	11
2000	5	10	5	17
2100	5	1	2	6
2200	3	1	2	3
2300	2	2	1	1
Total	**173**	**166**	**188**	**201**

Table 2-25: Military Flight Counts by Hour – X-Talon Low A MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	0
0100	0	0	0	0
0200	0	0	1	0
0300	0	0	1	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	3	5	1	9
0800	10	5	2	1
0900	6	6	2	14
1000	6	5	0	5
1100	5	5	3	8
1200	10	3	0	6
1300	10	4	1	2
1400	2	3	2	1
1500	6	4	4	1
1600	6	1	7	1
1700	1	0	5	0
1800	1	0	2	1
1900	0	0	0	0
2000	0	2	1	0
2100	0	0	1	0
2200	0	0	0	0
2300	0	0	0	0
Total	**66**	**43**	**33**	**49**

Table 2-26: Civilian Flight Counts by Hour – X-Talon Low B MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	1	1
0100	1	0	1	0
0200	1	0	0	0
0300	1	0	2	1
0400	1	0	1	1
0500	3	2	10	6
0600	5	11	16	17
0700	15	17	18	23
0800	22	10	6	22
0900	10	8	13	28
1000	20	6	6	24
1100	16	6	11	8
1200	12	10	6	6
1300	14	13	7	20
1400	8	7	8	13
1500	17	13	12	6
1600	14	5	9	13
1700	7	4	2	8
1800	4	4	3	6
1900	3	2	5	1
2000	4	13	18	18
2100	0	1	0	3
2200	5	1	1	1
2300	1	0	0	1
Total	**184**	**133**	**156**	**227**

Table 2-27 through *Table 2-31* present the average number of minutes spent transiting the X-Talon MOAs broken out by civilian and military users.

Table 2-27: Average Duration of Flights – X-Talon High A MOA

User	Oct	Jan	Apr	Jul
Civilian	4.7	4.9	4.9	4.5
Military	9.9	6.5	8.8	10.5

Table 2-28: Average Duration of Flights – X-Talon High B MOA

User	Oct	Jan	Apr	Jul
Civilian	2.6	2.8	2.9	3.4
Military	2.8	2.5	3.6	2.5

Table 2-29: Average Duration of Flights – X-Talon High C MOA

User	Oct	Jan	Apr	Jul
Civilian	2.0	2.4	2.4	2.7

Table 2-30: Average Duration of Flights – X-Talon Low A MOA

User	Oct	Jan	Apr	Jul
Civilian	9.7	10.6	10.8	10.8
Military	4.3	4.6	4.5	3.6

Table 2-31: Average Duration of Flights – X-Talon Low B MOA

User	Oct	Jan	Apr	Jul
Civilian	4.3	5.1	5.0	6.0

Figure 2-2 presents civilian traffic flows through X-Talon High A MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

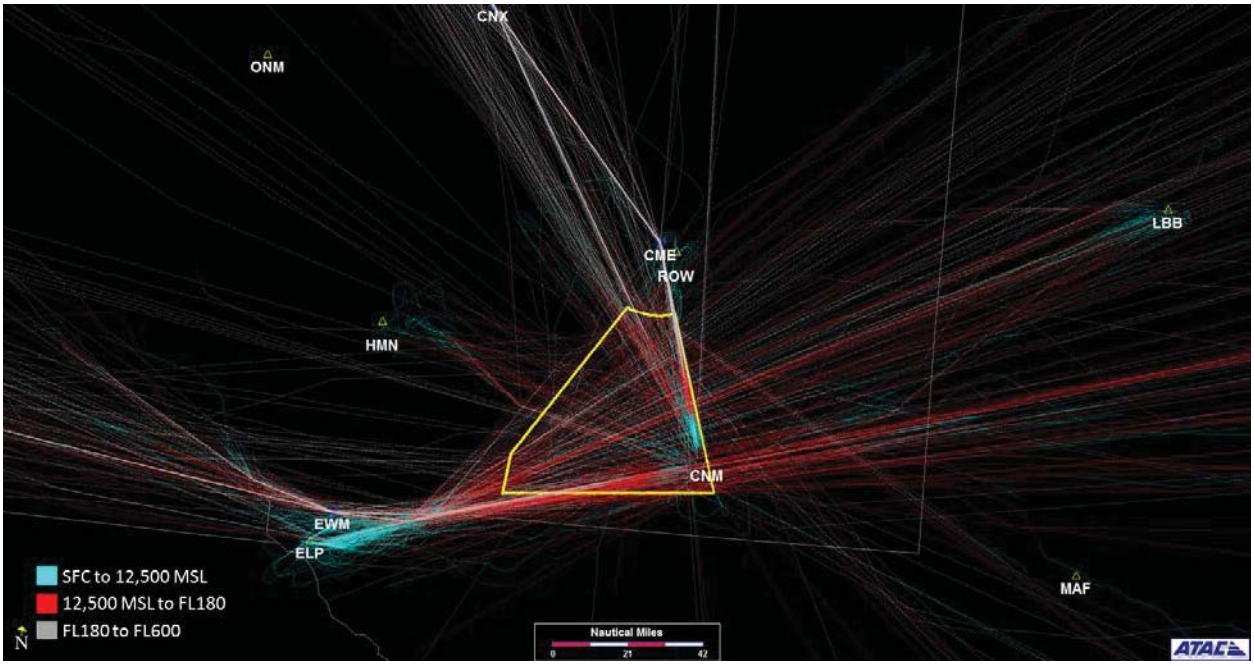


Figure 2-2: Civilian Traffic Flows – X-Talon High A MOA

Figure 2-3 presents civilian traffic flows through X-Talon High B MOA.

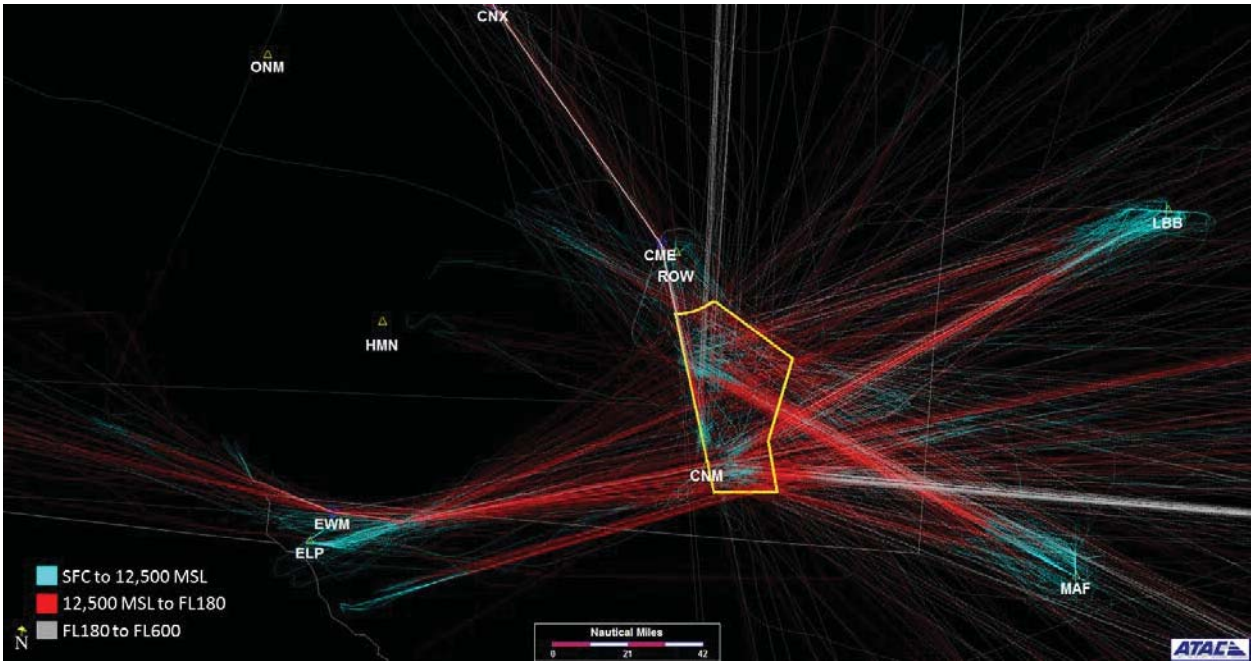


Figure 2-3: Civilian Traffic Flows – X-Talon High B MOA

Figure 2-4 presents civilian traffic flows through X-Talon High C MOA.

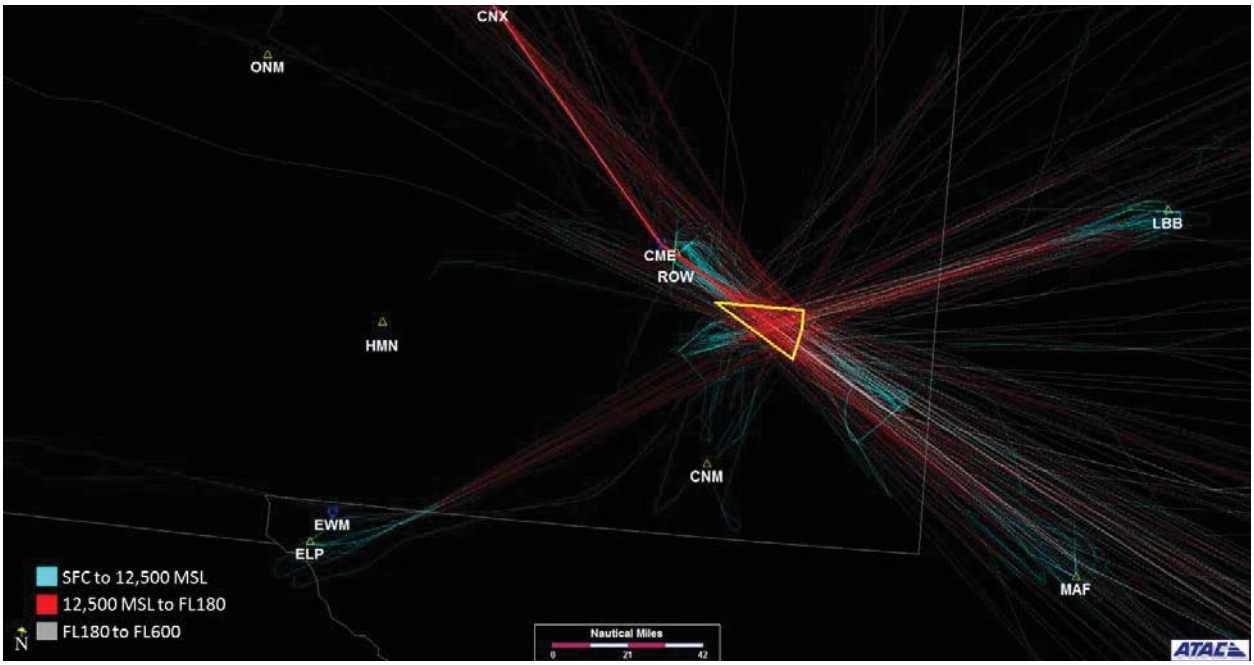


Figure 2-4: Civilian Traffic Flows – X-Talon High C MOA

Figure 2-5 presents civilian traffic flows through X-Talon Low A MOA.

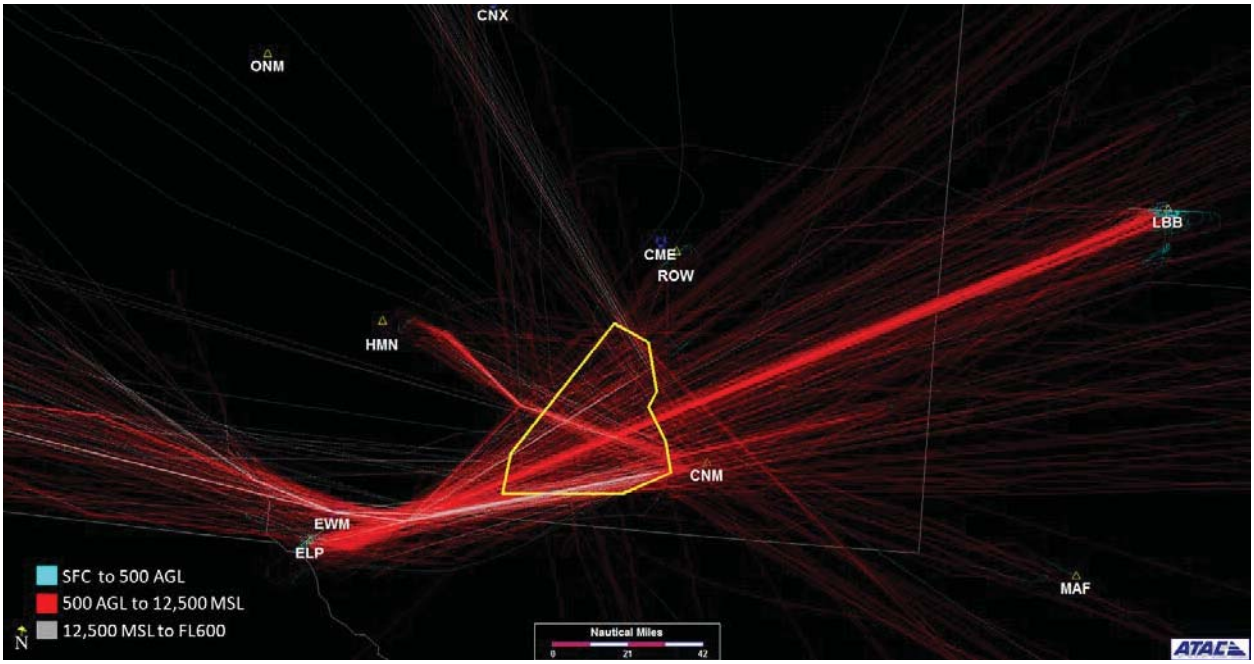


Figure 2-5: Civilian Traffic Flows – X-Talon Low A MOA

Figure 2-6 presents civilian traffic flows through X-Talon Low B MOA.

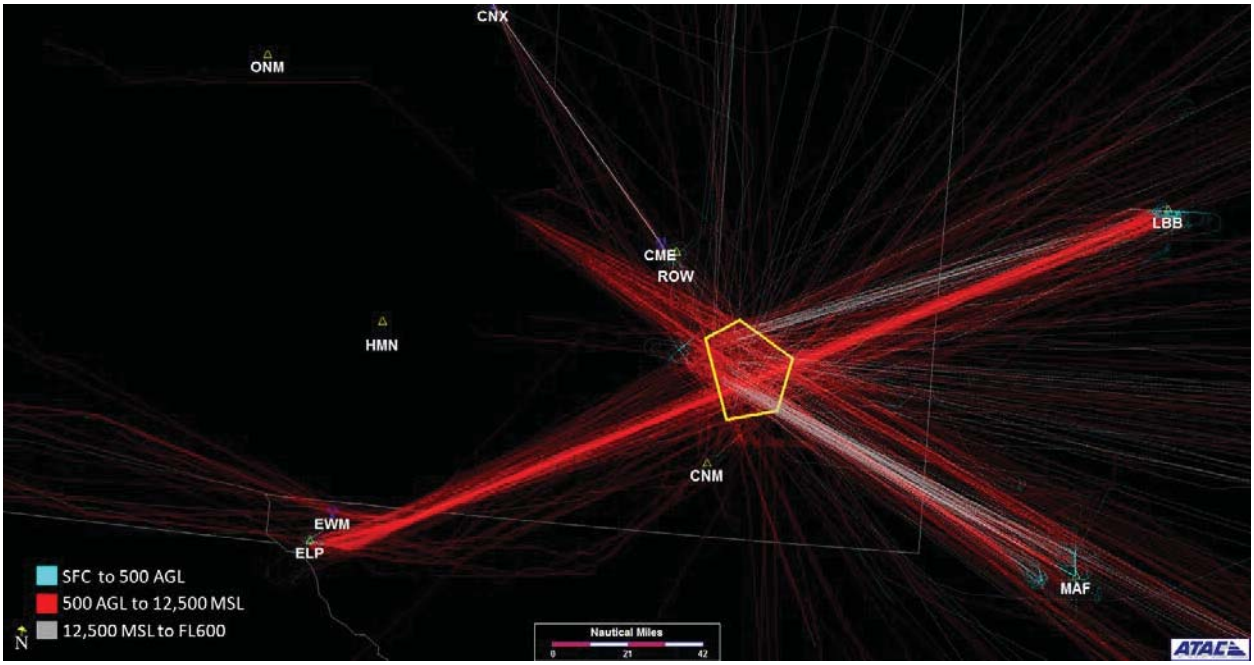


Figure 2-6: Civilian Traffic Flows – X-Talon Low B MOA

The following tables present origin and destination airports for civilian flights in the X-Talon High MOAs.

Table 2-32: Origin Airport - Civilian Flights – X-Talon High A MOA

Origin Airport	Count	Percent
Cavern City Air Terminal (CNM)	214	28.4%
Albuquerque International Sunport (ABQ)	130	17.2%
Lubbock Preston Smith International Airport (LBB)	33	4.4%
El Paso International Airport (ELP)	23	3.1%
Abernathy Field Airport (GZS)	21	2.8%
Other*/Unknown	333	44.2%
Total	**754**	**100.0%**

* Less than 3%

Table 2-33: Destination Airport - Civilian Flights – X-Talon High A MOA

Destination Airport	Count	Percent
Cavern City Air Terminal (CNM)	199	26.4%
El Paso International Airport (ELP)	155	20.6%
Albuquerque International Sunport (ABQ)	102	13.5%
Alamogordo–White Sands Regional Airport (ALM)	27	3.6%
Sierra Blanca Regional Airport (SRR)	23	3.1%
Las Cruces International Airport (LRU)	19	2.5%
Other*/Unknown	229	30.4%
Total	**754**	**100.0%**

* Less than 3%

Table 2-34: Origin Airport - Civilian Flights – X-Talon High B MOA

Origin Airport	Count	Percent
Cavern City Air Terminal (CNM)	298	32.8%
Midland International Airport (MAF)	49	5.4%
Lubbock Preston Smith International Airport (LBB)	28	3.1%
Roswell International Air Center (ROW)	27	3.0%
Other*/Unknown	506	55.7%
Total	**908**	**100.0%**

* Less than 3%

Table 2-35: Destination Airport - Civilian Flights – X-Talon High B MOA

Destination Airport	Count	Percent
Lubbock Preston Smith International Airport (LBB)	120	13.2%
Midland International Airport (MAF)	90	9.9%
El Paso International Airport (ELP)	72	7.9%
Dallas/Fort Worth International Airport (DFW)	72	7.9%
Artesia Municipal Airport (ATS)	71	7.8%
Cavern City Air Terminal (CNM)	55	6.1%
Sierra Blanca Regional Airport (SRR)	41	4.5%
Albuquerque International Sunport (ABQ)	33	3.6%
Other*/Unknown	354	39.0%
Total	**908**	**100.0%**

* Less than 3%

Table 2-36: Origin Airport - Civilian Flights – X-Talon High C MOA

Origin Airport	Count	Percent
Roswell International Air Center (ROW)	64	18.8%
Artesia Municipal Airport (ATS)	41	12.1%
Lea County Regional Airport (HOB)	34	10.0%
Albuquerque International Sunport (ABQ)	27	7.9%
Lubbock Preston Smith International Airport (LBB)	24	7.1%
George Bush Intercontinental/Houston Airport (IAH)	17	5.0%
Midland International Airport (MAF)	13	3.8%
Other*/Unknown	120	35.3%
Total	**340**	**100.0%**

* Less than 3%

Table 2-37: Destination Airport - Civilian Flights – X-Talon High C MOA

Destination Airport	Count	Percent
Roswell International Air Center (ROW)	69	20.3%
Artesia Municipal Airport (ATS)	34	10.0%
Lea County Regional Airport (HOB)	31	9.1%
Albuquerque International Sunport (ABQ)	30	8.8%
Lubbock Preston Smith International Airport (LBB)	24	7.1%
Midland International Airport (MAF)	13	3.8%
Cavern City Air Terminal (CNM)	13	3.8%
George Bush Intercontinental/Houston Airport (IAH)	12	3.5%
Sierra Blanca Regional Airport (SRR)	11	3.2%
El Paso International Airport (ELP)	11	3.2%
Dallas-Fort Worth International Airport (DFW)	9	2.6%
Other*/Unknown	83	24.4%
Total	**340**	**100.0%**

* Less than 3%

Table 2-38: Origin Airport - Civilian Flights – X-Talon Low A MOA

Origin Airport	Count	Percent
Cavern City Air Terminal (CNM)	142	19.5%
El Paso International Airport (ELP)	140	19.2%
Lubbock Preston Smith International Airport (LBB)	98	13.5%
Other*/Unknown	348	47.8%
Total	**728**	**100.0%**

* Less than 3%

Table 2-39: Destination Airport - Civilian Flights – X-Talon Low A MOA

Destination Airport	Count	Percent
El Paso International Airport (ELP)	153	21.0%
Alamogordo–White Sands Regional Airport (ALM)	102	14.0%
Cavern City Air Terminal (CNM)	88	12.1%
Lubbock Preston Smith International Airport (LBB)	67	9.2%
Las Cruces International Airport (LRU)	27	3.7%
Dona Ana County Airport at Santa Teresa (5T6)	20	2.7%
Other*/Unknown	271	37.2%
Total	**728**	**100.0%**

* Less than 3%

Table 2-40: Origin Airport - Civilian Flights – X-Talon Low B MOA

Origin Airport	Count	Percent
Artesia Municipal Airport (ATS)	117	16.7%
Lubbock Preston Smith International Airport (LBB)	114	16.3%
Midland International Airport (MAF)	82	11.7%
El Paso International Airport (ELP)	77	11.0%
Roswell International Air Center (ROW)	46	6.6%
Sierra Blanca Regional Airport (SRR)	22	3.1%
Other*/Unknown	242	34.6%
Total	**700**	**100.0%**

* Less than 3%

Table 2-41: Destination Airport - Civilian Flights – X-Talon Low B MOA

Destination Airport	Count	Percent
Artesia Municipal Airport (ATS)	137	19.6%
El Paso International Airport (ELP)	86	12.3%
Lubbock Preston Smith International Airport (LBB)	81	11.6%
Sierra Blanca Regional Airport (SRR)	63	9.0%
Midland International Airport (MAF)	53	7.6%
Cavern City Air Terminal (CNM)	42	6.0%
Odessa Airport-Schlemeyer Field (ODO)	23	3.3%
Other*/Unknown	215	30.7%
Total	**700**	**100.0%**

* Less than 3%

Figure 2-7 presents military traffic through X-Talon High A MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

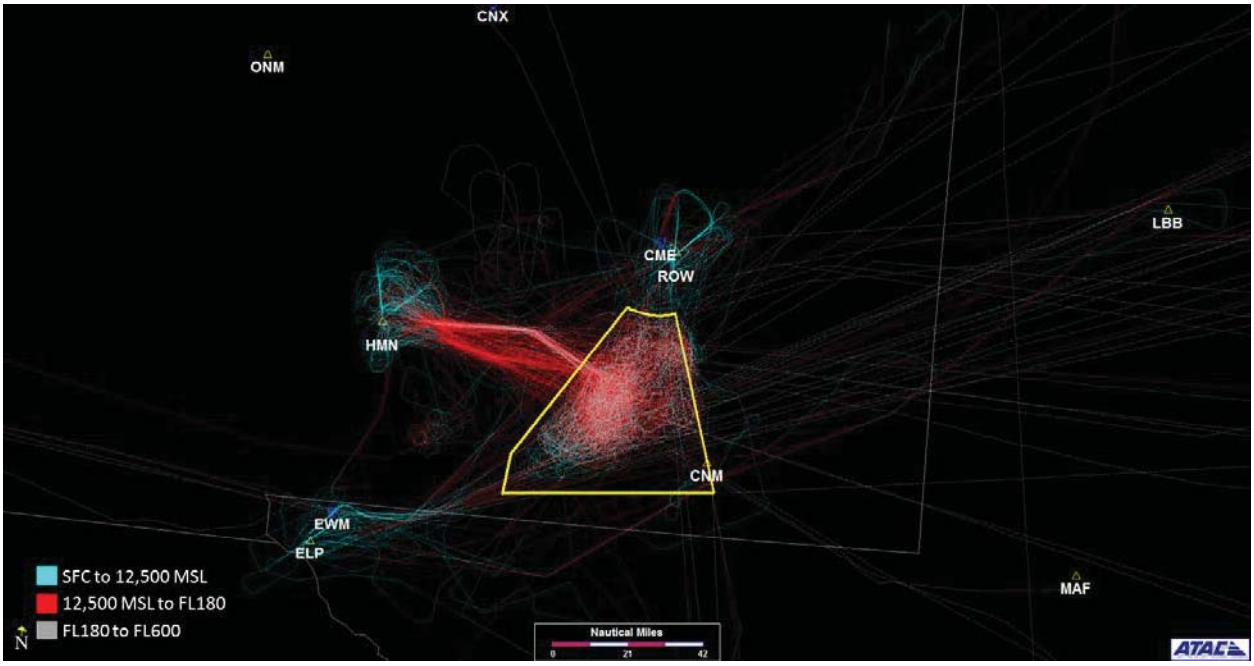


Figure 2-7: Military Traffic Flows – X-Talon High A MOA

Figure 2-8 presents military traffic through X-Talon High B MOA.

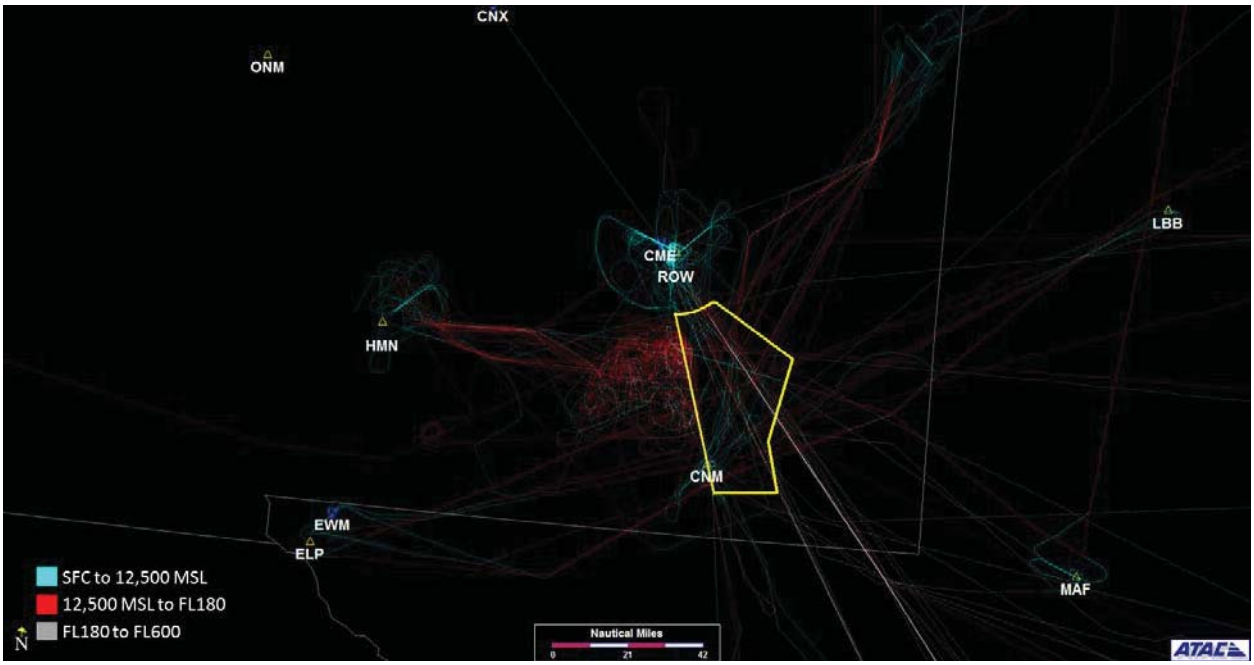


Figure 2-8: Military Traffic Flows – X-Talon High B MOA

Figure 2-9 presents military traffic through X-Talon High C MOA.

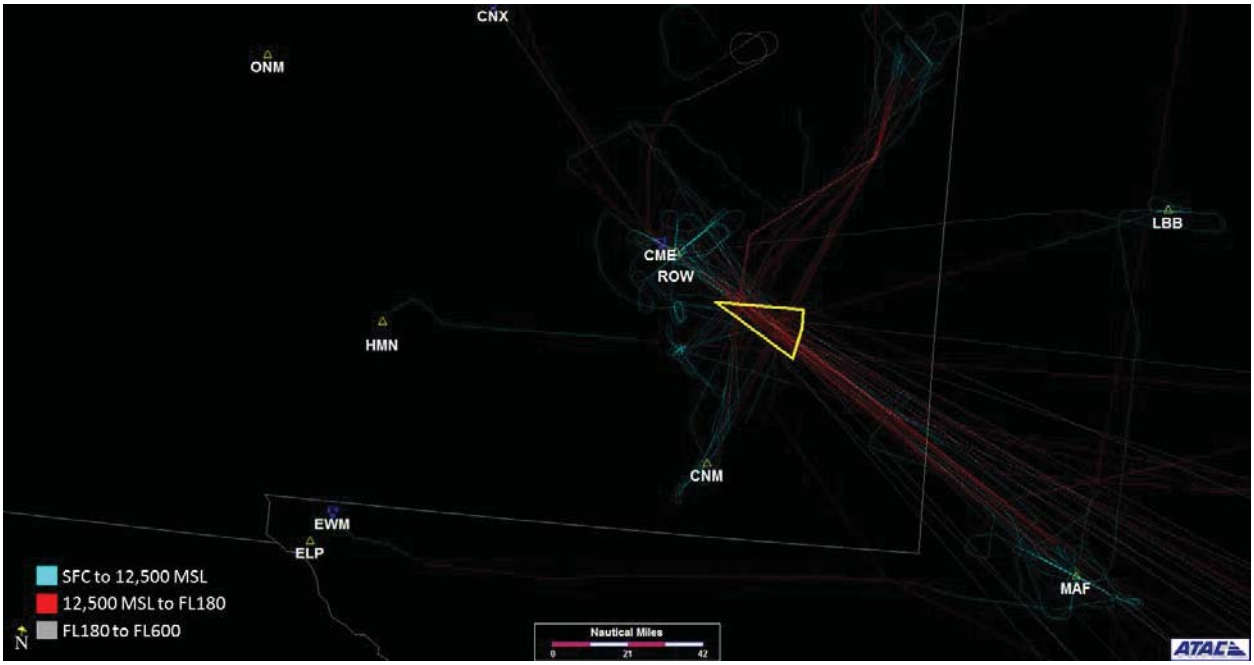


Figure 2-9: Military Traffic Flows – X-Talon High C MOA

Figure 2-10 presents military traffic through X-Talon Low A MOA.

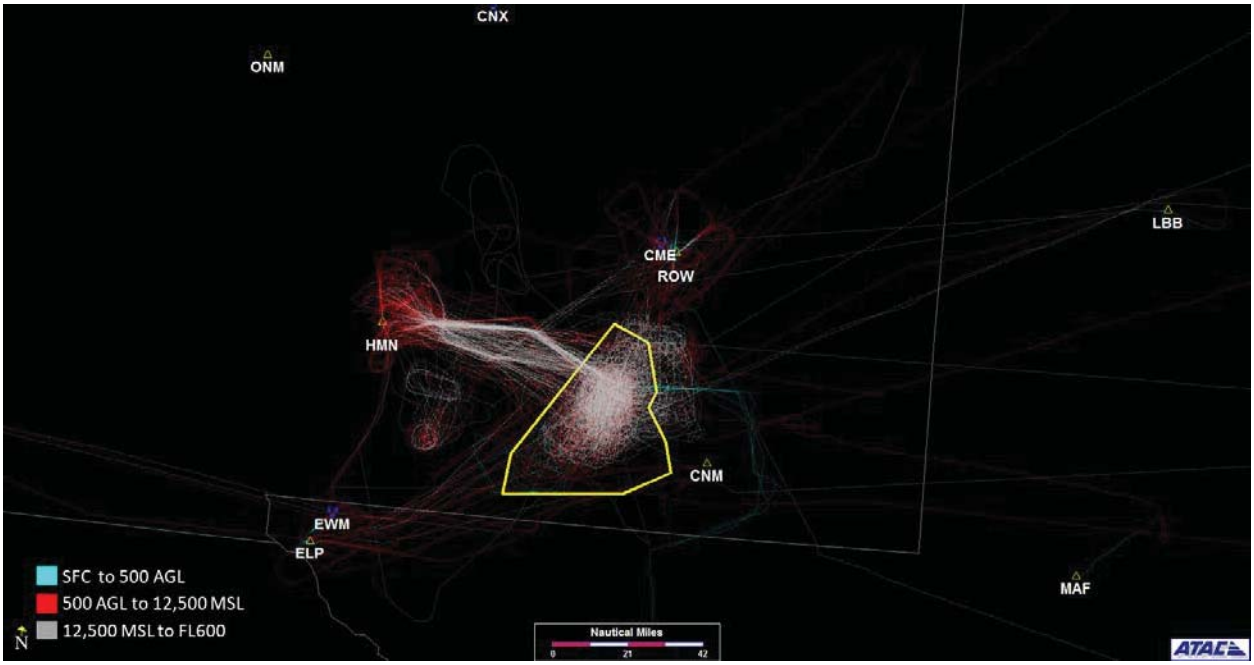


Figure 2-10: Military Traffic Flows – X-Talon Low A MOA

Figure 2-11 presents military traffic through X-Talon Low B MOA.

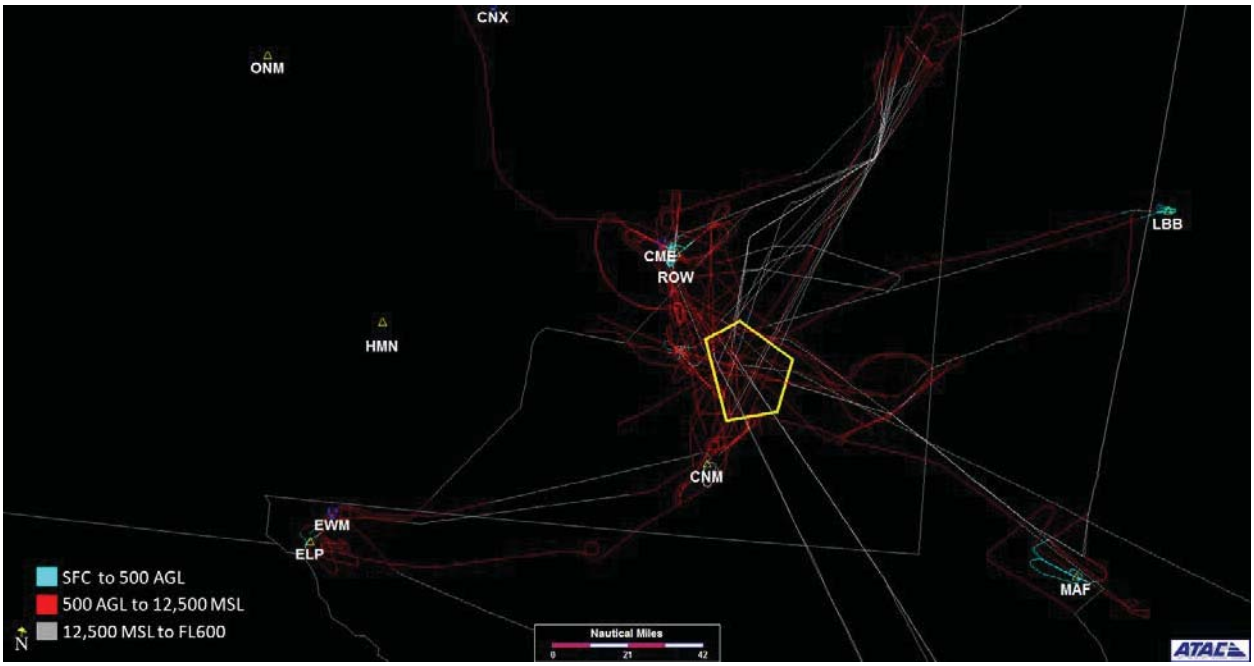


Figure 2-11: Military Traffic Flows – X-Talon Low B MOA

Table 2-42: Origin Airport - Military Flights – X-Talon High A MOA

Origin Airport	Count	Percent
Holloman AFB (HMN)	206	72.3%
Sheppard AFB (SPS)	10	3.5%
El Paso International Airport (ELP)	9	3.2%
Other*/Unknown	60	21.1%
Total	**285**	**100.0%**

* Less than 3%

Table 2-43: Destination Airport - Military Flights – X-Talon High A MOA

Destination Airport	Count	Percent
Holloman AFB (HMN)	218	76.5%
El Paso International Airport (ELP)	15	5.3%
Biggs Army Airfield (Fort Bliss) (BIF)	12	4.2%
Roswell International Air Center (ROW)	10	3.5%
Other*/Unknown	30	10.5%
Total	**285**	**100.0%**

* Less than 3%

Table 2-44: Origin Airport - Military Flights – X-Talon High B MOA

Origin Airport	Count	Percent
Holloman AFB (HMN)	18	18.4%
Cannon AFB (CVS)	17	17.3%
Roswell International Air Center (ROW)	14	14.3%
Laughlin AFB (DLF)	14	14.3%
El Paso International Airport (ELP)	5	5.1%
Cavern City Air Terminal (CNM)	5	5.1%
Biggs Army Airfield (Fort Bliss) (BIF)	3	3.1%
Other*/Unknown	22	22.4%
Total	**98**	**100.0%**

* Less than 3%

Table 2-45: Destination Airport - Military Flights – X-Talon High B MOA

Destination Airport	Count	Percent
Holloman AFB (HMN)	23	23.5%
Roswell International Air Center (ROW)	19	19.4%
Cannon AFB (CVS)	16	16.3%
Laughlin AFB (DLF)	10	10.2%
Lubbock Preston Smith International Airport (LBB)	5	5.1%
Biggs Army Airfield (Fort Bliss) (BIF)	3	3.1%
Other*/Unknown	22	22.4%
Total	**98**	**100.0%**

* Less than 3%

Table 2-46: Origin Airport - Military Flights – X-Talon Low A MOA

Origin Airport	Count	Percent
Holloman AFB (HMN)	155	81.2%
El Paso International Airport (ELP)	7	3.7%
Other*/Unknown	29	15.2%
Total	**191**	**100.0%**

* Less than 3%

Table 2-47: Destination Airport - Military Flights – X-Talon Low A MOA

Destination Airport	Count	Percent
Holloman AFB (HMN)	158	82.7%
Other*/Unknown	33	17.3%
Total	**191**	**100.0%**

* Less than 3%

2.1.2 X-Talon ATCAA

Table 2-48 presents the baseline PDARS flight counts for X-Talon ATCAA, broken out by civilian and military user. Civilian users accounted for approximately 95-97% of total flight counts in X-Talon ATCAA.

Table 2-48: Monthly Flight Counts FY16 – X-Talon ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	4,451	96.0%	4,621	96.1%	3,985	95.5%	5,901	97.2%
Military	186	4.0%	190	3.9%	187	4.5%	170	2.8%
Total	**4,637**	**100%**	**4,811**	**100%**	**4,172**	**100%**	**6,071**	**100%**

Table 2-49 presents the average and maximum number of daily flight counts in X-Talon ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-49: Average and Maximum Daily Flight Counts – X-Talon ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	143.6	225	149.1	225	132.8	233	190.4	300
Military	6.0	25	6.1	20	6.2	15	5.5	14

The following tables present flight counts for X-Talon ATCAA by day of week and hour.

Table 2-50: Civilian Flight Counts by Day of Week – X-Talon ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	742	962	864	1,071
Monday	590	652	351	759
Tuesday	611	390	450	809
Wednesday	554	448	445	613
Thursday	645	495	438	678
Friday	680	715	695	1,120
Saturday	629	959	742	851
Total	**4,451**	**4,621**	**3,985**	**5,901**

Table 2-51: Military Flight Counts by Day of Week- X-Talon ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	17	15	8	6
Monday	22	17	34	23
Tuesday	36	25	32	26
Wednesday	21	24	32	27
Thursday	33	42	35	37
Friday	50	55	32	46
Saturday	7	12	14	5
Total	**186**	**190**	**187**	**170**

Table 2-52: Civilian Flight Counts by Hour – X-Talon ATCAA

Hour	Oct	Jan	Apr	Jul
0000	64	105	96	142
0100	66	83	62	83
0200	113	124	106	94
0300	96	94	109	104
0400	25	45	19	34
0500	68	54	65	67
0600	130	106	91	150
0700	105	118	113	112
0800	189	163	144	224
0900	294	302	253	312
1000	161	266	236	253
1100	209	278	223	256
1200	186	283	261	264
1300	214	258	170	265
1400	283	248	204	357
1500	272	306	237	294
1600	204	247	212	294
1700	253	281	230	374
1800	234	219	219	446
1900	288	225	182	371
2000	277	325	185	445
2100	267	238	199	398
2200	387	192	266	353
2300	66	61	103	209
Total	**4,451**	**4,621**	**3,985**	**5,901**

Table 2-53: Military Flight Counts by Hour – X-Talon ATCAA

Hour	Oct	Jan	Apr	Jul
0000	1	0	2	0
0100	3	2	0	0
0200	0	0	0	0
0300	0	0	3	0
0400	0	0	2	0
0500	0	0	1	1
0600	0	0	0	4
0700	4	8	7	7
0800	10	8	8	3
0900	9	13	14	24
1000	23	12	13	16
1100	21	20	15	18
1200	26	21	12	13
1300	20	26	14	16
1400	28	29	31	9
1500	25	19	13	21
1600	4	12	14	8
1700	2	8	14	7
1800	4	5	8	5
1900	3	4	2	8
2000	1	2	6	4
2100	2	1	5	5
2200	0	0	3	1
2300	0	0	0	0
Total	**186**	**190**	**187**	**170**

Table 2-54 presents the average number of minutes spent transiting X-Talon ATCAA broken out by civilian and military users. On average, civilian flights through X-Talon ATCAA ranged from 5.5 to 5.8 minutes. Military flights through X-Talon ATCAA ranged from 6.5 to 11.7 minutes.

Table 2-54: Average Duration of Flights – X-Talon ATCAA

User	Oct	Jan	Apr	Jul
Civilian	5.5	5.5	5.7	5.8
Military	10.2	9.1	11.7	6.5

Figure 2-12 presents civilian traffic flows through X-Talon ATCAA.

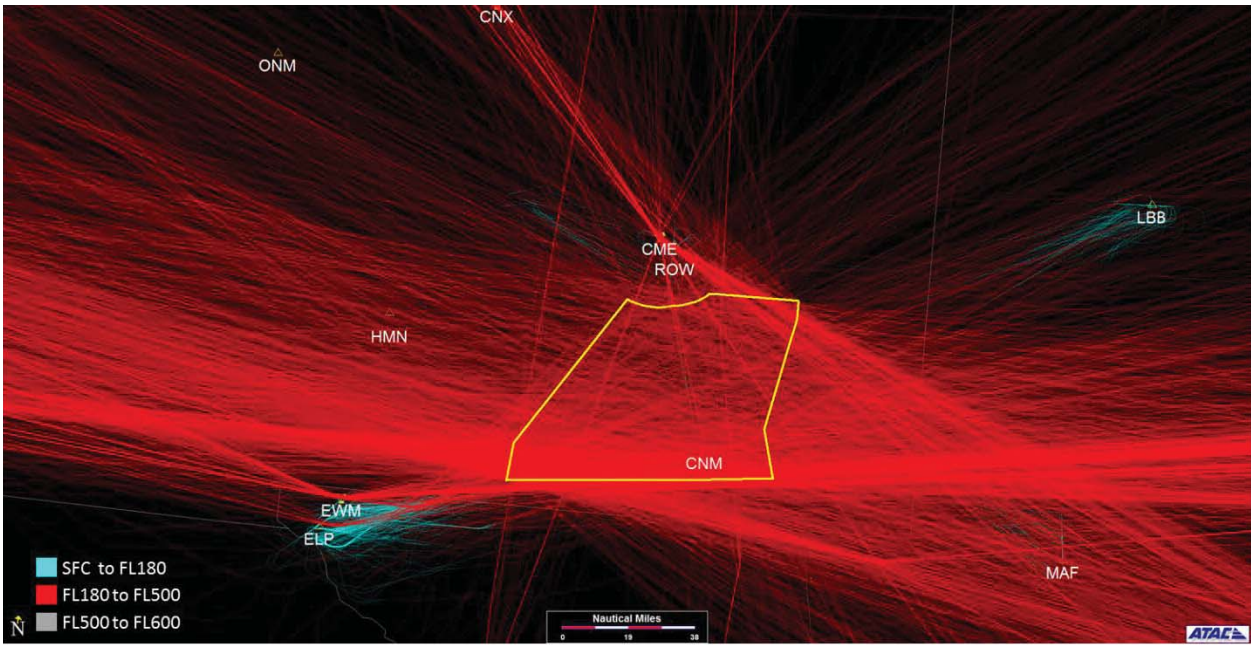


Figure 2-12: Civilian Traffic Flows – X-Talon ATCAA

The following tables present origin and destination airports for civilian flights in X-Talon ATCAA.

Table 2-55: Origin Airport - Civilian Flights – X-Talon ATCAA

Origin Airport	Count	Percent
Dallas/Fort Worth International Airport (DFW)	2,201	11.6%
Los Angeles International Airport (LAX)	1,786	9.4%
George Bush Intercontinental Airport (IAH)	1,136	6.0%
Phoenix Sky Harbor International Airport (PHX)	1,034	5.5%
McCarran International Airport (LAS)	1,033	5.4%
Dallas Love Field (DAL)	874	4.6%
William P. Hobby Airport (HOU)	701	3.7%
San Diego International Airport (SAN)	683	3.6%
El Paso International Airport (ELP)	623	3.3%
Hartsfield–Jackson Atlanta International Airport (ATL)	586	3.1%
Other*/Unknown	8,301	43.8%
Total	**18,958**	**100.0%**

* Less than 3%

Table 2-56: Destination Airport - Civilian Flights – X-Talon ATCAA

Destination Airport	Count	Percent
Los Angeles International Airport (LAX)	1,939	10.2%
Dallas/Fort Worth International Airport (DFW)	1,665	8.8%
Phoenix Sky Harbor International Airport (PHX)	1,337	7.1%
McCarran International Airport (LAS)	1,272	6.7%
George Bush Intercontinental Airport (IAH)	1,134	6.0%
San Diego International Airport (SAN)	906	4.8%
Albuquerque International Sunport (ABQ)	875	4.6%
Austin-Bergstrom International Airport (AUS)	724	3.8%
El Paso International Airport (ELP)	636	3.4%
Tucson International Airport (TUS)	612	3.2%
Other*/Unknown	7,858	41.4%
Total	**18,958**	**100.0%**

* Less than 3%

Figure 2-13 presents military traffic through X-Talon ATCAA. Flights may be descending or climbing into or out of the ATCAA, which is why some tracks change color along flight path.

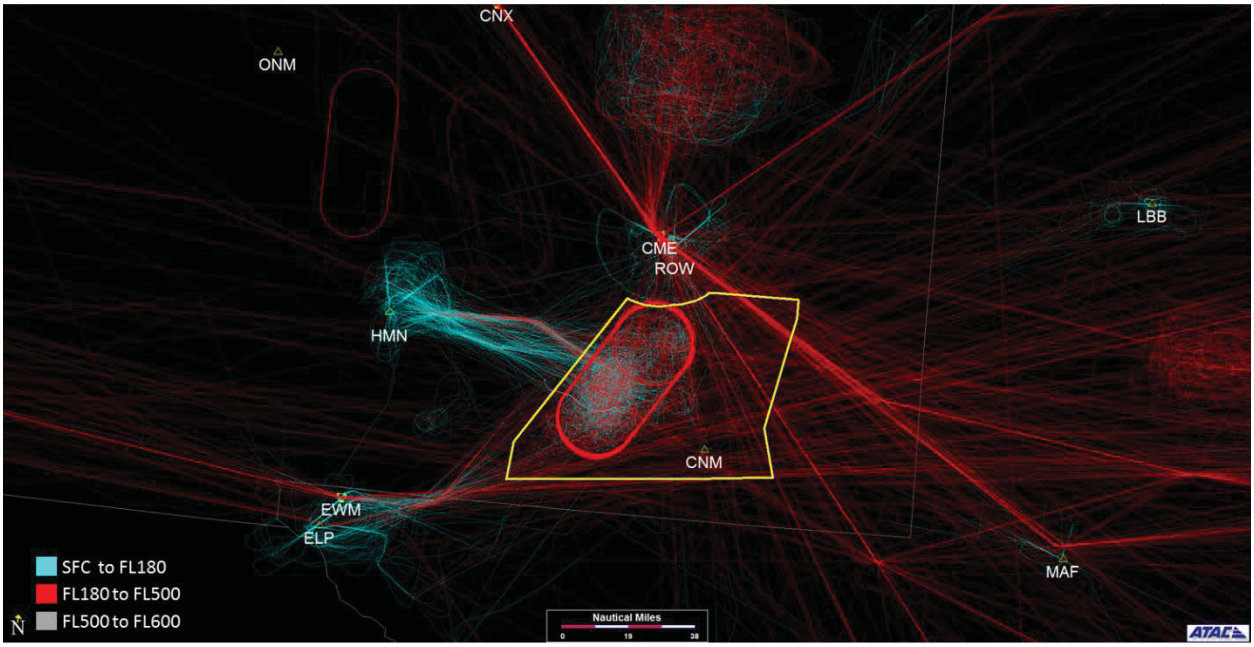


Figure 2-13: Military Traffic Flows – X-Talon ATCAA

Table 2-57: Origin Airport - Military Flights – X-Talon ATCAA

Origin Airport	Count	Percent
Holloman AFB (HMN)	166	22.6%
Dyess AFB (DYS)	127	17.3%
Sheppard AFB (SPS)	46	6.3%
Tinker AFB (TIK)	28	3.8%
Roswell International Air Center (ROW)	24	3.3%
El Paso International Airport (ELP)	24	3.3%
Barksdale AFB (BAD)	23	3.1%
Other*/Unknown	295	40.2%
Total	**733**	**100.0%**

* Less than 3%

Table 2-58: Destination Airport - Military Flights – X-Talon ATCAA

Destination Airport		Percent
Holloman AFB (HMN)	177	24.1%
Dyess AFB (DYS)	124	16.9%
El Paso International Airport (ELP)	52	7.1%
Tinker AFB (TIK)	31	4.2%
Biggs Army Airfield (Fort Bliss) (BIF)	29	4.0%
Roswell International Air Center (ROW)	27	3.7%
Barksdale AFB (BAD)	23	3.1%
Other*/Unknown	270	36.8%
Total	**733**	**100.0%**

* Less than 3%

2.2 EIS Alternative 2

This section presents analysis for proposed airspace associated with the *Special Use Airspace Modifications, Holloman AFB* EIS Alternative 2. These areas include proposed operating areas of New Smitty/Cato and Lobos MOAs as well as Christa and Kendra ATCAAs. Smitty and Cato MOAs will be scheduled together, and were treated as a single MOA for analysis. The location of the airspace is presented in *Figure 2-14*, and the altitudes of each of the Alternative 2 SUAs are listed below:

- Smitty (500 – 13,500), western corner has floor of 1,600
- Cato (13,500 – 18,000)
- Lobos Low (500 – 13,500), Lobos High (13,500 – 18,000)
- Christa ATCAA (FL180-FL510)
- Kendra ATCAA (FL180-FL510)

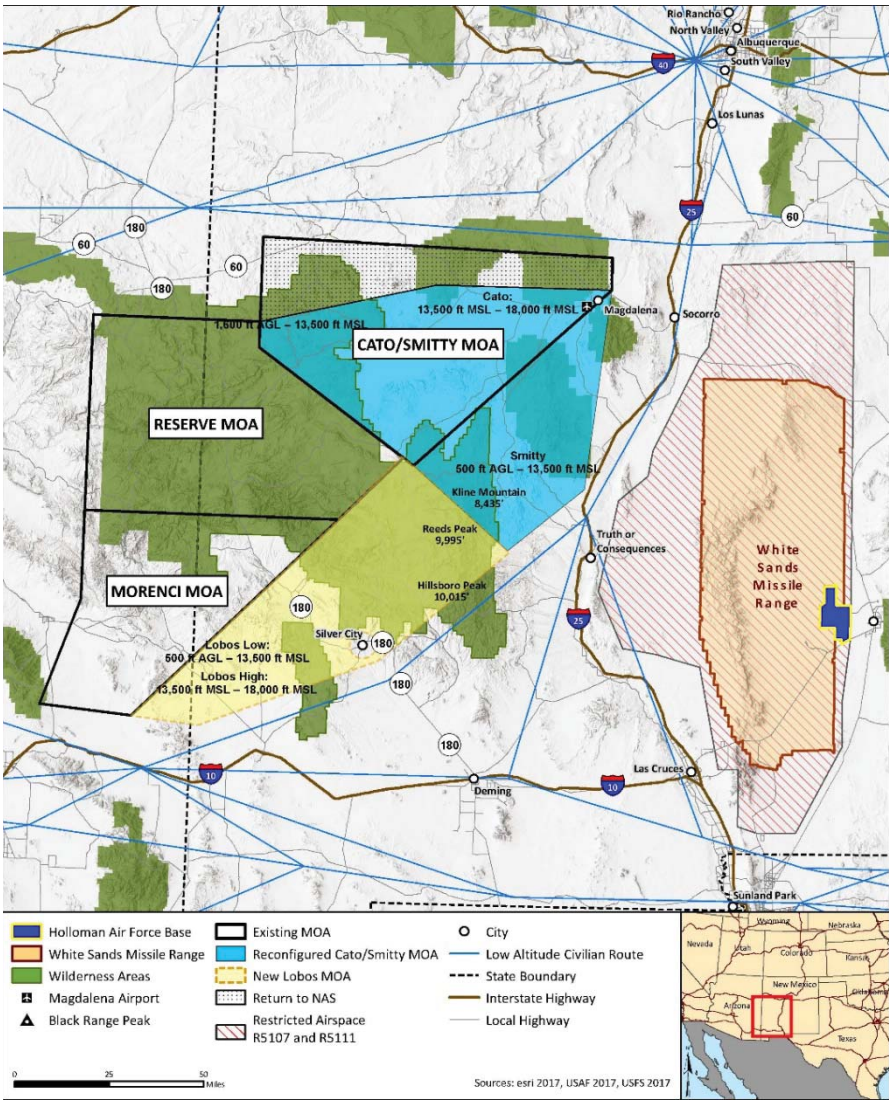


Figure 2-14: Alternative 2 Airspace

2.2.1 New Smitty/Cato MOA

Table 2-59 present the baseline PDARS flight counts for the New Smitty/Cato MOA, broken out by civilian and military user. The majority of flights transiting this airspace were civilian.

Table 2-59: Monthly Flight Counts FY16 – New Smitty/Cato MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	162	93.6%	129	87.8%	88	86.3%	145	94.2%
Military	11	6.4%	18	12.2%	14	13.7%	9	5.8%
Total	**173**	**100%**	**147**	**100%**	**102**	**100%**	**154**	**100%**

Table 2-60 presents the average and maximum number of daily flight counts in the New Smitty/Cato MOA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-60: Average and Maximum Daily Flight Counts – New Smitty/Cato MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	5.2	11	4.2	9	2.9	8	4.7	11
Military	0.4	2	0.6	4	0.5	3	0.3	2

Table 2-61 and *Table 2-62* present flight counts for the New Smitty/Cato MOA by day of week.

Table 2-61: Civilian Flight Counts by Day of Week – New Smitty/Cato MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	17	15	10	18
Monday	25	17	13	20
Tuesday	18	16	10	22
Wednesday	28	17	17	17
Thursday	26	22	9	19
Friday	33	23	16	33
Saturday	15	19	13	16
Total	**162**	**129**	**88**	**145**

Table 2-62: Military Flight Counts by Day of Week- New Smitty/Cato MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	0	0	2	0
Monday	1	0	2	3
Tuesday	1	4	2	1
Wednesday	1	1	4	1
Thursday	3	6	2	4
Friday	2	6	1	0
Saturday	3	1	1	0
Total	**11**	**18**	**14**	**9**

The following tables present flight counts by hour through the New Smitty/Cato MOA.

Table 2-63: Civilian Flight Counts by Hour – New Smitty/Cato MOA

Hour	Oct	Jan	Apr	Jul
0000	1	2	0	1
0100	2	1	1	0
0200	0	0	1	0
0300	0	0	1	1
0400	0	1	0	0
0500	0	1	0	0
0600	0	5	2	12
0700	6	6	0	10
0800	21	19	12	20
0900	14	4	3	8
1000	6	4	11	8
1100	16	6	7	9
1200	11	6	5	10
1300	7	9	3	7
1400	17	6	5	6
1500	11	7	3	9
1600	12	13	5	2
1700	8	4	3	13
1800	19	11	11	9
1900	4	16	3	5
2000	1	5	2	6
2100	1	2	4	3
2200	4	1	6	5
2300	1	0	0	1
Total	**162**	**129**	**88**	**145**

Table 2-64: Military Flight Counts by Hour – New Smitty/Cato MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	0	0	0
0800	0	0	0	2
0900	0	0	1	0
1000	1	0	1	0
1100	2	1	2	0
1200	1	3	0	0
1300	0	1	0	1
1400	2	2	2	1
1500	1	2	0	1
1600	1	0	3	0
1700	1	3	1	1
1800	0	1	2	0
1900	0	1	1	0
2000	0	3	0	1
2100	2	1	0	0
2200	0	0	1	1
2300	0	0	0	1
Total	**11**	**18**	**14**	**9**

Table 2-65 presents the average number of minutes spent transiting the New Smitty/Cato MOA broken out by civilian and military users.

Table 2-65: Average Duration of Flights – New Smitty/Cato MOA

User	Oct	Jan	Apr	Jul
Civilian	8.7	9.6	10.6	10.6
Military	5.6	10.3	7.2	6.7

Figure 2-15 presents civilian traffic flows through New Smitty/Cato MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

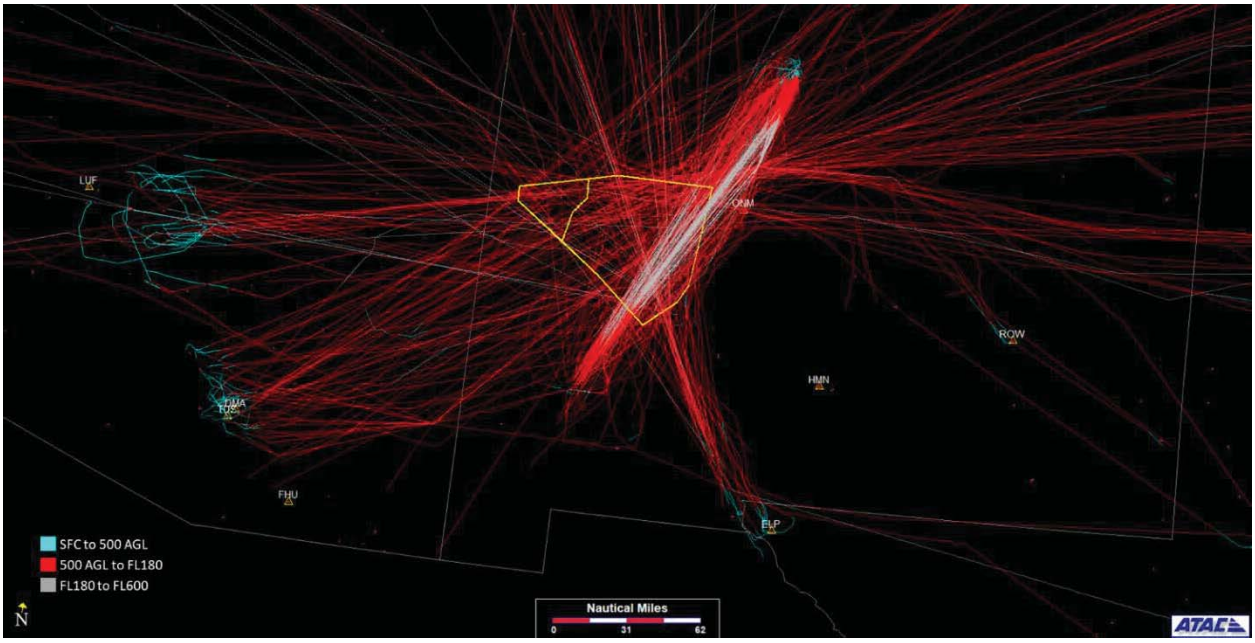


Figure 2-15: Civilian Traffic Flows – New Smitty/Cato MOA

The following tables present origin and destination airports for civilian flights in the New Smitty/Cato MOA.

Table 2-66: Origin Airport - Civilian Flights – New Smitty/Cato MOA

Origin Airport	Count	Percent
Albuquerque International Sunport (ABQ)	189	36.1%
Grant County Airport (SVC)	68	13.0%
Tucson International Airport (TUS)	25	4.8%
Las Cruces International Airport (LRU)	17	3.2%
Other*/Unknown	225	42.9%
Total	**524**	**100.0%**

* Less than 3%

Table 2-67: Destination Airport - Civilian Flights – New Smitty/Cato MOA

Destination Airport	Count	Percent
Grant County Airport (SVC)	169	32.3%
Albuquerque International Sunport (ABQ)	78	14.9%
Tucson International Airport (TUS)	28	5.3%
Other*/Unknown	249	47.5%
Total	**524**	**100.0%**

* Less than 3%

Figure 2-16 presents military traffic through New Smitty/Cato MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

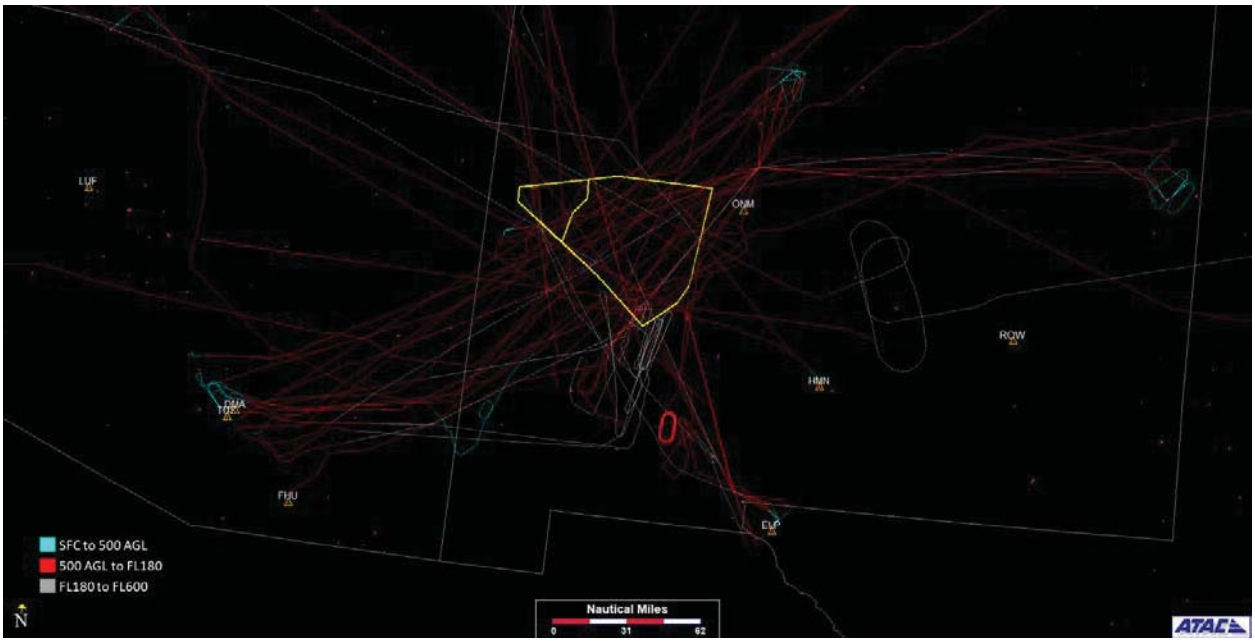


Figure 2-16: Military Traffic Flows – New Smitty/Cato MOA

Table 2-68: Origin Airport - Military Flights – New Smitty/Cato MOA

Origin Airport	Count	Percent
Cannon AFB (CVS)	5	9.6%
El Paso International Airport (ELP)	5	9.6%
Tucson International Airport (TUS)	4	7.7%
Grant County Airport (SVC)	4	7.7%
Albuquerque International Sunport (ABQ)	4	7.7%
Santa Fe Municipal Airport (SAF)	3	5.8%
Phoenix Sky Harbor International Airport (PHX)	2	3.8%
Davis Monthan AFB (DMA)	2	3.8%
Biggs Army Airfield (Fort Bliss) (BIF)	2	3.8%
Other*/Unknown	21	40.4%
Total	**52**	**100.0%**

* Less than 3%

Table 2-69: Destination Airport - Military Flights – New Smitty/Cato MOA

Destination Airport	Count	Percent
Cannon AFB (CVS)	7	13.5%
Davis Monthan AFB (DMA)	6	11.5%
Albuquerque International Sunport (ABQ)	6	11.5%
Grant County Airport (SVC)	3	5.8%
Biggs Army Airfield (Fort Bliss) (BIF)	3	5.8%
Tucson International Airport (TUS)	3	5.8%
Holloman AFB (HMN)	2	3.8%
Other*/Unknown	22	42.3%
Total	**52**	**100.0%**

* Less than 3%

2.2.2 New Smitty/Cato ATCAA

Table 2-70 presents the baseline PDARS flight counts for New Smitty/Cato ATCAA, broken out by civilian and military user. Civilian users accounted for approximately 95-98% of total flight counts in New Smitty/Cato ATCAA.

Table 2-70: Monthly Flight Counts FY16 – New Smitty/Cato ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	3,230	95.9%	4,021	97.5%	3,253	96.3%	3,928	98.3%
Military	137	4.1%	102	2.5%	125	3.7%	69	1.7%
Total	**3,367**	**100%**	**4,123**	**100%**	**3,378**	**100%**	**3,997**	**100%**

Table 2-71 presents the average and maximum number of daily flight counts in New Smitty/Cato ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-71: Average and Maximum Daily Flight Counts – New Smitty/Cato ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	104.2	178	129.7	201	108.4	200	126.7	204
Military	4.4	12	3.3	12	4.2	10	2.2	8

The following tables present flight counts for New Smitty/Cato ATCAA by day of week and hour.

Table 2-72: Civilian Flight Counts by Day of Week – New Smitty/Cato ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	630	776	634	789
Monday	370	536	341	476
Tuesday	365	428	321	487
Wednesday	367	376	363	394
Thursday	458	441	338	439
Friday	455	641	554	698
Saturday	585	823	702	645
Total	**3,230**	**4,021**	**3,253**	**3,928**

Table 2-73: Military Flight Counts by Day of Week- New Smitty/Cato ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	13	24	10	5
Monday	24	10	21	9
Tuesday	14	11	20	6
Wednesday	17	7	24	11
Thursday	33	19	19	15
Friday	28	18	21	20
Saturday	8	13	10	3
Total	**137**	**102**	**125**	**69**

Table 2-74: Civilian Flight Counts by Hour – New Smitty/Cato ATCAA

Hour	Oct	Jan	Apr	Jul
0000	96	138	95	148
0100	60	73	62	121
0200	97	124	88	92
0300	66	85	57	115
0400	18	32	20	32
0500	26	31	31	34
0600	35	64	57	122
0700	83	130	130	104
0800	168	187	203	162
0900	239	209	207	221
1000	108	160	160	131
1100	201	297	213	185
1200	177	266	199	144
1300	171	229	154	150
1400	170	188	149	161
1500	160	223	176	164
1600	177	223	188	145
1700	171	246	202	270
1800	148	158	144	208
1900	198	260	169	319
2000	182	209	140	248
2100	225	203	175	294
2200	173	175	120	159
2300	81	111	114	199
Total	**3,230**	**4,021**	**3,253**	**3,928**

Table 2-75: Military Flight Counts by Hour – New Smitty/Cato ATCAA

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	1
0100	0	0	0	0
0200	1	1	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	1	1
0700	1	1	0	3
0800	6	3	1	4
0900	5	13	10	3
1000	13	8	13	10
1100	24	12	18	11
1200	16	6	13	10
1300	15	21	15	4
1400	16	10	9	5
1500	13	6	16	5
1600	8	7	6	0
1700	3	5	7	2
1800	3	4	4	4
1900	3	4	7	3
2000	5	1	1	0
2100	2	0	2	0
2200	1	0	2	2
2300	1	0	0	1
Total	**137**	**102**	**125**	**69**

Table 2-76 presents the average number of minutes spent transiting New Smitty/Cato ATCAA broken out by civilian and military users. On average, civilian flights through New Smitty/Cato ATCAA ranged from 6.4 to 6.9 minutes. Military flights through New Smitty/Cato ATCAA ranged from 7.7 to 9.0 minutes.

Table 2-76: Average Duration of Flights – New Smitty/Cato ATCAA

User	Oct	Jan	Apr	Jul
Civilian	6.9	6.8	6.9	6.4
Military	9.0	7.7	8.9	8.2

Figure 2-17 presents civilian traffic flows through New Smitty/Cato ATCAA.

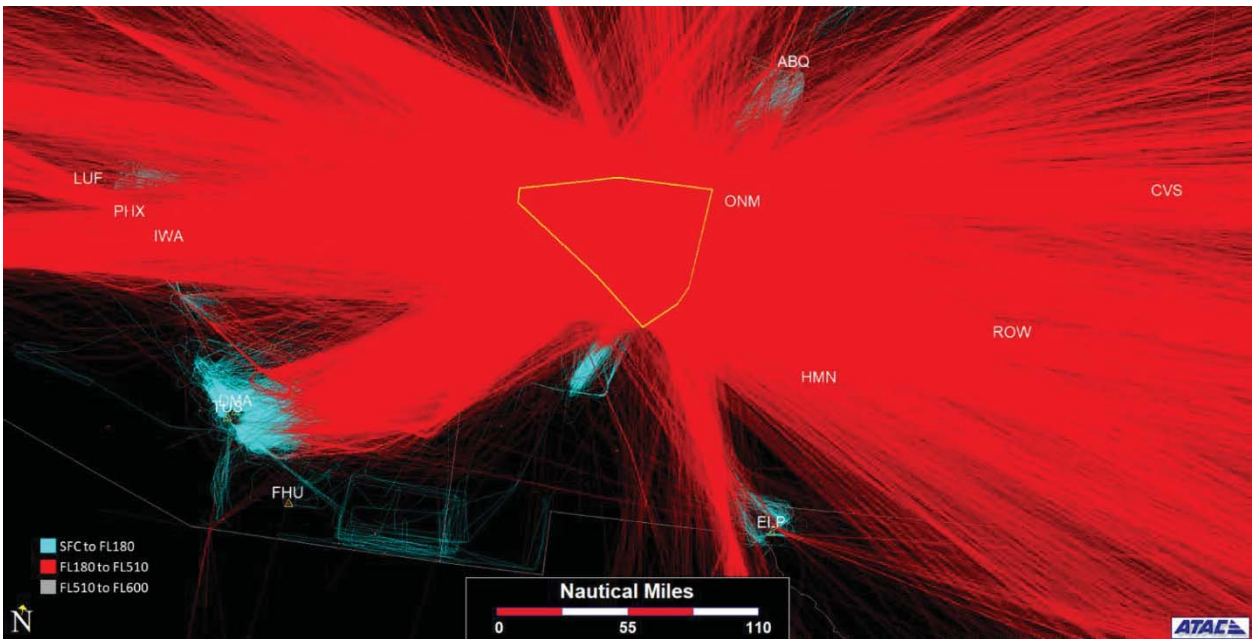


Figure 2-17: Civilian Traffic Flows – New Smitty/Cato ATCAA

The following tables present origin and destination airports for civilian flights in New Smitty/Cato ATCAA.

Table 2-77: Origin Airport - Civilian Flights – New Smitty/Cato ATCAA

Origin Airport	Count	Percent
Phoenix Sky Harbor International Airport (PHX)	1,434	9.9%
Tucson International Airport (TUS)	1,063	7.4%
San Diego International Airport (SAN)	1,013	7.0%
Dallas/Fort Worth International Airport (DFW)	895	6.2%
McCarran International Airport (LAS)	744	5.2%
Los Angeles International Airport (LAX)	710	4.9%
Denver International Airport (DEN)	579	4.0%
Albuquerque International Sunport (ABQ)	481	3.3%
George Bush Intercontinental Airport (IAH)	463	3.2%
Hartsfield–Jackson Atlanta International Airport (ATL)	427	3.0%
Other*/Unknown	6,623	45.9%
Total	**14,432**	**100.0%**

* Less than 3%

Table 2-78: Destination Airport - Civilian Flights – New Smitty/Cato ATCAA

Destination Airport	Count	Percent
Tucson International Airport (TUS)	1,440	10.0%
McCarran International Airport (LAS)	1,282	8.9%
Los Angeles International Airport (LAX)	1,000	6.9%
Dallas/Fort Worth International Airport (DFW)	927	6.4%
San Diego International Airport (SAN)	889	6.2%
Hartsfield–Jackson Atlanta International Airport (ATL)	541	3.7%
Other*/Unknown	8,353	57.9%
Total	**14,432**	**100.0%**

* Less than 3%

Figure 2-18 presents military traffic through New Smitty/Cato ATCAA. Flights may be descending or climbing into or out of the ATCAA, which is why some tracks change color along flight path.

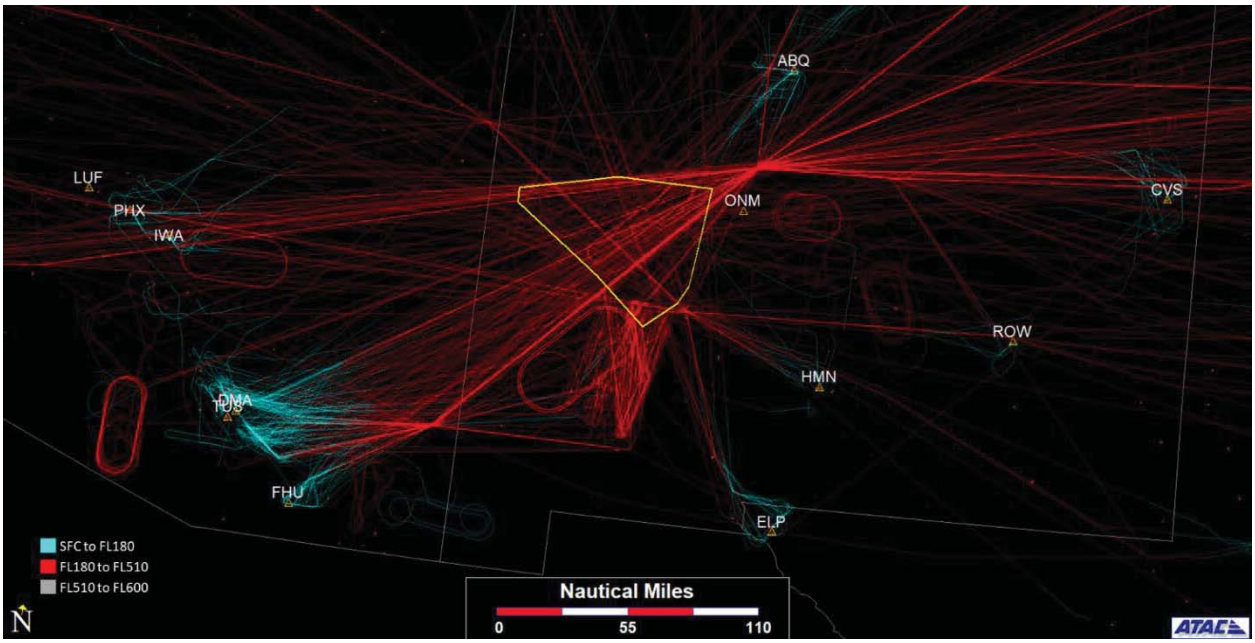


Figure 2-18: Military Traffic Flows – New Smitty/Cato ATCAA

Table 2-79: Origin Airport - Military Flights – New Smitty/Cato ATCAA

Origin Airport	Count	Percent
Davis Monthan AFB (DMA)	86	19.9%
Tucson International Airport (TUS)	27	6.2%
Sierra Vista Municipal Airport (FHU)	21	4.8%
McConnell AFB (IAB)	17	3.9%
Holloman AFB (HMN)	17	3.9%
Phoenix Sky Harbor International Airport (PHX)	15	3.5%
Rosecrans Memorial Airport (STJ)	13	3.0%
Other*/Unknown	237	54.7%
Total	**433**	**100.0%**

Table 2-80: Destination Airport - Military Flights – New Smitty/Cato ATCAA

Destination Airport	Count	Percent
Davis Monthan AFB (DMA)	75	17.3%
Sierra Vista Municipal Airport (FHU)	27	6.2%
Tucson International Airport (TUS)	21	4.8%
McConnell AFB (IAB)	20	4.6%
Rick Husband Amarillo International Airport (AMA)	17	3.9%
Cannon AFB (CVS)	16	3.7%
Albuquerque International Sunport (ABQ)	13	3.0%
Other*/Unknown	244	56.4%
Total	**433**	**100.0%**

* Less than 3%

2.2.3 Lobos MOA

The following tables present the PDARS flight counts for Lobos High and Low MOAs. The majority of flights transiting Lobos High and Low MOAs were civilian.

Table 2-81: Monthly Flight Counts FY16 – Lobos High MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	264	94.6%	223	91.0%	211	89.0%	222	96.1%
Military	15	5.4%	22	9.0%	26	11.0%	9	3.9%
Total	**279**	**100%**	**245**	**100%**	**237**	**100%**	**231**	**100%**

Table 2-82: Monthly Flight Counts FY16 – Lobos Low MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	247	93.6%	204	90.3%	224	91.8%	227	93.4%
Military	17	6.4%	22	9.7%	20	8.2%	16	6.6%
Total	**264**	**100%**	**226**	**100%**	**244**	**100%**	**243**	**100%**

Table 2-83 and *Table 2-84* present the daily average and daily maximum number of flights traversing Lobos High and Low MOAs.

Table 2-83: Average and Maximum Daily Flight Counts – Lobos High MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	8.5	14	7.2	12	7.0	12	7.2	13
Military	0.5	2	0.7	3	0.9	4	0.3	3

Table 2-84: Average and Maximum Daily Flight Counts – Lobos Low MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	8.0	13	6.6	10	7.5	17	7.3	12
Military	0.5	3	0.7	4	0.7	4	0.5	5

The following tables present flight counts for Lobos High and Low MOAs broken out by day of week.

Table 2-85: Civilian Flight Counts by Day of Week – Lobos High MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	37	28	24	31
Monday	39	33	30	32
Tuesday	39	33	28	34
Wednesday	45	28	31	34
Thursday	43	32	32	32
Friday	40	38	43	36
Saturday	21	31	23	23
Total	**264**	**223**	**211**	**222**

Table 2-86: Military Flight Counts by Day of Week – Lobos High MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	0	1	2	0
Monday	1	1	3	3
Tuesday	2	5	6	1
Wednesday	1	1	2	2
Thursday	6	5	5	3
Friday	3	6	6	0
Saturday	2	3	2	0
Total	**15**	**22**	**26**	**9**

Table 2-87: Civilian Flight Counts by Day of Week – Lobos Low MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	33	32	27	35
Monday	35	24	34	36
Tuesday	35	29	27	25
Wednesday	31	23	32	24
Thursday	41	27	41	28
Friday	42	33	40	45
Saturday	30	36	23	34
Total	**247**	**204**	**224**	**227**

Table 2-88: Military Flight Counts by Day of Week – Lobos Low MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	0	2	4	0
Monday	1	4	0	7
Tuesday	1	0	0	0
Wednesday	1	3	8	2
Thursday	6	2	3	7
Friday	4	7	2	0
Saturday	4	4	3	0
Total	**17**	**22**	**20**	**16**

The following tables present flights counts in Lobos High and Low MOAs by hour of the day.

Table 2-89: Civilian Flight Counts by Hour – Lobos High MOA

Hour	Oct	Jan	Apr	Jul
0000	1	1	1	4
0100	1	3	2	0
0200	0	0	0	0
0300	1	0	1	0
0400	0	0	0	1
0500	0	2	0	0
0600	1	24	28	46
0700	0	2	0	18
0800	29	29	26	6
0900	30	9	5	5
1000	3	4	1	1
1100	24	7	3	6
1200	30	4	8	6
1300	7	3	4	1
1400	27	24	5	4
1500	32	36	27	3
1600	5	12	27	5
1700	4	7	5	22
1800	31	15	21	13
1900	30	29	17	16
2000	3	5	8	28
2100	1	3	9	28
2200	3	2	12	7
2300	1	2	1	2
Total	**264**	**223**	**211**	**222**

Table 2-90: Military Flight Counts by Hour – Lobos High MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	0	0	0
0800	0	0	0	1
0900	1	1	2	0
1000	2	1	3	0
1100	0	3	1	0
1200	1	3	0	1
1300	1	2	0	0
1400	3	4	2	1
1500	1	1	1	1
1600	1	0	4	0
1700	2	2	0	0
1800	0	1	2	1
1900	0	0	3	1
2000	0	3	2	3
2100	1	1	5	0
2200	1	0	1	0
2300	1	0	0	0
Total	**15**	**22**	**26**	**9**

Table 2-91: Civilian Flight Counts by Hour – Lobos Low MOA

Hour	Oct	Jan	Apr	Jul
0000	1	0	2	2
0100	1	2	1	0
0200	0	0	1	0
0300	0	0	0	1
0400	0	1	0	0
0500	0	2	1	0
0600	1	11	24	22
0700	0	9	6	11
0800	35	13	12	19
0900	26	13	20	18
1000	11	13	10	11
1100	22	9	13	12
1200	21	19	10	14
1300	9	5	9	6
1400	25	23	10	9
1500	24	27	26	3
1600	15	9	26	7
1700	7	12	7	23
1800	21	13	15	14
1900	21	12	16	13
2000	3	5	5	19
2100	1	4	3	20
2200	3	0	7	2
2300	0	2	0	1
Total	**247**	**204**	**224**	**227**

Table 2-92: Military Flight Counts by Hour – Lobos Low MOA

Hour	Oct	Jan	Apr	Jul
0000	0	2	0	0
0100	0	0	0	0
0200	0	0	2	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	0	0	0
0800	0	2	3	2
0900	0	0	2	1
1000	1	0	2	3
1100	5	1	0	2
1200	3	0	0	1
1300	0	1	1	0
1400	5	1	1	2
1500	1	2	1	0
1600	0	2	0	1
1700	1	2	0	2
1800	0	0	4	0
1900	0	3	0	0
2000	0	3	0	2
2100	1	0	0	0
2200	0	0	4	0
2300	0	3	0	0
Total	**17**	**22**	**20**	**16**

The following tables present the average duration of flights transiting Lobos High and Low MOAs.

Table 2-93: Average Duration of Flights – Lobos High MOA

User	Oct	Jan	Apr	Jul
Civilian	3.9	3.3	3.9	3.7
Military	4.0	5.7	5.6	2.8

Table 2-94: Average Duration of Flights – Lobos Low MOA

User	Oct	Jan	Apr	Jul
Civilian	6.0	6.8	5.9	6.1
Military	4.2	7.5	7.3	8.4

Figure 2-19 and *Figure 2-20* present the traffic flows for civilian flights traversing Lobos High and Low MOAs.

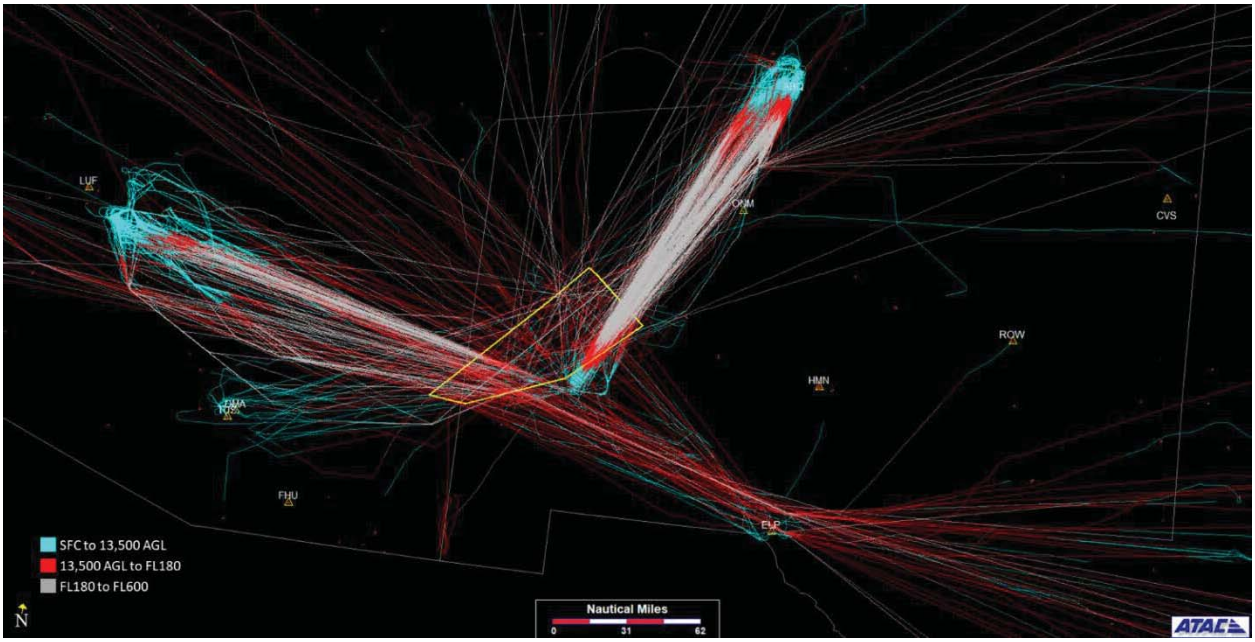


Figure 2-19: Civilian Traffic Flows – Lobos High MOA

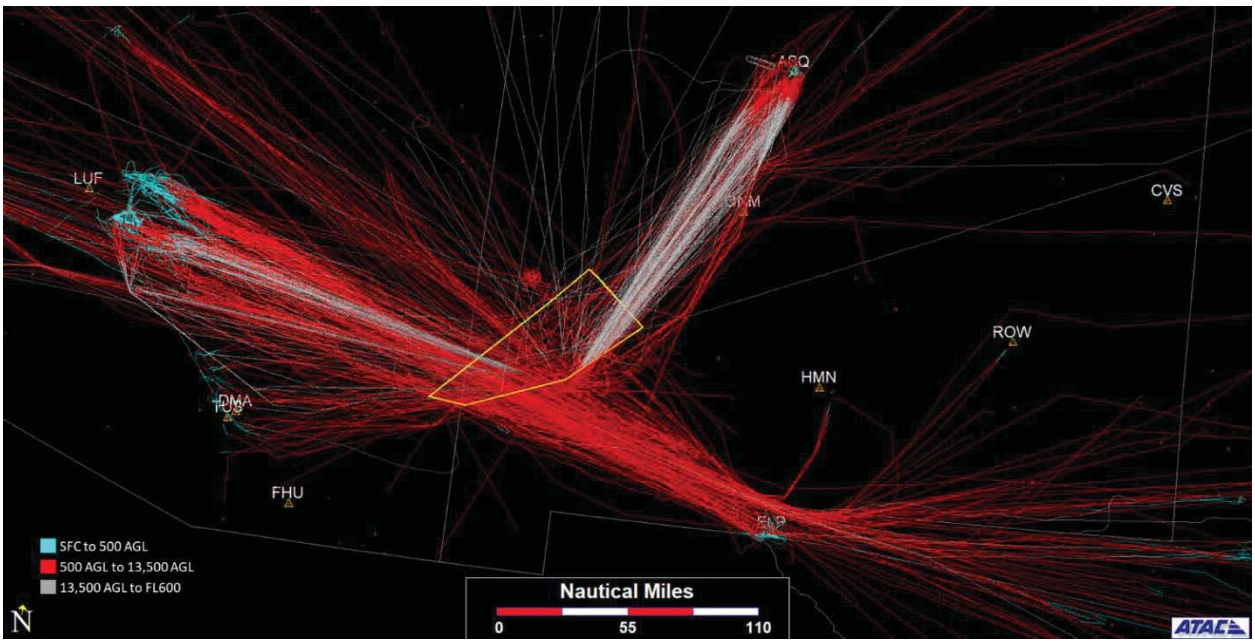


Figure 2-20: Civilian Traffic Flows – Lobos Low MOA

The following tables present the origin and destination airports for civilian flights traversing Lobos High and Low MOAs. The most common origin and destination airport for civilian flights transiting Lobos High and Low MOAs was Grant County Airport.

Table 2-95: Origin Airport - Civilian Flights – Lobos High MOA

Origin Airport	Count	Percent
Grant County Airport (SVC)	356	38.7%
Albuquerque International Sunport (ABQ)	311	33.8%
Phoenix Sky Harbor International Airport (PHX)	101	11.0%
Other*/Unknown	152	16.5%
Total	**920**	**100.0%**

* Less than 3%

Table 2-96: Destination Airport - Civilian Flights – Lobos High MOA

Destination Airport	Count	Percent
Grant County Airport (SVC)	408	44.3%
Albuquerque International Sunport (ABQ)	332	36.1%
Other*/Unknown	180	19.6%
Total	**920**	**100.0%**

* Less than 3%

Table 2-97: Origin Airport - Civilian Flights – Lobos Low MOA

Origin Airport	Count	Percent
Grant County Airport (SVC)	198	22.0%
Albuquerque International Sunport (ABQ)	178	19.7%
Phoenix Sky Harbor International Airport (PHX)	107	11.9%
El Paso International Airport (ELP)	40	4.4%
Other*/Unknown	379	42.0%
Total	**902**	**100.0%**

* Less than 3%

Table 2-98: Destination Airport - Civilian Flights – Lobos Low MOA

Destination Airport	Count	Percent
Grant County Airport (SVC)	266	29.5%
Albuquerque International Sunport (ABQ)	200	22.2%
El Paso International Airport (ELP)	32	3.5%
Other*/Unknown	404	44.8%
Total	**902**	**100.0%**

* Less than 3%

Figure 2-21 and *Figure 2-22* present the traffic flows for military flights in Lobos High and Low MOAs.

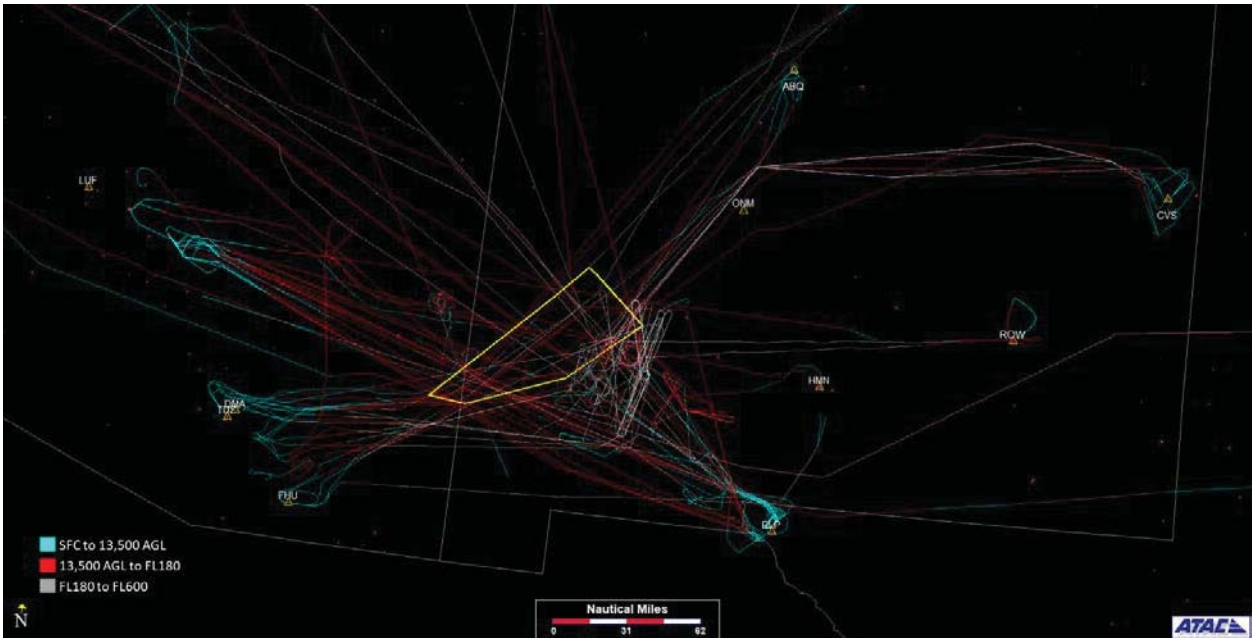


Figure 2-21: Military Traffic Flows – Lobos High MOA

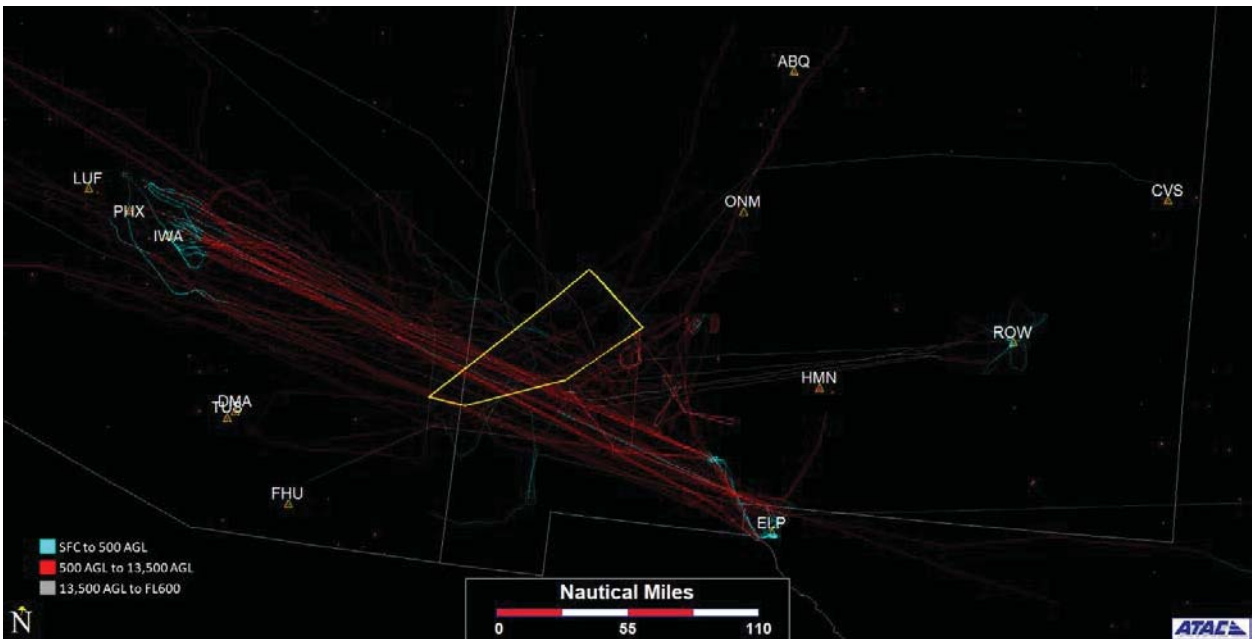


Figure 2-22: Military Traffic Flows – Lobos Low MOA

The following tables present the origin and destination airports for military flights traversing Lobos High and Low MOAs.

Table 2-99: Origin Airport – Military Flights – Lobos High MOA

Origin Airport	Count	Percent
El Paso International Airport (ELP)	15	20.8%
Davis Monthan AFB (DMA)	7	9.7%
Cannon AFB (CVS)	6	8.3%
Grant County Airport (SVC)	6	8.3%
Phoenix–Mesa Gateway International Airport (IWA)	4	5.6%
Phoenix Sky Harbor International Airport (PHX)	4	5.6%
Santa Fe Municipal Airport (SAF)	3	4.2%
Other*/Unknown	27	37.5%
Total	**72**	**100.0%**

* Less than 3%

Table 2-100: Destination Airport - Military Flights – Lobos High MOA

Destination Airport	Count	Percent
Biggs Army Airfield (Fort Bliss) (BIF)	11	15.3%
Davis Monthan AFB (DMA)	10	13.9%
Phoenix–Mesa Gateway International Airport (IWA)	8	11.1%
Cannon AFB (CVS)	8	11.1%
Albuquerque International Sunport (ABQ)	4	5.6%
Tucson International Airport (TUS)	4	5.6%
Laughlin/Bullhead International Airport (IFP)	3	4.2%
Sierra Vista Municipal Airport (FHU)	3	4.2%
El Paso International Airport (ELP)	3	4.2%
Other*/Unknown	18	25.0%
Total	**72**	**100.0%**

* Less than 3%

Table 2-101: Origin Airport – Military Flights – Lobos Low MOA

Origin Airport	Count	Percent
Phoenix Sky Harbor International Airport (PHX)	13	17.3%
El Paso International Airport (ELP)	12	16.0%
Biggs Army Airfield (Fort Bliss) (BIF)	4	5.3%
Phoenix–Mesa Gateway International Airport (IWA)	4	5.3%
Grant County Airport (SVC)	3	4.0%
Other*/Unknown	39	52.0%
Total	**75**	**100.0%**

* Less than 3%

Table 2-102: Destination Airport - Military Flights – Lobos Low MOA

Destination Airport	Count	Percent
El Paso International Airport (ELP)	11	14.7%
Biggs Army Airfield (Fort Bliss) (BIF)	9	12.0%
Phoenix–Mesa Gateway International Airport (IWA)	6	8.0%
Roswell International Air Center (ROW)	5	6.7%
Safford Regional Airport (SAD)	4	5.3%
Scottsdale Airport (SDL)	4	5.3%
Alamogordo–White Sands Regional Airport (ALM)	4	5.3%
Grant County Airport (SVC)	4	5.3%
Davis Monthan AFB (DMA)	3	4.0%
Las Cruces International Airport (LRU)	3	4.0%
Phoenix Deer Valley Airport (DVT)	3	4.0%
Other*/Unknown	19	25.3%
Total	**75**	**100.0%**

* Less than 3%

2.2.4 Lobos ATCAA

Table 2-103 presents the baseline PDARS flight counts for Lobos ATCAA, broken out by civilian and military user. Civilian users accounted for approximately 98-99% of total flight counts in Lobos ATCAA.

Table 2-103: Monthly Flight Counts FY16 – Lobos ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	9,572	98.0%	10,098	98.4%	9,933	98.4%	11,676	99.0%
Military	199	2.0%	160	1.6%	157	1.6%	113	1.0%
Total	**9,771**	**100%**	**10,258**	**100%**	**10,090**	**100%**	**11,789**	**100%**

Table 2-104 presents the average and maximum number of daily flight counts in Lobos ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-104: Average and Maximum Daily Flight Counts – Lobos ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	308.8	440	325.7	402	331.1	480	376.6	460
Military	6.4	21	5.2	13	5.2	12	3.6	12

The following tables present flight counts for Lobos ATCAA by day of week and hour.

Table 2-105: Civilian Flight Counts by Day of Week – Lobos ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	1,264	1,640	1,436	1,960
Monday	1,325	1,381	1,254	1,558
Tuesday	1,297	1,255	1,367	1,504
Wednesday	1,215	1,243	1,236	1,436
Thursday	1,646	1,391	1,349	1,514
Friday	1,600	1,685	1,871	1,929
Saturday	1,225	1,503	1,420	1,775
Total	**9,572**	**10,098**	**9,933**	**11,676**

Table 2-106: Military Flight Counts by Day of Week- Lobos ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	26	26	17	12
Monday	23	23	25	9
Tuesday	24	18	23	11
Wednesday	29	17	25	16
Thursday	42	23	20	21
Friday	47	35	28	32
Saturday	8	18	19	12
Total	**199**	**160**	**157**	**113**

Table 2-107: Civilian Flight Counts by Hour – Lobos ATCAA

Hour	Oct	Jan	Apr	Jul
0000	135	220	212	243
0100	115	145	167	172
0200	179	163	215	183
0300	66	104	130	117
0400	34	53	32	26
0500	26	29	31	45
0600	185	146	221	331
0700	255	373	303	327
0800	500	482	499	513
0900	630	556	530	725
1000	566	837	602	653
1100	673	741	643	757
1200	615	576	660	579
1300	665	751	593	622
1400	640	645	558	637
1500	642	728	645	707
1600	597	788	634	640
1700	493	490	521	747
1800	453	441	402	634
1900	520	514	539	694
2000	603	525	585	804
2100	495	319	523	631
2200	310	304	404	463
2300	175	168	284	426
Total	**9,572**	**10,098**	**9,933**	**11,676**

Table 2-108: Military Flight Counts by Hour – Lobos ATCAA

Hour	Oct	Jan	Apr	Jul
0000	2	1	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	2	0
0400	0	0	1	1
0500	0	0	0	2
0600	0	0	1	0
0700	0	2	0	1
0800	3	8	4	2
0900	13	10	12	10
1000	39	15	17	14
1100	29	22	9	19
1200	12	13	16	21
1300	27	28	21	9
1400	21	16	14	9
1500	13	7	18	5
1600	9	12	11	4
1700	10	10	14	3
1800	7	3	4	5
1900	7	6	3	1
2000	3	5	3	3
2100	1	2	4	2
2200	2	0	3	2
2300	1	0	0	0
Total	**199**	**160**	**157**	**113**

Table 2-109 presents the average number of minutes spent transiting Lobos ATCAA broken out by civilian and military users. On average, civilian flights through Lobos ATCAA ranged from 3.1 to 3.2 minutes. Military flights through Lobos ATCAA ranged from 7.1 to 8.1 minutes.

Table 2-109: Average Duration of Flights – Lobos ATCAA

User	Oct	Jan	Apr	Jul
Civilian	3.1	3.2	3.2	3.2
Military	7.7	7.1	8.1	7.1

Figure 2-23 presents civilian traffic flows through Lobos ATCAA.

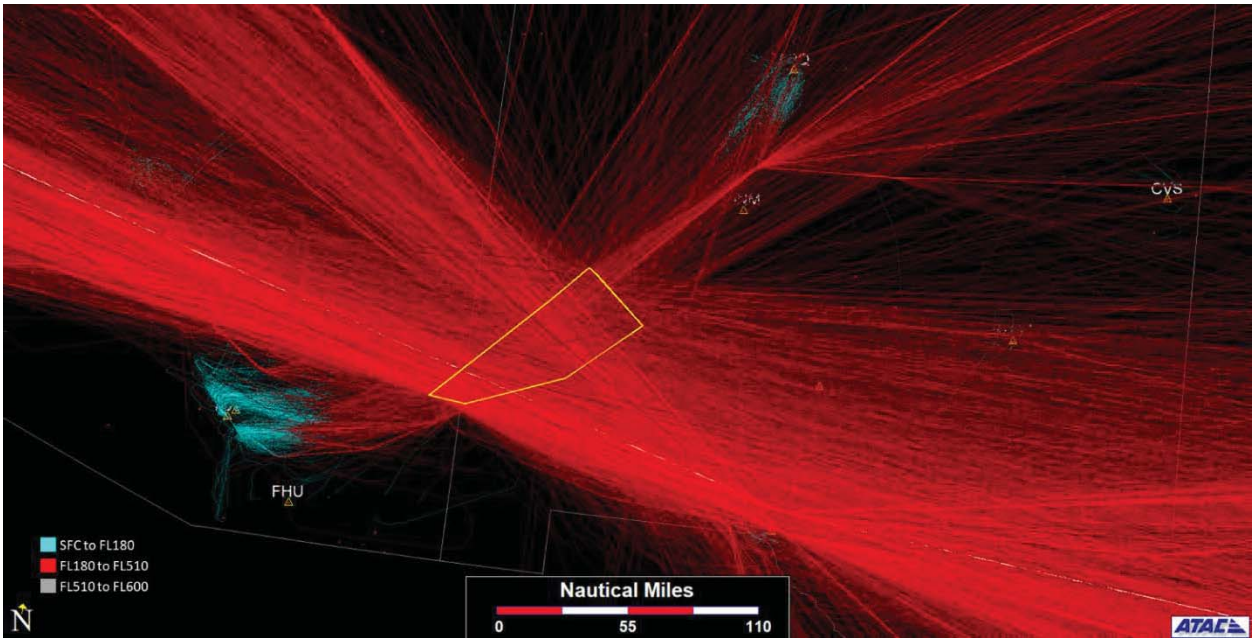


Figure 2-23: Civilian Traffic Flows – Lobos ATCAA

The following tables present origin and destination airports for civilian flights in Lobos ATCAA.

Table 2-110: Origin Airport - Civilian Flights – Lobos ATCAA

Origin Airport	Count	Percent
Phoenix Sky Harbor International Airport (PHX)	6,257	15.2%
Los Angeles International Airport (LAX)	5,647	13.7%
McCarran International Airport (LAS)	3,240	7.8%
George Bush Intercontinental Airport (IAH)	3,110	7.5%
Dallas/Fort Worth International Airport (DFW)	2,057	5.0%
Austin-Bergstrom International Airport (AUS)	1,792	4.3%
San Francisco International Airport (SFO)	1,380	3.3%
Other*/Unknown	17,796	43.1%
Total	**41,279**	**100.0%**

* Less than 3%

Table 2-111: Destination Airport - Civilian Flights – Lobos ATCAA

Destination Airport	Count	Percent
Los Angeles International Airport (LAX)	6,792	16.5%
George Bush Intercontinental Airport (IAH)	3,792	9.2%
Dallas/Fort Worth International Airport (DFW)	3,227	7.8%
McCarran International Airport (LAS)	2,790	6.8%
Austin-Bergstrom International Airport (AUS)	2,613	6.3%
San Antonio International Airport (SAT)	1,586	3.8%
El Paso International Airport (ELP)	1,491	3.6%
San Diego International Airport (SAN)	1,327	3.2%
William P. Hobby Airport (HOU)	1,304	3.2%
Other*/Unknown	16,357	39.6%
Total	**41,279**	**100.0%**

* Less than 3%

Figure 2-24 presents military traffic through Lobos ATCAA. Flights may be descending or climbing into or out of the ATCAA, which is why some tracks change color along flight path.

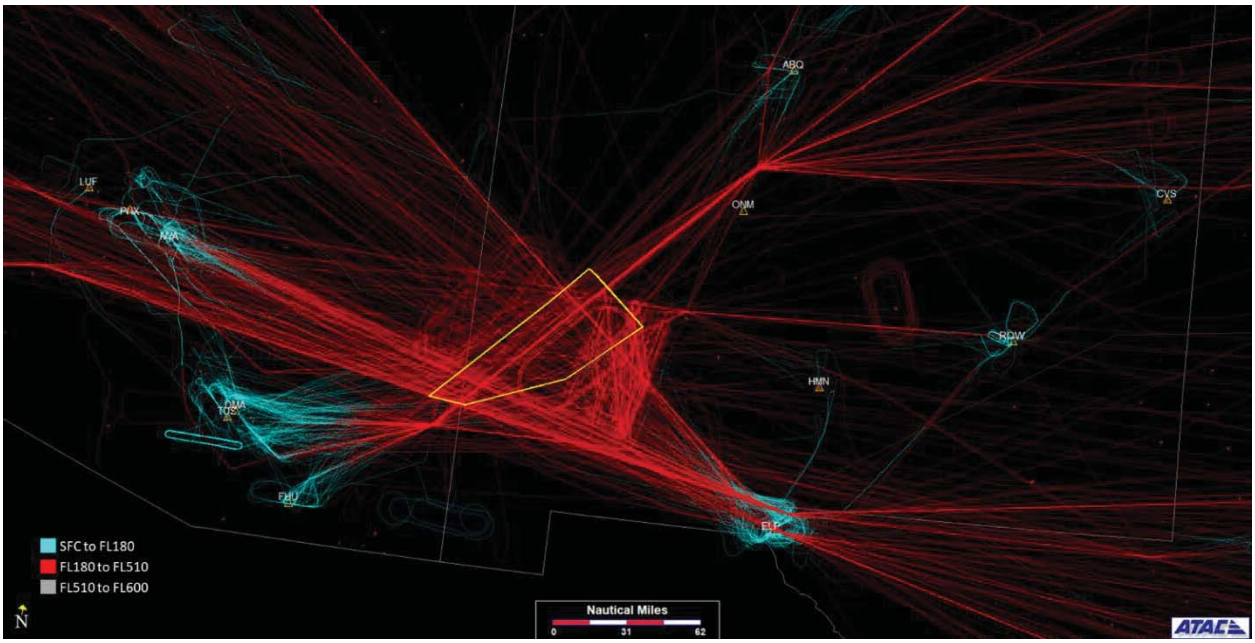


Figure 2-24: Military Traffic Flows – Lobos ATCAA

Table 2-112: Origin Airport - Military Flights – Lobos ATCAA

Origin Airport	Count	Percent
Davis Monthan AFB (DMA)	75	11.9%
El Paso International Airport (ELP)	55	8.7%
Phoenix Sky Harbor International Airport (PHX)	41	6.5%
Phoenix–Mesa Gateway International Airport (IWA)	34	5.4%
Nellis AFB (LSV)	21	3.3%
Sierra Vista Municipal Airport (FHU)	20	3.2%
Travis AFB (SUU)	19	3.0%
Other*/Unknown	364	57.9%
Total	**629**	**100.0%**

* Less than 3%

Table 2-113: Destination Airport - Military Flights – Lobos ATCAA

Destination Airport	Count	Percent
Davis Monthan AFB (DMA)	74	11.8%
El Paso International Airport (ELP)	72	11.4%
Biggs Army Airfield (Fort Bliss) (BIF)	33	5.2%
Sierra Vista Municipal Airport (FHU)	29	4.6%
Phoenix–Mesa Gateway International Airport (IWA)	23	3.7%
Tucson International Airport (TUS)	22	3.5%
Nellis AFB (LSV)	21	3.3%
Phoenix Sky Harbor International Airport (PHX)	20	3.2%
Other*/Unknown	335	53.3%
Total	**629**	**100.0%**

* Less than 3%

2.2.5 Christa ATCAA

Table 2-114 presents the baseline PDARS flight counts for the Christa ATCAA, broken out by civilian and military user. The majority of flights transiting this airspace were civilian.

Table 2-114: Monthly Flight Counts FY16 – Christa ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	2614	96.1%	3600	97.5%	2747	95.6%	3456	98.0%
Military	105	3.9%	94	2.5%	125	4.4%	71	2.0%
Total	**2719**	**100%**	**3694**	**100%**	**2872**	**100%**	**3527**	**100%**

Table 2-115 presents the average and maximum number of daily flight counts in the Christa ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-115: Average and Maximum Daily Flight Counts – Christa ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	84.3	158	116.1	201	91.6	185	111.5	195
Military	3.4	12	3.0	7	4.2	11	2.3	8

Table 2-116 and *Table 2-117* present flight counts for the Christa ATCAA by day of week.

Table 2-116: Civilian Flight Counts by Day of Week – Christa ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	554	738	625	693
Monday	301	486	263	399
Tuesday	255	326	247	383
Wednesday	261	303	271	316
Thursday	348	370	249	358
Friday	367	583	440	688
Saturday	528	794	652	619
Total	**2,614**	**3,600**	**2,747**	**3,456**

Table 2-117: Military Flight Counts by Day of Week- Christa ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	9	17	10	5
Monday	15	10	18	11
Tuesday	10	17	26	5
Wednesday	10	10	23	13
Thursday	26	18	15	12
Friday	27	12	20	23
Saturday	8	10	13	2
Total	**105**	**94**	**125**	**71**

The following tables present flight counts by hour through the Christa ATCAA.

Table 2-118: Civilian Flight Counts by Hour – Christa ATCAA

Hour	Oct	Jan	Apr	Jul
0000	63	94	68	123
0100	46	61	46	107
0200	99	131	93	86
0300	69	87	52	123
0400	16	33	20	26
0500	16	18	17	23
0600	32	24	29	87
0700	84	141	130	92
0800	111	154	127	111
0900	135	205	152	160
1000	75	146	160	97
1100	197	258	209	179
1200	125	235	164	121
1300	147	234	157	181
1400	151	223	167	142
1500	106	170	113	142
1600	151	190	164	131
1700	136	221	181	207
1800	137	155	109	198
1900	176	229	154	303
2000	147	177	102	234
2100	179	172	132	269
2200	162	148	105	130
2300	54	94	96	184
Total	**2,614**	**3,600**	**2,747**	**3,456**

Table 2-119: Military Flight Counts by Hour – Christa ATCAA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	1
0100	0	0	0	0
0200	0	2	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	1	0
0700	0	1	2	4
0800	3	4	3	4
0900	4	6	6	1
1000	11	7	16	15
1100	17	12	15	10
1200	11	6	8	9
1300	16	15	15	5
1400	11	8	12	6
1500	9	4	15	0
1600	6	7	3	2
1700	3	6	8	3
1800	5	3	5	3
1900	3	7	6	3
2000	3	5	2	1
2100	0	1	5	0
2200	1	0	3	3
2300	2	0	0	1
Total	**105**	**94**	**125**	**71**

Table 2-120 presents the average number of minutes spent transiting the Christa ATCAA broken out by civilian and military users.

Table 2-120: Average Duration of Flights – Christa ATCAA

User	Oct	Jan	Apr	Jul
Civilian	3.1	3.2	3.2	2.9
Military	3.8	6.3	5.7	5.4

Figure 2-25 presents civilian traffic flows through Christa ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

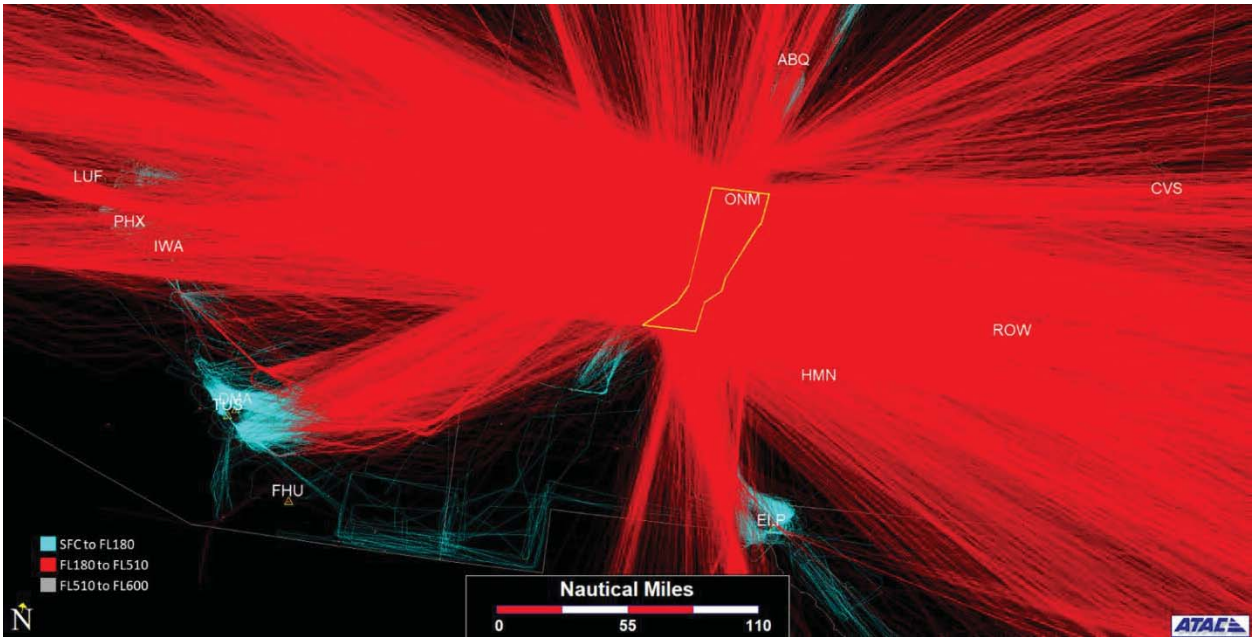


Figure 2-25: Civilian Traffic Flows – Christa ATCAA

The following tables present origin and destination airports for civilian flights in the Christa ATCAA.

Table 2-121: Origin Airport - Civilian Flights – Christa ATCAA

Origin Airport	Count	Percent
Dallas/Fort Worth International Airport (DFW)	901	7.3%
McCarran International Airport (LAS)	867	7.0%
Phoenix Sky Harbor International Airport (PHX)	658	5.3%
Denver International Airport (DEN)	590	4.8%
Tucson International Airport (TUS)	573	4.6%
El Paso International Airport (ELP)	543	4.4%
Los Angeles International Airport (LAX)	538	4.3%
Albuquerque International Sunport (ABQ)	527	4.2%
George Bush Intercontinental Airport (IAH)	484	3.9%
Licenciado Gustavo Díaz Ordaz International Airport (MMPR)	411	3.3%
Other*/Unknown	6,325	50.9%
Total	**12,417**	**100.0%**

* Less than 3%

Table 2-122: Destination Airport - Civilian Flights – Christa ATCAA

Destination Airport	Count	Percent
McCarran International Airport (LAS)	1,311	10.6%
Los Angeles International Airport (LAX)	1,011	8.1%
Tucson International Airport (TUS)	756	6.1%
Denver International Airport (DEN)	623	5.0%
Dallas/Fort Worth International Airport (DFW)	615	5.0%
El Paso International Airport (ELP)	475	3.8%
San Diego International Airport (SAN)	391	3.1%
Other*/Unknown	7,235	58.3%
Total	**12,417**	**100.0%**

* Less than 3%

Figure 2-26 presents military traffic through Christa ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

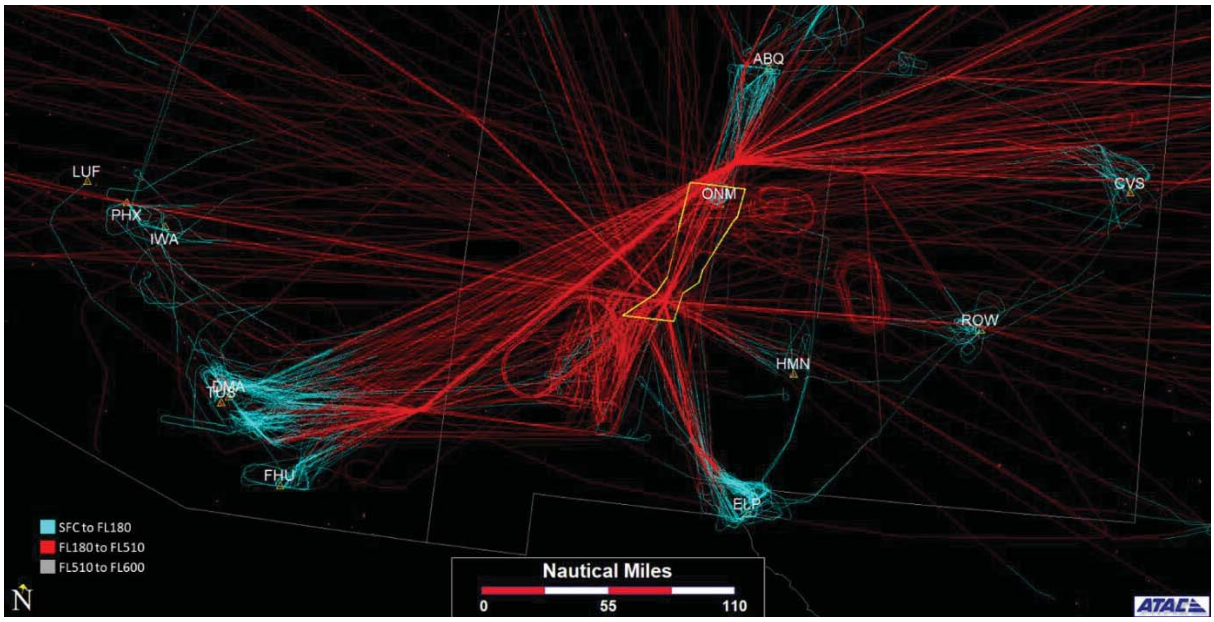


Figure 2-26: Military Traffic Flows – Christa ATCAA

Table 2-123: Origin Airport - Military Flights – Christa ATCAA

Origin Airport	Count	Percent
Davis Monthan AFB (DMA)	63	15.9%
Biggs Army Airfield (Fort Bliss) (BIF)	38	9.6%
Albuquerque International Sunport (ABQ)	22	5.6%
Holloman AFB (HMN)	19	4.8%
Tucson International Airport (TUS)	18	4.6%
Cannon AFB (CVS)	18	4.6%
Sierra Vista Municipal Airport (FHU)	14	3.5%
Rosecrans Memorial Airport (STJ)	13	3.3%
Other*/Unknown	190	48.1%
Total	**395**	**100.0%**

* Less than 3%

Table 2-124: Destination Airport - Military Flights – Christa ATCAA

Destination Airport	Count	Percent
Davis Monthan AFB (DMA)	55	13.9%
Biggs Army Airfield (Fort Bliss) (BIF)	31	7.8%
Sierra Vista Municipal Airport (FHU)	24	6.1%
Albuquerque International Sunport (ABQ)	22	5.6%
Cannon AFB (CVS)	21	5.3%
Tucson International Airport (TUS)	17	4.3%
Other*/Unknown	225	57.0%
Total	**395**	**100.0%**

* Less than 3%

2.2.6 Kendra ATCAA

Table 2-125 presents the baseline PDARS flight counts for the Kendra ATCAA, broken out by civilian and military user. The majority of flights transiting this airspace were civilian.

Table 2-125: Monthly Flight Counts FY16 – Kendra ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	3690	97.7%	4453	98.3%	4000	97.4%	4687	98.8%
Military	85	2.3%	79	1.7%	108	2.6%	57	1.2%
Total	**3775**	**100%**	**4532**	**100%**	**4108**	**100%**	**4744**	**100%**

Table 2-126 presents the average and maximum number of daily flight counts in the Kendra ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-126: Average and Maximum Daily Flight Counts – Kendra ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	119.0	181	143.6	216	133.3	201	151.2	245
Military	2.7	9	2.5	10	3.6	10	1.8	9

Table 2-127 through *Table 2-128* present flight counts for the Kendra ATCAA by day of week.

Table 2-127: Civilian Flight Counts by Day of Week – Kendra ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	584	881	758	920
Monday	505	595	478	600
Tuesday	468	428	450	570
Wednesday	401	465	431	479
Thursday	590	547	455	469
Friday	562	723	745	889
Saturday	580	814	683	760
Total	**3,690**	**4,453**	**4,000**	**4,687**

Table 2-128: Military Flight Counts by Day of Week- Kendra ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	12	10	10	2
Monday	7	9	11	7
Tuesday	8	9	18	3
Wednesday	15	11	15	9
Thursday	23	16	15	10
Friday	15	13	24	23
Saturday	5	11	15	3
Total	**85**	**79**	**108**	**57**

The following tables present flight counts by hour through the Kendra ATCAA.

Table 2-129: Civilian Flight Counts by Hour – Kendra ATCAA

Hour	Oct	Jan	Apr	Jul
0000	59	117	89	116
0100	68	83	95	87
0200	100	98	97	82
0300	33	73	86	89
0400	7	29	18	18
0500	16	22	27	24
0600	76	35	55	87
0700	109	166	154	132
0800	124	138	123	98
0900	206	234	202	239
1000	160	191	180	218
1100	250	332	267	316
1200	195	307	231	201
1300	284	373	272	292
1400	242	342	250	259
1500	222	286	250	263
1600	228	278	278	200
1700	230	286	277	300
1800	156	194	154	274
1900	257	243	215	370
2000	232	217	192	351
2100	221	189	168	323
2200	150	167	188	170
2300	65	53	132	178
Total	**3,690**	**4,453**	**4,000**	**4,687**

Table 2-130: Military Flight Counts by Hour – Kendra ATCAA

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	0
0100	0	1	0	0
0200	0	0	0	0
0300	0	0	2	0
0400	0	0	1	2
0500	0	0	0	1
0600	1	0	0	0
0700	1	3	3	2
0800	0	4	4	5
0900	7	2	6	4
1000	8	8	14	7
1100	12	9	4	7
1200	8	7	11	4
1300	12	9	8	8
1400	8	5	10	2
1500	7	3	8	3
1600	2	14	9	3
1700	7	1	11	2
1800	3	5	3	1
1900	4	3	3	1
2000	3	3	4	1
2100	0	2	4	1
2200	1	0	3	2
2300	0	0	0	1
Total	**85**	**79**	**108**	**57**

Table 2-131 presents the average number of minutes spent transiting the Kendra ATCAA broken out by civilian and military users.

Table 2-131: Average Duration of Flights – Kendra ATCAA

User	Oct	Jan	Apr	Jul
Civilian	5.2	5.1	5.1	5.0
Military	12.1	17.0	9.7	11.5

Figure 2-27 presents civilian traffic flows through Kendra ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

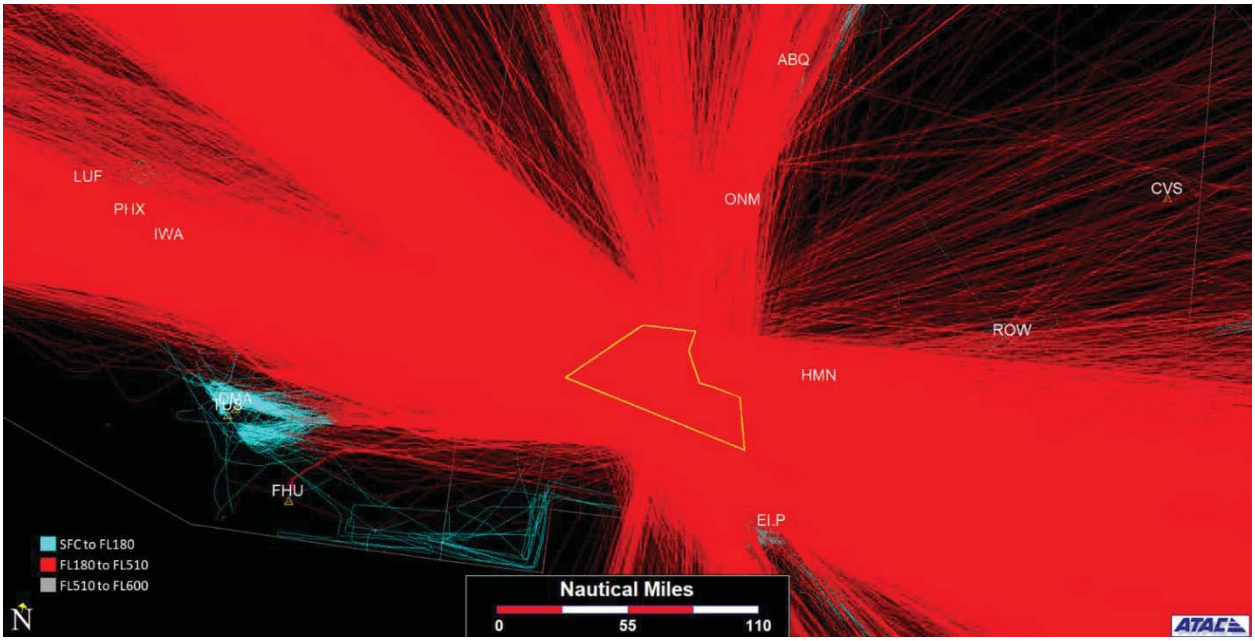


Figure 2-27: Civilian Traffic Flows – Kendra ATCAA

The following tables present origin and destination airports for civilian flights in the Kendra ATCAA.

Table 2-132: Origin Airport - Civilian Flights – Kendra ATCAA

Origin Airport	Count	Percent
McCarran International Airport (LAS)	2,954	17.6%
Los Angeles International Airport (LAX)	1,241	7.4%
George Bush Intercontinental Airport (IAH)	929	5.5%
El Paso International Airport (ELP)	884	5.3%
Phoenix Sky Harbor International Airport (PHX)	791	4.7%
Dallas/Fort Worth International Airport (DFW)	735	4.4%
William P. Hobby Airport (HOU)	595	3.5%
Mexico City International Airport (MMMX)	583	3.5%
Denver International Airport (DEN)	578	3.4%
Austin-Bergstrom International Airport (AUS)	543	3.2%
San Antonio International Airport (SAT)	501	3.0%
Other*/Unknown	6,496	38.6%
Total	**16,830**	**100.0%**

* Less than 3%

Table 2-133: Destination Airport - Civilian Flights – Kendra ATCAA

Destination Airport	Count	Percent
McCarran International Airport (LAS)	2,693	16.0%
Los Angeles International Airport (LAX)	1,210	7.2%
El Paso International Airport (ELP)	805	4.8%
Austin-Bergstrom International Airport (AUS)	788	4.7%
Dallas/Fort Worth International Airport (DFW)	788	4.7%
George Bush Intercontinental Airport (IAH)	734	4.4%
Denver International Airport (DEN)	623	3.7%
Mexico City International Airport (MMMX)	621	3.7%
San Antonio International Airport (SAT)	534	3.2%
William P. Hobby Airport (HOU)	520	3.1%
Other*/Unknown	7,514	44.6%
Total	**16,830**	**100.0%**

* Less than 3%

Figure 2-28 presents military traffic through Kendra ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

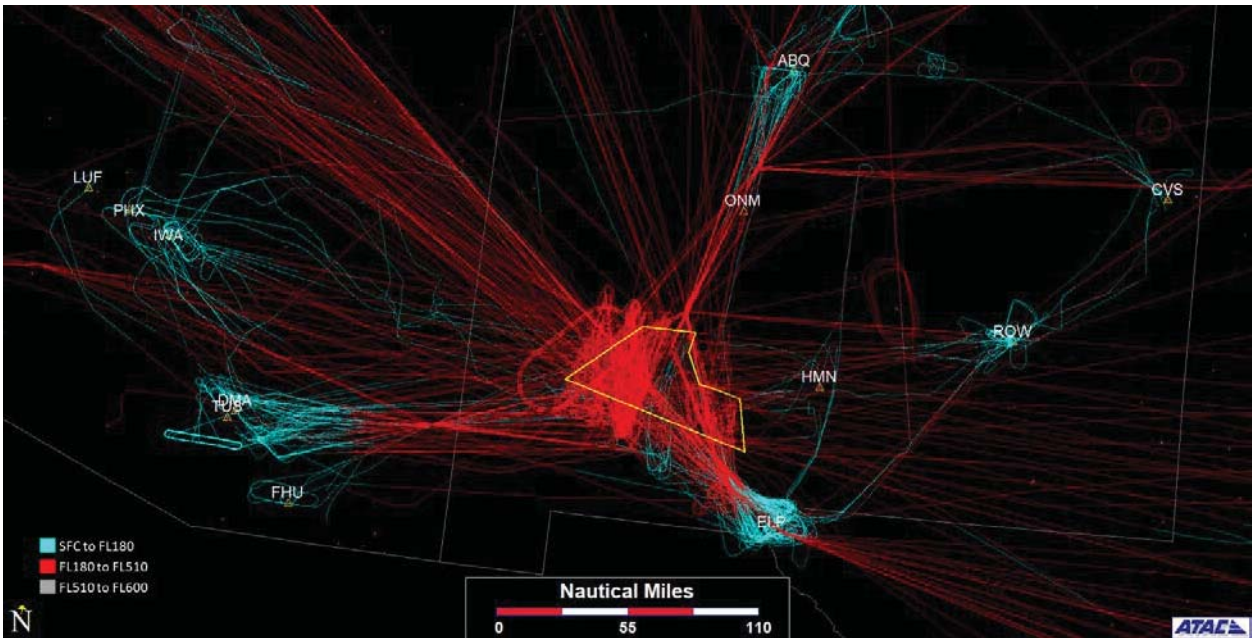


Figure 2-28: Military Traffic Flows – Kendra ATCAA

Table 2-134: Origin Airport - Military Flights – Kendra ATCAA

Origin Airport	Count	Percent
El Paso International Airport (ELP)	46	14.0%
Biggs Army Airfield (Fort Bliss) (BIF)	45	13.7%
Davis Monthan AFB (DMA)	36	10.9%
Nellis AFB (LSV)	17	5.2%
Holloman AFB (HMN)	17	5.2%
Albuquerque International Sunport (ABQ)	14	4.3%
Travis AFB (SUU)	12	3.6%
Las Cruces International Airport (LRU)	11	3.3%
Phoenix–Mesa Gateway International Airport (IWA)	10	3.0%
McCarran International Airport (LAS)	10	3.0%
Other*/Unknown	111	33.7%
Total	**329**	**100.0%**

* Less than 3%

Table 2-135: Destination Airport - Military Flights – Kendra ATCAA

Destination Airport	Count	Percent
Biggs Army Airfield (Fort Bliss) (BIF)	49	14.9%
Davis Monthan AFB (DMA)	40	12.2%
El Paso International Airport (ELP)	33	10.0%
Albuquerque International Sunport (ABQ)	18	5.5%
Nellis AFB (LSV)	16	4.9%
Phoenix–Mesa Gateway International Airport (IWA)	10	3.0%
McCarran International Airport (LAS)	10	3.0%
Other*/Unknown	153	46.5%
Total	**329**	**100.0%**

* Less than 3%

2.3 EIS Alternative 3

This section presents analysis for proposed airspace associated with the *Special Use Airspace Modifications, Holloman AFB* EIS Alternative 3. This alternative combines most of the areas from Alternatives 1 and 2, with the following exceptions: Lobos Low is not included, and the Talon MOAs and ATCAA do not include 'High C'. Otherwise, all areas are the same as in Alternatives 1 and 2, as seen in *Figure 2-29*:

- Smitty (500 – 13,500), western corner has floor of 1,600
- Cato (13,500 – 18,000)
- Lobos High (13,500 – 18,000)
- Christa ATCAA (FL180-FL510)
- Kendra ATCAA (FL180-FL510)
- Talon Low A, B (500 – 12,500)
- Talon High A, B (12,500 – 18,000)
- Talon ATCAA (FL180-FL510) (only covering A and B)

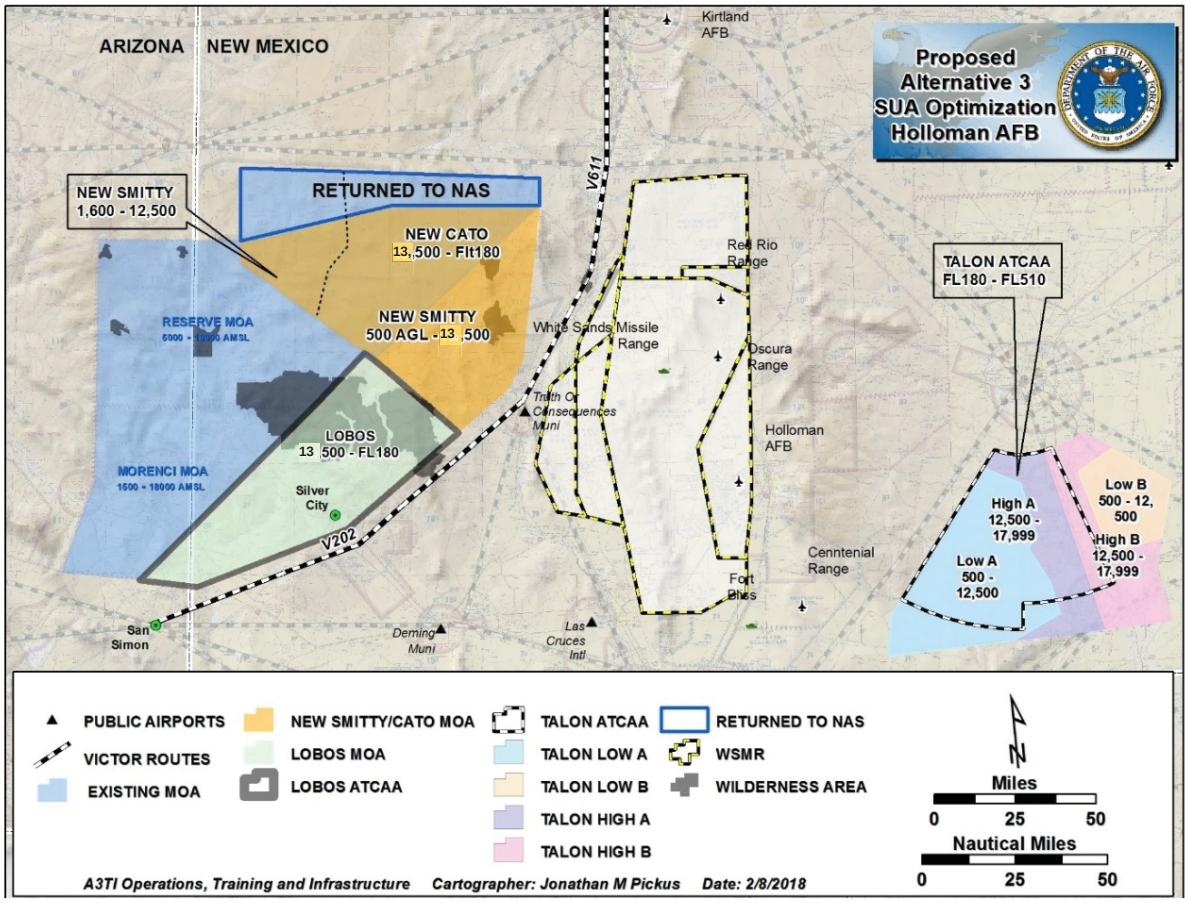


Figure 2-29: Alternative 3 Airspace

2.3.1 X-Talon MOA

Table 2-136 through *Table 2-139* present the baseline PDARS flight counts for X-Talon High A, High B, Low A, and Low B MOAs, broken out by civilian and military user. The majority of flights transiting X-Talon airspace were civilian.

Table 2-136: Monthly Flight Counts FY16 – X-Talon High A MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	185	68.0%	154	70.3%	209	78.9%	206	72.8%
Military	87	32.0%	65	29.7%	56	21.1%	77	27.2%
Total	**272**	**100%**	**219**	**100%**	**265**	**100%**	**283**	**100%**

Table 2-137: Monthly Flight Counts FY16 – X-Talon High B MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	261	88.5%	199	90.5%	221	87.4%	227	95.4%
Military	34	11.5%	21	9.5%	32	12.6%	11	4.6%
Total	**295**	**100%**	**220**	**100%**	**253**	**100%**	**238**	**100%**

Table 2-138: Monthly Flight Counts FY16 – X-Talon Low A MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	173	72.4%	166	79.4%	188	85.1%	201	80.4%
Military	66	27.6%	43	20.6%	33	14.9%	49	19.6%
Total	**239**	**100%**	**209**	**100%**	**221**	**100%**	**250**	**100%**

Table 2-139: Monthly Flight Counts FY16 – X-Talon Low B MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	184	95.3%	133	93.7%	156	91.2%	227	97.0%
Military	9	4.7%	9	6.3%	15	8.8%	7	3.0%
Total	**193**	**100%**	**142**	**100%**	**171**	**100%**	**234**	**100%**

Table 2-140 through *Table 2-143* present the average and maximum number of daily flight counts in the X-Talon MOAs broken out by civilian and military users. X-Talon Low B does not have military counts because there was less than one flight per day. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-140: Average and Maximum Daily Flight Counts – X-Talon High A MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	6.0	14	5.0	9	7.0	13	6.6	14
Military	2.8	10	2.1	9	1.9	7	2.5	8

Table 2-141: Average and Maximum Daily Flight Counts – X-Talon High B MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	8.4	16	6.4	15	7.4	17	7.3	16
Military	1.1	6	0.7	4	1.1	5	0.4	2

Table 2-142: Average and Maximum Daily Flight Counts – X-Talon Low A MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	5.6	12	5.4	12	6.3	12	6.5	14
Military	2.1	10	1.4	6	1.1	4	1.6	5

Table 2-143: Average and Maximum Daily Flight Counts – X-Talon Low B MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	5.9	13	4.3	8	5.2	13	7.3	16

Table 2-144 through *Table 2-150* present flight counts for the X-Talon MOAs by day of week. X-Talon Low B does not have military counts because there was less than one flight per day

Table 2-144: Civilian Flight Counts by Day of Week – X-Talon High A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	14	22	22	31
Monday	28	13	25	29
Tuesday	29	28	30	41
Wednesday	32	29	39	22
Thursday	38	27	35	22
Friday	23	21	29	37
Saturday	21	14	29	24
Total	**185**	**154**	**209**	**206**

Table 2-145: Military Flight Counts by Day of Week- X-Talon High A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	1	1	1	2
Monday	17	6	10	12
Tuesday	18	13	14	17
Wednesday	13	10	12	16
Thursday	17	13	7	17
Friday	19	20	10	13
Saturday	2	2	2	0
Total	**87**	**65**	**56**	**77**

Table 2-146: Civilian Flight Counts by Day of Week – X-Talon High B MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	26	21	21	24
Monday	42	33	29	31
Tuesday	34	45	37	40
Wednesday	44	20	49	23
Thursday	56	32	37	28
Friday	43	28	17	42
Saturday	16	20	31	39
Total	**261**	**199**	**221**	**227**

Table 2-147: Military Flight Counts by Day of Week- X-Talon High B MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	1	0	1	1
Monday	4	2	4	3
Tuesday	5	4	7	0
Wednesday	4	1	8	4
Thursday	8	5	8	2
Friday	12	8	4	1
Saturday	0	1	0	0
Total	**34**	**21**	**32**	**11**

Table 2-148: Civilian Flight Counts by Day of Week – X-Talon Low A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	13	23	13	29
Monday	18	16	26	18
Tuesday	31	26	25	26
Wednesday	25	24	28	21
Thursday	31	28	38	31
Friday	29	29	35	46
Saturday	26	20	23	30
Total	**173**	**166**	**188**	**201**

Table 2-149: Military Flight Counts by Day of Week- X-Talon Low A MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	2	0	2	0
Monday	18	4	6	8
Tuesday	18	9	5	11
Wednesday	9	10	6	11
Thursday	11	11	7	9
Friday	8	8	6	10
Saturday	0	1	1	0
Total	**66**	**43**	**33**	**49**

Table 2-150: Civilian Flight Counts by Day of Week – X-Talon Low B MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	23	14	12	24
Monday	19	20	19	27
Tuesday	22	23	35	34
Wednesday	30	16	22	29
Thursday	45	18	32	31
Friday	28	25	18	42
Saturday	17	17	18	40
Total	**184**	**133**	**156**	**227**

The following tables present flight counts by hour through the X-Talon MOAs.

Table 2-151: Civilian Flight Counts by Hour – X-Talon High A MOA

Hour	Oct	Jan	Apr	Jul
0000	0	3	3	1
0100	2	3	2	1
0200	2	2	3	4
0300	1	4	3	2
0400	4	3	5	2
0500	2	1	4	1
0600	30	2	4	8
0700	4	1	4	7
0800	7	7	12	27
0900	9	20	26	20
1000	5	11	15	13
1100	12	4	13	8
1200	9	10	8	8
1300	10	9	16	5
1400	13	8	9	22
1500	13	19	21	20
1600	11	16	11	7
1700	6	7	16	20
1800	4	5	8	6
1900	5	1	6	4
2000	3	7	4	5
2100	27	3	4	5
2200	2	4	9	7
2300	4	4	3	3
Total	**185**	**154**	**209**	**206**

Table 2-152: Military Flight Counts by Hour – X-Talon High A MOA

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	0
0100	1	1	0	0
0200	0	0	1	0
0300	0	0	1	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	3	6	2	9
0800	13	7	0	4
0900	8	7	4	20
1000	9	7	2	8
1100	9	5	2	10
1200	10	6	3	10
1300	12	5	3	1
1400	6	9	2	4
1500	12	3	12	6
1600	2	5	8	3
1700	0	2	7	0
1800	0	0	1	0
1900	0	1	1	1
2000	0	1	4	0
2100	0	0	3	1
2200	0	0	0	0
2300	1	0	0	0
Total	**87**	**65**	**56**	**77**

Table 2-153: Civilian Flight Counts by Hour – X-Talon High B MOA

Hour	Oct	Jan	Apr	Jul
0000	2	1	5	0
0100	5	1	2	0
0200	0	1	4	3
0300	3	3	3	3
0400	0	2	7	3
0500	5	2	4	6
0600	4	6	6	7
0700	19	13	20	15
0800	16	14	11	13
0900	18	10	17	17
1000	28	23	30	16
1100	24	8	10	16
1200	10	11	14	11
1300	20	13	7	18
1400	16	8	11	32
1500	28	30	25	18
1600	21	19	9	11
1700	12	15	11	10
1800	4	7	7	9
1900	5	3	5	4
2000	2	4	1	2
2100	6	2	4	1
2200	10	3	7	9
2300	3	0	1	3
Total	**261**	**199**	**221**	**227**

Table 2-154: Military Flight Counts by Hour – X-Talon High B MOA

Hour	Oct	Jan	Apr	Jul
0000	0	1	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	1	0	1
0800	4	3	3	2
0900	7	1	3	1
1000	1	3	1	0
1100	6	0	2	1
1200	3	0	2	1
1300	4	2	2	1
1400	0	3	1	3
1500	4	3	7	0
1600	1	2	0	0
1700	1	0	2	0
1800	2	1	2	0
1900	1	0	2	0
2000	0	1	1	0
2100	0	0	2	0
2200	0	0	2	1
2300	0	0	0	0
Total	**34**	**21**	**32**	**11**

Table 2-155: Civilian Flight Counts by Hour – X-Talon Low A MOA

Hour	Oct	Jan	Apr	Jul
0000	2	0	3	1
0100	0	1	2	1
0200	2	0	0	0
0300	1	0	0	1
0400	1	0	0	1
0500	1	1	3	2
0600	4	3	20	17
0700	3	16	5	17
0800	10	10	12	18
0900	19	14	7	17
1000	8	18	7	9
1100	14	4	10	7
1200	14	13	13	10
1300	10	10	16	6
1400	11	13	5	9
1500	13	5	8	7
1600	12	10	6	3
1700	22	27	29	30
1800	7	3	5	7
1900	4	4	27	11
2000	5	10	5	17
2100	5	1	2	6
2200	3	1	2	3
2300	2	2	1	1
Total	**173**	**166**	**188**	**201**

Table 2-156: Military Flight Counts by Hour – X-Talon Low A MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	0
0100	0	0	0	0
0200	0	0	1	0
0300	0	0	1	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	3	5	1	9
0800	10	5	2	1
0900	6	6	2	14
1000	6	5	0	5
1100	5	5	3	8
1200	10	3	0	6
1300	10	4	1	2
1400	2	3	2	1
1500	6	4	4	1
1600	6	1	7	1
1700	1	0	5	0
1800	1	0	2	1
1900	0	0	0	0
2000	0	2	1	0
2100	0	0	1	0
2200	0	0	0	0
2300	0	0	0	0
Total	**66**	**43**	**33**	**49**

Table 2-157: Civilian Flight Counts by Hour – X-Talon Low B MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	1	1
0100	1	0	1	0
0200	1	0	0	0
0300	1	0	2	1
0400	1	0	1	1
0500	3	2	10	6
0600	5	11	16	17
0700	15	17	18	23
0800	22	10	6	22
0900	10	8	13	28
1000	20	6	6	24
1100	16	6	11	8
1200	12	10	6	6
1300	14	13	7	20
1400	8	7	8	13
1500	17	13	12	6
1600	14	5	9	13
1700	7	4	2	8
1800	4	4	3	6
1900	3	2	5	1
2000	4	13	18	18
2100	0	1	0	3
2200	5	1	1	1
2300	1	0	0	1
Total	**184**	**133**	**156**	**227**

Table 2-158 through *Table 2-161* present the average number of minutes spent transiting the X-Talon MOAs broken out by civilian and military users.

Table 2-158: Average Duration of Flights – X-Talon High A MOA

User	Oct	Jan	Apr	Jul
Civilian	4.7	4.9	4.9	4.5
Military	9.9	6.5	8.8	10.5

Table 2-159: Average Duration of Flights – X-Talon High B MOA

User	Oct	Jan	Apr	Jul
Civilian	2.6	2.8	2.9	3.4
Military	2.8	2.5	3.6	2.5

Table 2-160: Average Duration of Flights – X-Talon Low A MOA

User	Oct	Jan	Apr	Jul
Civilian	9.7	10.6	10.8	10.8
Military	4.3	4.6	4.5	3.6

Table 2-161: Average Duration of Flights – X-Talon Low B MOA

User	Oct	Jan	Apr	Jul
Civilian	4.3	5.1	5.0	6.0

Figure 2-30 presents civilian traffic flows through X-Talon High A MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

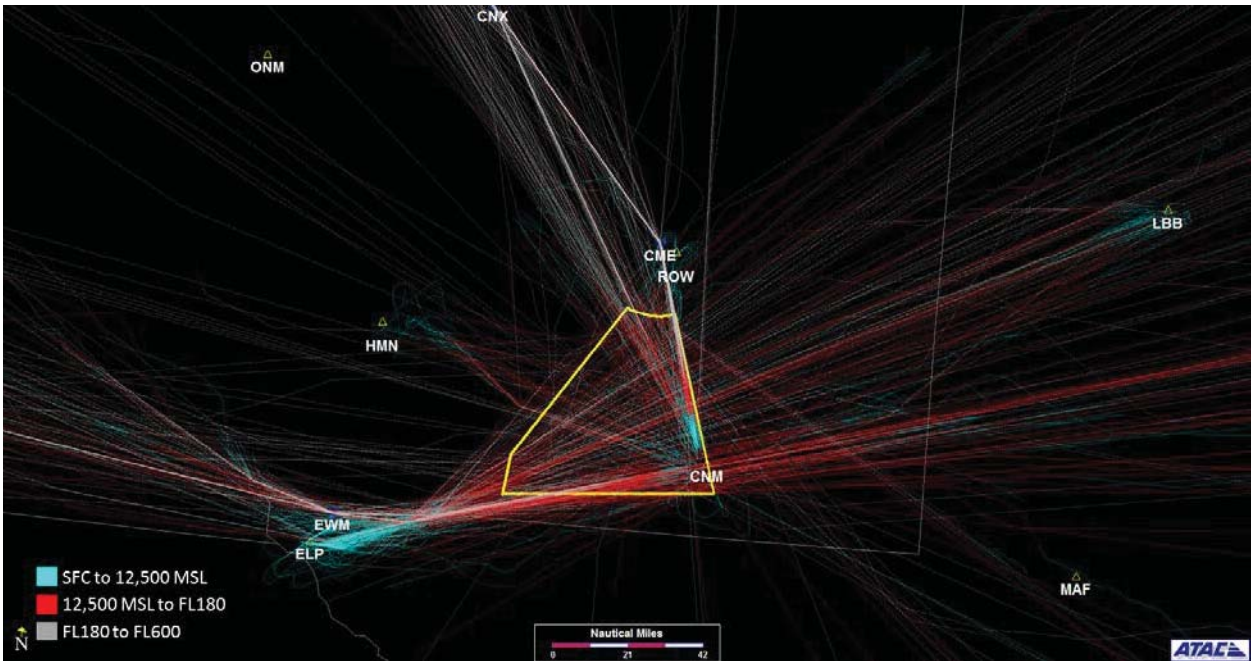


Figure 2-30: Civilian Traffic Flows – X-Talon High A MOA

Figure 2-31 presents civilian traffic flows through X-Talon High B MOA.

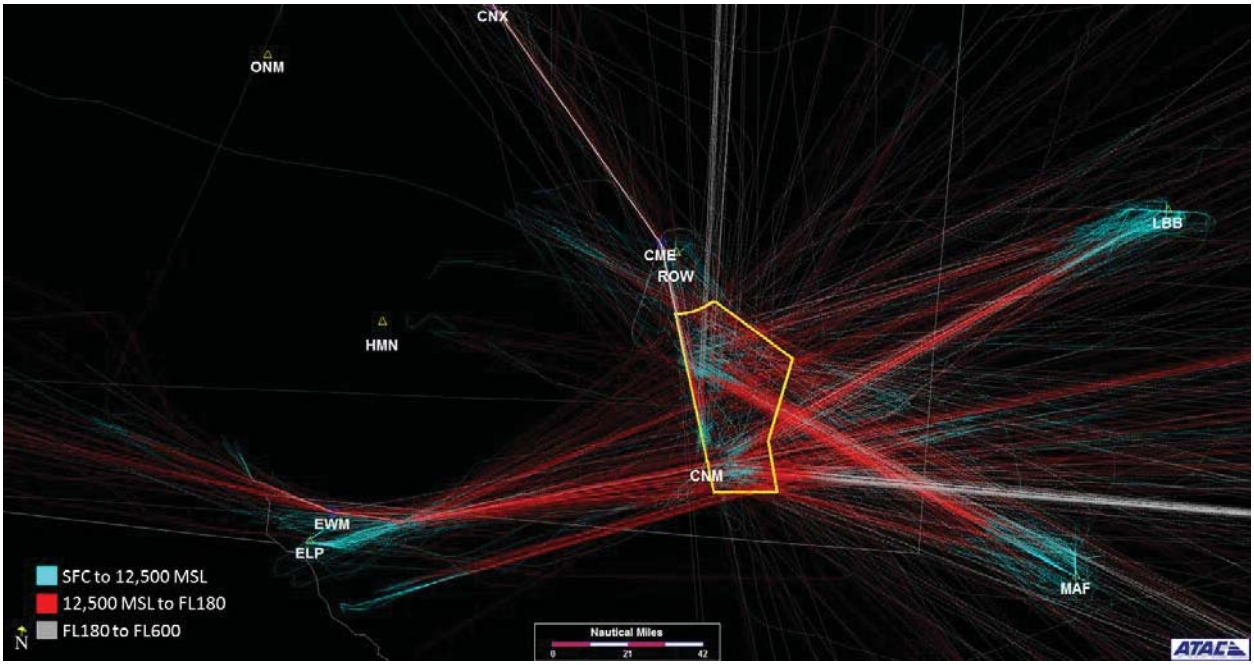


Figure 2-31: Civilian Traffic Flows – X-Talon High B MOA

Figure 2-32 presents civilian traffic flows through X-Talon Low A MOA.

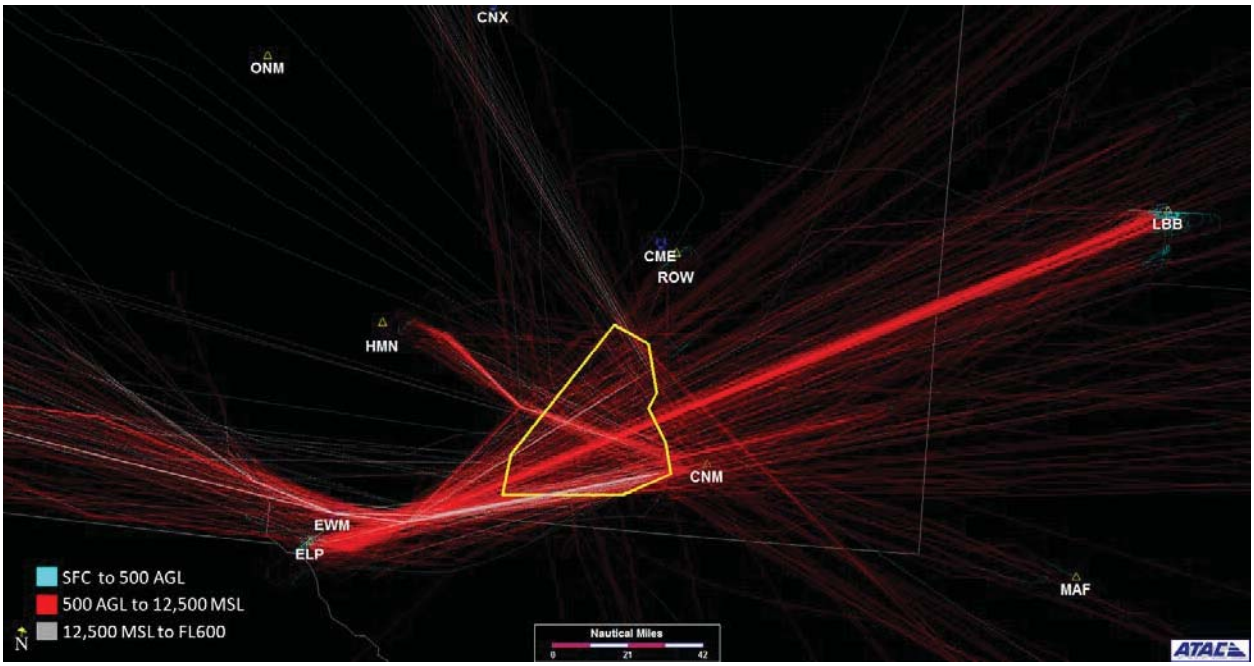


Figure 2-32: Civilian Traffic Flows – X-Talon Low A MOA

Figure 2-33 presents civilian traffic flows through X-Talon Low B MOA.

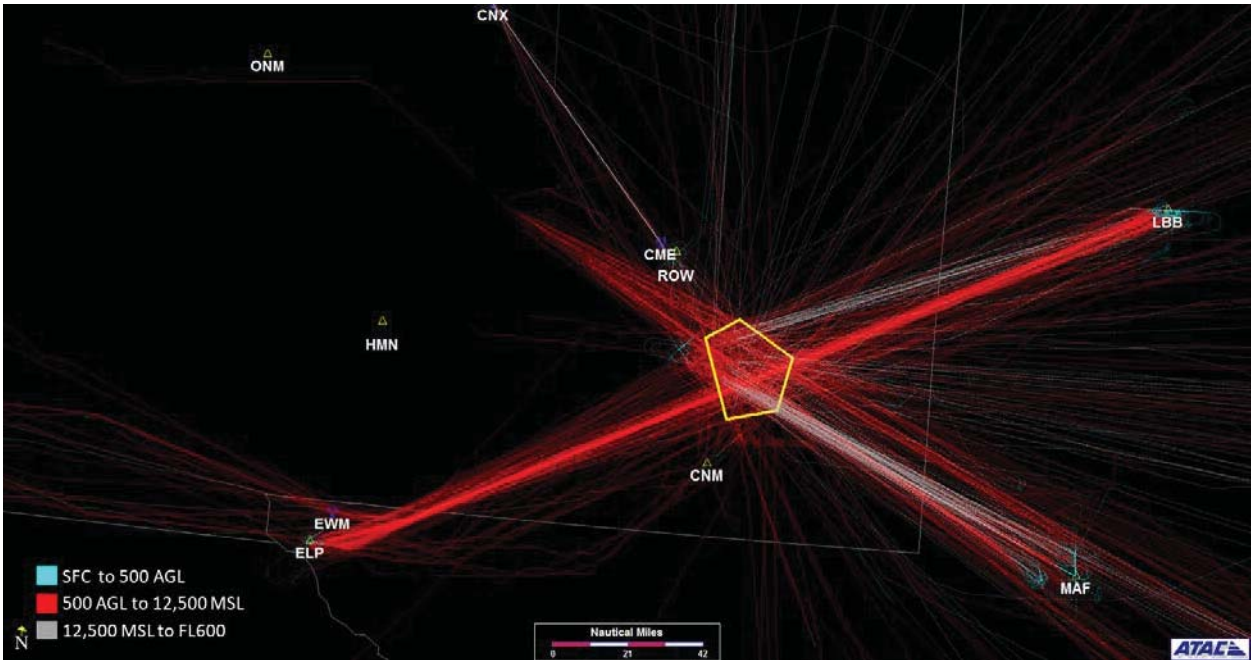


Figure 2-33: Civilian Traffic Flows – X-Talon Low B MOA

The following tables present origin and destination airports for civilian flights in the X-Talon High MOAs.

Table 2-162: Origin Airport - Civilian Flights – X-Talon High A MOA

Origin Airport	Count	Percent
Cavern City Air Terminal (CNM)	214	28.4%
Albuquerque International Sunport (ABQ)	130	17.2%
Lubbock Preston Smith International Airport (LBB)	33	4.4%
El Paso International Airport (ELP)	23	3.1%
Abernathy Field Airport (GZS)	21	2.8%
Other*/Unknown	333	44.2%
Total	**754**	**100.0%**

* Less than 3%

Table 2-163: Destination Airport - Civilian Flights – X-Talon High A MOA

Destination Airport	Count	Percent
Cavern City Air Terminal (CNM)	199	26.4%
El Paso International Airport (ELP)	155	20.6%
Albuquerque International Sunport (ABQ)	102	13.5%
Alamogordo–White Sands Regional Airport (ALM)	27	3.6%
Sierra Blanca Regional Airport (SRR)	23	3.1%
Las Cruces International Airport (LRU)	19	2.5%
Other*/Unknown	229	30.4%
Total	**754**	**100.0%**

* Less than 3%

Table 2-164: Origin Airport - Civilian Flights – X-Talon High B MOA

Origin Airport	Count	Percent
Cavern City Air Terminal (CNM)	298	32.8%
Midland International Airport (MAF)	49	5.4%
Lubbock Preston Smith International Airport (LBB)	28	3.1%
Roswell International Air Center (ROW)	27	3.0%
Other*/Unknown	506	55.7%
Total	**908**	**100.0%**

* Less than 3%

Table 2-165: Destination Airport - Civilian Flights – X-Talon High B MOA

Destination Airport	Count	Percent
Lubbock Preston Smith International Airport (LBB)	120	13.2%
Midland International Airport (MAF)	90	9.9%
El Paso International Airport (ELP)	72	7.9%
Dallas/Fort Worth International Airport (DFW)	72	7.9%
Artesia Municipal Airport (ATS)	71	7.8%
Cavern City Air Terminal (CNM)	55	6.1%
Sierra Blanca Regional Airport (SRR)	41	4.5%
Albuquerque International Sunport (ABQ)	33	3.6%
Other*/Unknown	354	39.0%
Total	**908**	**100.0%**

* Less than 3%

Table 2-166: Origin Airport - Civilian Flights – X-Talon Low A MOA

Origin Airport	Count	Percent
Cavern City Air Terminal (CNM)	142	19.5%
El Paso International Airport (ELP)	140	19.2%
Lubbock Preston Smith International Airport (LBB)	98	13.5%
Other*/Unknown	348	47.8%
Total	**728**	**100.0%**

* Less than 3%

Table 2-167: Destination Airport - Civilian Flights – X-Talon Low A MOA

Destination Airport	Count	Percent
El Paso International Airport (ELP)	153	21.0%
Alamogordo–White Sands Regional Airport (ALM)	102	14.0%
Cavern City Air Terminal (CNM)	88	12.1%
Lubbock Preston Smith International Airport (LBB)	67	9.2%
Las Cruces International Airport (LRU)	27	3.7%
Dona Ana County Airport at Santa Teresa (5T6)	20	2.7%
Other*/Unknown	271	37.2%
Total	**728**	**100.0%**

* Less than 3%

Table 2-168: Origin Airport - Civilian Flights – X-Talon Low B MOA

Origin Airport	Count	Percent
Artesia Municipal Airport (ATS)	117	16.7%
Lubbock Preston Smith International Airport (LBB)	114	16.3%
Midland International Airport (MAF)	82	11.7%
El Paso International Airport (ELP)	77	11.0%
Roswell International Air Center (ROW)	46	6.6%
Sierra Blanca Regional Airport (SRR)	22	3.1%
Other*/Unknown	242	34.6%
Total	**700**	**100.0%**

* Less than 3%

Table 2-169: Destination Airport - Civilian Flights – X-Talon Low B MOA

Destination Airport	Count	Percent
Artesia Municipal Airport (ATS)	137	19.6%
El Paso International Airport (ELP)	86	12.3%
Lubbock Preston Smith International Airport (LBB)	81	11.6%
Sierra Blanca Regional Airport (SRR)	63	9.0%
Midland International Airport (MAF)	53	7.6%
Cavern City Air Terminal (CNM)	42	6.0%
Odessa Airport-Schlemeyer Field (ODO)	23	3.3%
Other*/Unknown	215	30.7%
Total	**700**	**100.0%**

* Less than 3%

Figure 2-34 presents military traffic through X-Talon High A MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

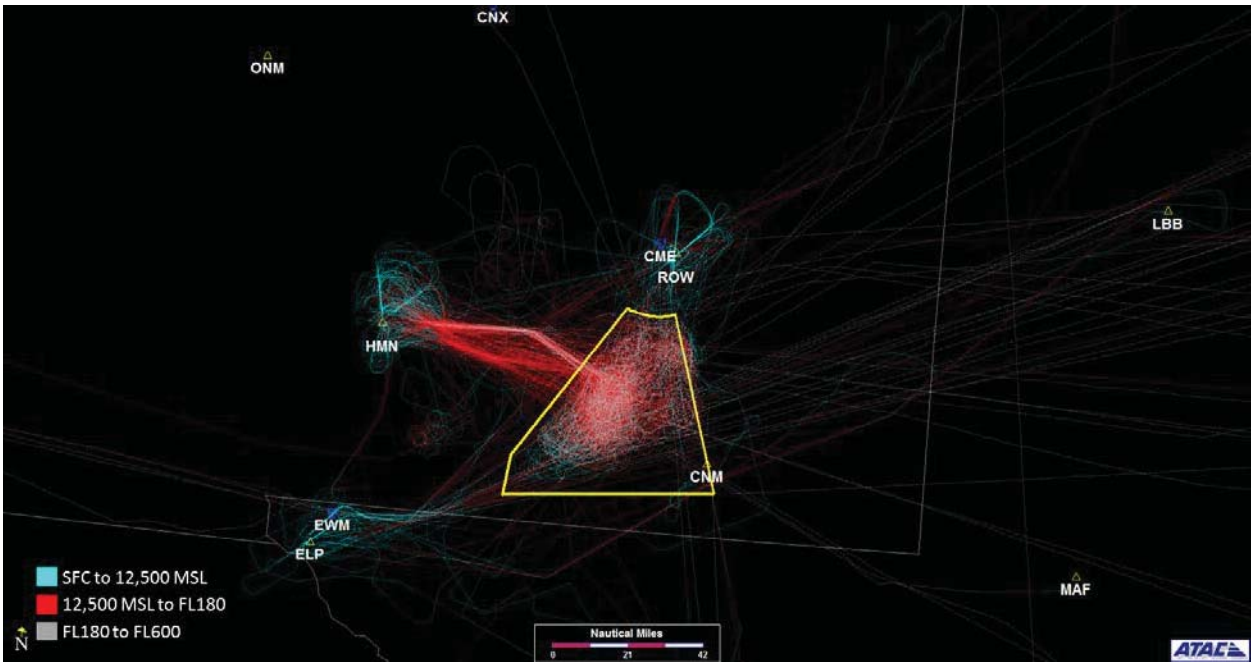


Figure 2-34: Military Traffic Flows – X-Talon High A MOA

Figure 2-35 presents military traffic through X-Talon High B MOA.

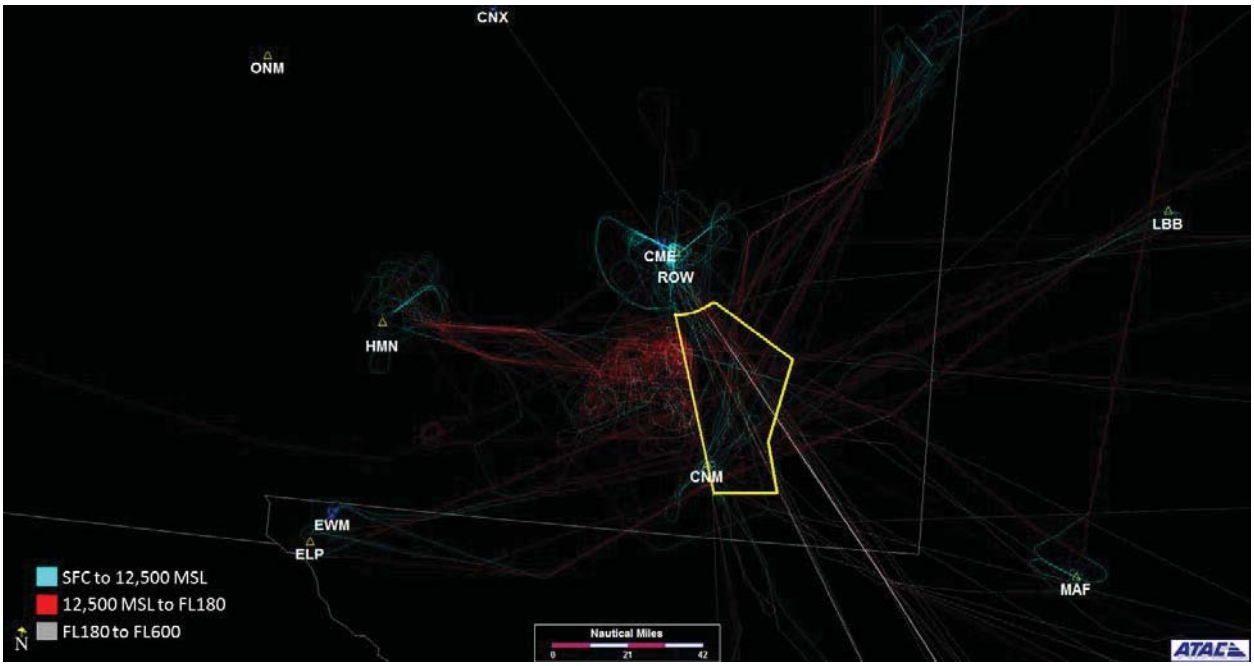


Figure 2-35: Military Traffic Flows – X-Talon High B MOA

Figure 2-36 presents military traffic through X-Talon Low A MOA.

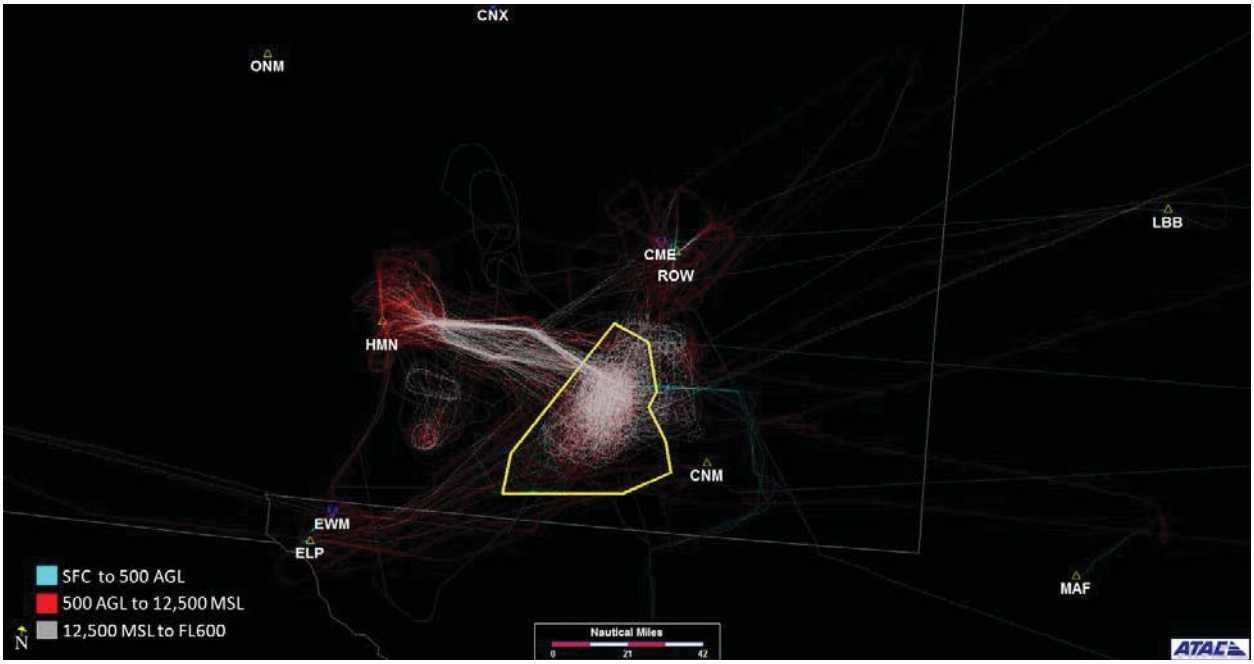


Figure 2-36: Military Traffic Flows – X-Talon Low A MOA

Figure 2-37 presents military traffic through X-Talon Low B MOA.

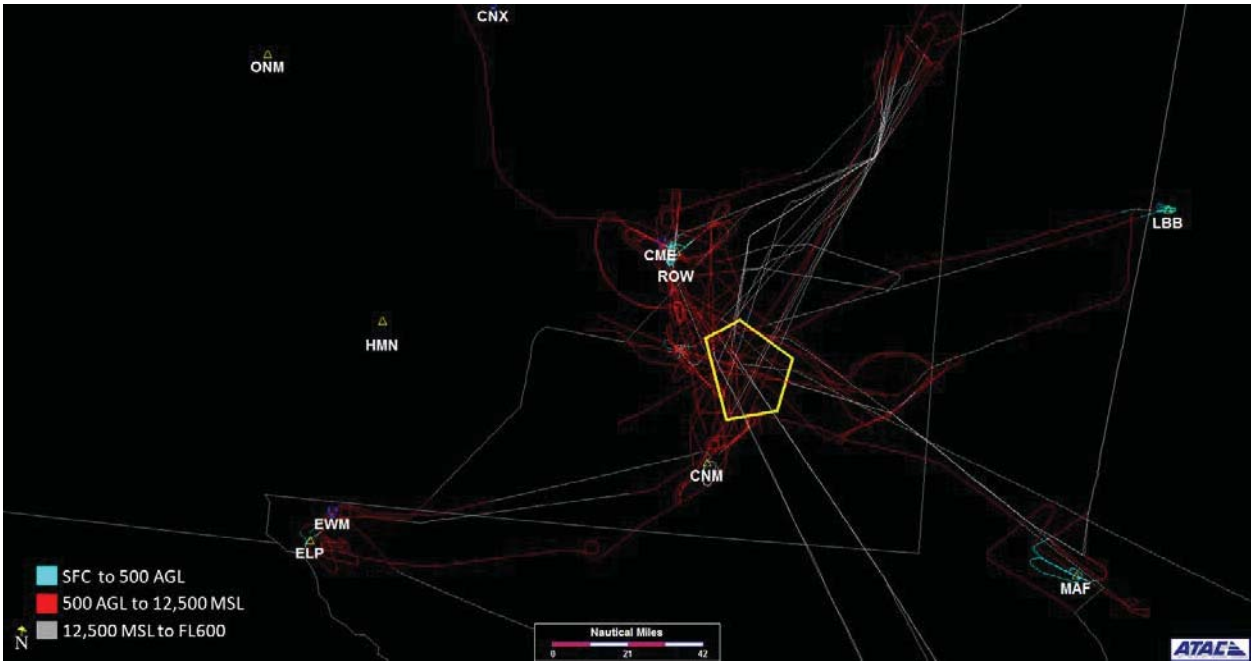


Figure 2-37: Military Traffic Flows – X-Talon Low B MOA

Table 2-170: Origin Airport - Military Flights – X-Talon High A MOA

Origin Airport	Count	Percent
Holloman AFB (HMN)	206	72.3%
Sheppard AFB (SPS)	10	3.5%
El Paso International Airport (ELP)	9	3.2%
Other*/Unknown	60	21.1%
Total	**285**	**100.0%**

* Less than 3%

Table 2-171: Destination Airport - Military Flights – X-Talon High A MOA

Destination Airport	Count	Percent
Holloman AFB (HMN)	218	76.5%
El Paso International Airport (ELP)	15	5.3%
Biggs Army Airfield (Fort Bliss) (BIF)	12	4.2%
Roswell International Air Center (ROW)	10	3.5%
Other*/Unknown	30	10.5%
Total	**285**	**100.0%**

* Less than 3%

Table 2-172: Origin Airport - Military Flights – X-Talon High B MOA

Origin Airport	Count	Percent
Holloman AFB (HMN)	18	18.4%
Cannon AFB (CVS)	17	17.3%
Roswell International Air Center (ROW)	14	14.3%
Laughlin AFB (DLF)	14	14.3%
El Paso International Airport (ELP)	5	5.1%
Cavern City Air Terminal (CNM)	5	5.1%
Biggs Army Airfield (Fort Bliss) (BIF)	3	3.1%
Other*/Unknown	22	22.4%
Total	**98**	**100.0%**

* Less than 3%

Table 2-173: Destination Airport - Military Flights – X-Talon High B MOA

Destination Airport	Count	Percent
Holloman AFB (HMN)	23	23.5%
Roswell International Air Center (ROW)	19	19.4%
Cannon AFB (CVS)	16	16.3%
Laughlin AFB (DLF)	10	10.2%
Lubbock Preston Smith International Airport (LBB)	5	5.1%
Biggs Army Airfield (Fort Bliss) (BIF)	3	3.1%
Other*/Unknown	22	22.4%
Total	**98**	**100.0%**

* Less than 3%

Table 2-174: Origin Airport - Military Flights – X-Talon Low A MOA

Origin Airport	Count	Percent
Holloman AFB (HMN)	155	81.2%
El Paso International Airport (ELP)	7	3.7%
Other*/Unknown	29	15.2%
Total	**191**	**100.0%**

* Less than 3%

Table 2-175: Destination Airport - Military Flights – X-Talon Low A MOA

Destination Airport	Count	Percent
Holloman AFB (HMN)	158	82.7%
Other*/Unknown	33	17.3%
Total	**191**	**100.0%**

* Less than 3%

2.3.2 X-Talon ATCAA (A and B only)

Table 2-176 presents the baseline PDARS flight counts for X-Talon ATCAA (A and B only), broken out by civilian and military user. Civilian users accounted for approximately 96-97% of total flight counts in X-Talon ATCAA (A and B only).

Table 2-176: Monthly Flight Counts FY16 – X-Talon ATCAA (A and B only)

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	3,878	96.0%	4,137	96.4%	3,472	96.3%	5,316	97.6%
Military	160	4.0%	154	3.6%	134	3.7%	130	2.4%
Total	**4,038**	**100%**	**4,291**	**100%**	**3,606**	**100%**	**5,446**	**100%**

Table 2-177 presents the average and maximum number of daily flight counts in X-Talon ATCAA (A and B only) broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-177: Average and Maximum Daily Flight Counts – X-Talon ATCAA (A and B only)

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	125.1	217	133.5	209	115.7	220	171.5	285
Military	5.2	23	5.0	18	4.5	10	4.2	11

The following tables present flight counts for X-Talon ATCAA (A and B only) by day of week and hour.

Table 2-178: Civilian Flight Counts by Day of Week – X-Talon ATCAA (A and B only)

Day of Week	Oct	Jan	Apr	Jul
Sunday	666	894	812	978
Monday	521	582	289	681
Tuesday	545	330	356	732
Wednesday	481	392	376	539
Thursday	530	425	368	610
Friday	583	630	595	1,013
Saturday	552	884	676	763
Total	**3,878**	**4,137**	**3,472**	**5,316**

Table 2-179: Military Flight Counts by Day of Week- X-Talon ATCAA (A and B only)

Day of Week	Oct	Jan	Apr	Jul
Sunday	17	15	4	6
Monday	18	12	24	18
Tuesday	28	22	21	24
Wednesday	18	12	27	21
Thursday	26	34	22	27
Friday	46	48	25	34
Saturday	7	11	11	0
Total	**160**	**154**	**134**	**130**

Table 2-180: Civilian Flight Counts by Hour – X-Talon ATCAA (A and B only)

Hour	Oct	Jan	Apr	Jul
0000	61	104	94	134
0100	64	83	59	80
0200	110	114	104	92
0300	91	92	104	95
0400	23	43	19	32
0500	67	54	62	66
0600	127	102	86	122
0700	90	92	96	101
0800	159	148	123	190
0900	218	248	181	255
1000	136	236	214	217
1100	181	250	181	221
1200	163	249	245	245
1300	180	227	144	247
1400	217	224	177	322
1500	236	258	197	266
1600	183	223	189	254
1700	217	255	188	330
1800	194	185	169	408
1900	259	208	171	345
2000	264	310	175	424
2100	243	214	166	357
2200	335	160	233	314
2300	60	58	95	199
Total	**3,878**	**4,137**	**3,472**	**5,316**

Table 2-181: Military Flight Counts by Hour – X-Talon ATCAA (A and B only)

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	0
0100	3	2	0	0
0200	0	0	0	0
0300	0	0	1	0
0400	0	0	2	0
0500	0	0	1	1
0600	0	0	0	4
0700	4	7	6	6
0800	7	4	5	3
0900	8	11	8	19
1000	19	10	8	14
1100	19	16	11	14
1200	24	18	11	11
1300	19	20	8	11
1400	24	22	24	7
1500	22	18	13	16
1600	3	9	12	7
1700	1	8	10	2
1800	1	4	3	1
1900	3	3	0	6
2000	0	1	4	2
2100	2	1	4	5
2200	0	0	3	1
2300	0	0	0	0
Total	**160**	**154**	**134**	**130**

Table 2-182 presents the average number of minutes spent transiting X-Talon ATCAA (A and B only) broken out by civilian and military users. On average, civilian flights through X-Talon ATCAA (A and B only) ranged from 5.8 to 6.1 minutes. Military flights through X-Talon ATCAA (A and B only) ranged from 7.7 to 15.3 minutes.

Table 2-182: Average Duration of Flights – X-Talon ATCAA (A and B only)

User	Oct	Jan	Apr	Jul
Civilian	5.9	5.8	6.1	6.1
Military	11.4	10.6	15.3	7.7

Figure 2-38 presents civilian traffic flows through X-Talon ATCAA (A and B only).

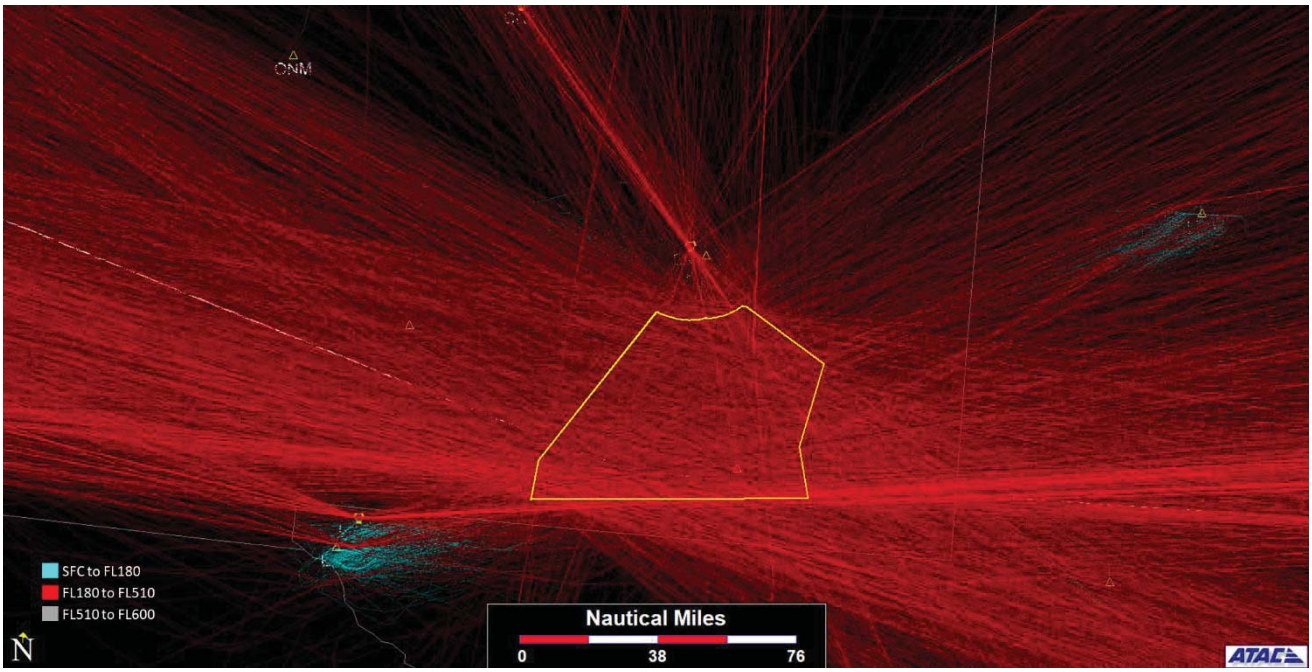


Figure 2-38: Civilian Traffic Flows – X-Talon ATCAA (A and B only)

The following tables present origin and destination airports for civilian flights in X-Talon ATCAA (A and B only).

Table 2-183: Origin Airport - Civilian Flights – X-Talon ATCAA (A and B only)

Origin Airport	Count	Percent
Dallas/Fort Worth International Airport (DFW)	2,156	12.8%
Los Angeles International Airport (LAX)	1,766	10.5%
Phoenix Sky Harbor International Airport (PHX)	1,027	6.1%
Dallas Love Field (DAL)	858	5.1%
McCarran International Airport (LAS)	834	5.0%
George Bush Intercontinental Airport (IAH)	772	4.6%
San Diego International Airport (SAN)	680	4.0%
El Paso International Airport (ELP)	622	3.7%
Hartsfield–Jackson Atlanta International Airport (ATL)	577	3.4%
Other*/Unknown	7,511	44.7%
Total	**16,803**	**100.0%**

* Less than 3%

Table 2-184: Destination Airport - Civilian Flights – X-Talon ATCAA (A and B only)

Destination Airport	Count	Percent
Los Angeles International Airport (LAX)	1,898	11.3%
Dallas/Fort Worth International Airport (DFW)	1,617	9.6%
Phoenix Sky Harbor International Airport (PHX)	1,334	7.9%
McCarran International Airport (LAS)	1,115	6.6%
San Diego International Airport (SAN)	897	5.3%
George Bush Intercontinental Airport (IAH)	865	5.1%
El Paso International Airport (ELP)	636	3.8%
Tucson International Airport (TUS)	612	3.6%
Austin-Bergstrom International Airport (AUS)	593	3.5%
Other*/Unknown	7,236	43.1%
Total	**16,803**	**100.0%**

* Less than 3%

Figure 2-39 presents military traffic through X-Talon ATCAA (A and B only). Flights may be descending or climbing into or out of the ATCAA, which is why some tracks change color along flight path.

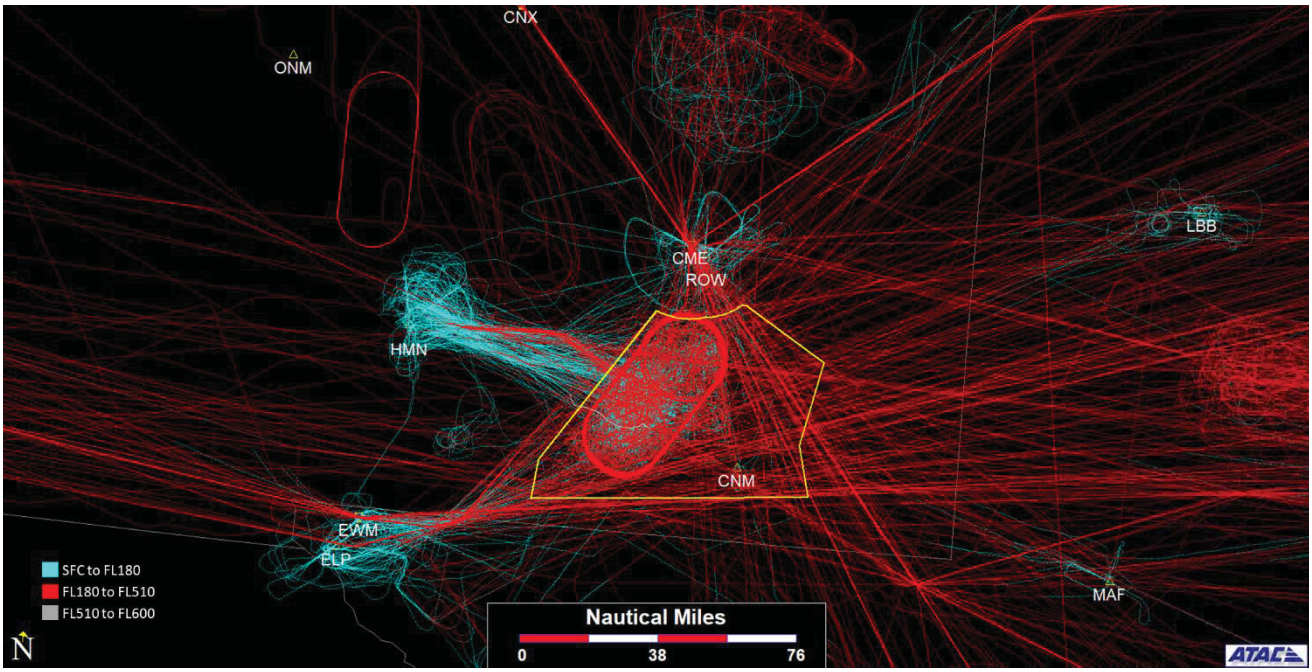


Figure 2-39: Military Traffic Flows – X-Talon ATCAA (A and B only)

Table 2-185: Origin Airport - Military Flights – X-Talon ATCAA (A and B only)

Origin Airport	Count	Percent
Holloman AFB (HMN)	166	28.7%
Sheppard AFB (SPS)	46	8.0%
Dyess AFB (DYS)	40	6.9%
Tinker AFB (TIK)	26	4.5%
El Paso International Airport (ELP)	24	4.2%
Barksdale AFB (BAD)	20	3.5%
Roswell International Air Center (ROW)	18	3.1%
Other*/Unknown	238	41.2%
Total	**578**	**100.0%**

* Less than 3%

Table 2-186: Destination Airport - Military Flights – X-Talon ATCAA (A and B only)

Destination Airport	Count	Percent
Holloman AFB (HMN)	177	30.6%
El Paso International Airport (ELP)	52	9.0%
Dyess AFB (DYS)	40	6.9%
Tinker AFB (TIK)	31	5.4%
Biggs Army Airfield (Fort Bliss) (BIF)	28	4.8%
Roswell International Air Center (ROW)	19	3.3%
Barksdale AFB (BAD)	19	3.3%
Davis Monthan AFB (DMA)	18	3.1%
Other*/Unknown	194	33.6%
Total	**578**	**100.0%**

* Less than 3%

2.3.3 New Smitty/Cato MOA

Table 2-187 present the baseline PDARS flight counts for the New Smitty/Cato MOA, broken out by civilian and military user. The majority of flights transiting this airspace were civilian.

Table 2-187: Monthly Flight Counts FY16 – New Smitty/Cato MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	162	93.6%	129	87.8%	88	86.3%	145	94.2%
Military	11	6.4%	18	12.2%	14	13.7%	9	5.8%
Total	**173**	**100%**	**147**	**100%**	**102**	**100%**	**154**	**100%**

Table 2-188 presents the average and maximum number of daily flight counts in the New Smitty/Cato MOA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-188: Average and Maximum Daily Flight Counts – New Smitty/Cato MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	5.2	11	4.2	9	2.9	8	4.7	11
Military	0.4	2	0.6	4	0.5	3	0.3	2

Table 2-189 and *Table 2-190* present flight counts for the New Smitty/Cato MOA by day of week.

Table 2-189: Civilian Flight Counts by Day of Week – New Smitty/Cato MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	17	15	10	18
Monday	25	17	13	20
Tuesday	18	16	10	22
Wednesday	28	17	17	17
Thursday	26	22	9	19
Friday	33	23	16	33
Saturday	15	19	13	16
Total	**162**	**129**	**88**	**145**

Table 2-190: Military Flight Counts by Day of Week- New Smitty/Cato MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	0	0	2	0
Monday	1	0	2	3
Tuesday	1	4	2	1
Wednesday	1	1	4	1
Thursday	3	6	2	4
Friday	2	6	1	0
Saturday	3	1	1	0
Total	**11**	**18**	**14**	**9**

The following tables present flight counts by hour through the New Smitty/Cato MOA.

Table 2-191: Civilian Flight Counts by Hour – New Smitty/Cato MOA

Hour	Oct	Jan	Apr	Jul
0000	1	2	0	1
0100	2	1	1	0
0200	0	0	1	0
0300	0	0	1	1
0400	0	1	0	0
0500	0	1	0	0
0600	0	5	2	12
0700	6	6	0	10
0800	21	19	12	20
0900	14	4	3	8
1000	6	4	11	8
1100	16	6	7	9
1200	11	6	5	10
1300	7	9	3	7
1400	17	6	5	6
1500	11	7	3	9
1600	12	13	5	2
1700	8	4	3	13
1800	19	11	11	9
1900	4	16	3	5
2000	1	5	2	6
2100	1	2	4	3
2200	4	1	6	5
2300	1	0	0	1
Total	**162**	**129**	**88**	**145**

Table 2-192: Military Flight Counts by Hour – New Smitty/Cato MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	0	0	0
0800	0	0	0	2
0900	0	0	1	0
1000	1	0	1	0
1100	2	1	2	0
1200	1	3	0	0
1300	0	1	0	1
1400	2	2	2	1
1500	1	2	0	1
1600	1	0	3	0
1700	1	3	1	1
1800	0	1	2	0
1900	0	1	1	0
2000	0	3	0	1
2100	2	1	0	0
2200	0	0	1	1
2300	0	0	0	1
Total	**11**	**18**	**14**	**9**

Table 2-193 presents the average number of minutes spent transiting the New Smitty/Cato MOA broken out by civilian and military users.

Table 2-193: Average Duration of Flights – New Smitty/Cato MOA

User	Oct	Jan	Apr	Jul
Civilian	8.7	9.6	10.6	10.6
Military	5.6	10.3	7.2	6.7

Figure 2-40 presents civilian traffic flows through New Smitty/Cato MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

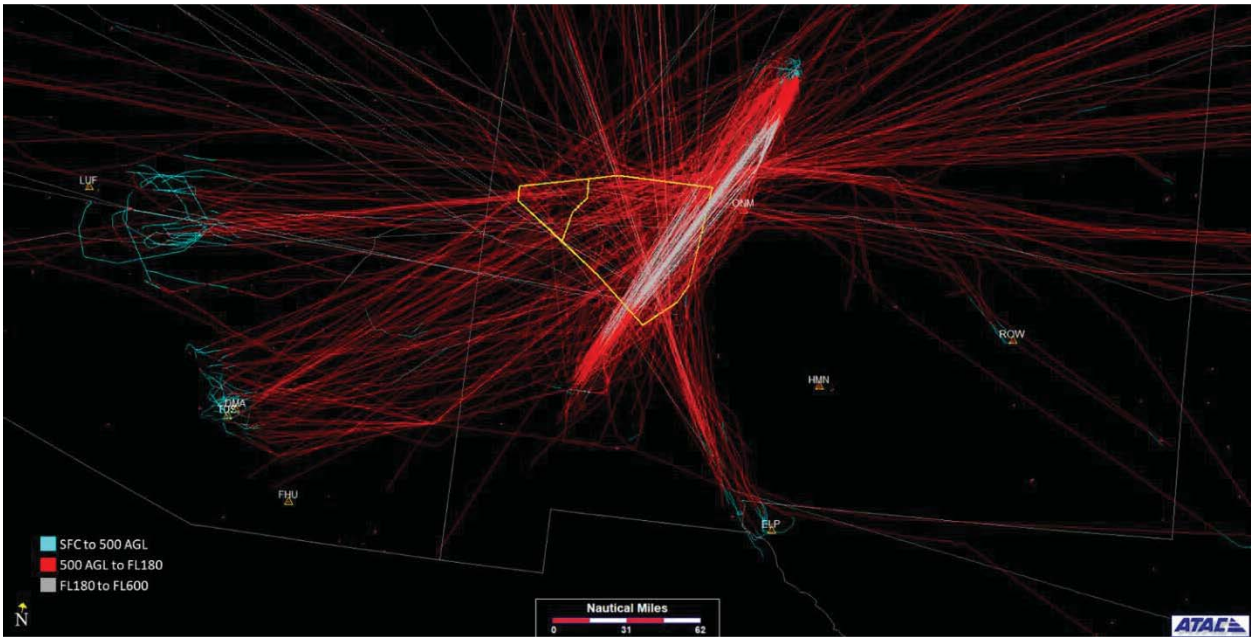


Figure 2-40: Civilian Traffic Flows – New Smitty/Cato MOA

The following tables present origin and destination airports for civilian flights in the New Smitty/Cato MOA.

Table 2-194: Origin Airport - Civilian Flights – New Smitty/Cato MOA

Origin Airport	Count	Percent
Albuquerque International Sunport (ABQ)	189	36.1%
Grant County Airport (SVC)	68	13.0%
Tucson International Airport (TUS)	25	4.8%
Las Cruces International Airport (LRU)	17	3.2%
Other*/Unknown	225	42.9%
Total	**524**	**100.0%**

* Less than 3%

Table 2-195: Destination Airport - Civilian Flights – New Smitty/Cato MOA

Destination Airport	Count	Percent
Grant County Airport (SVC)	169	32.3%
Albuquerque International Sunport (ABQ)	78	14.9%
Tucson International Airport (TUS)	28	5.3%
Other*/Unknown	249	47.5%
Total	**524**	**100.0%**

* Less than 3%

Figure 2-41 presents military traffic through New Smitty/Cato MOA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

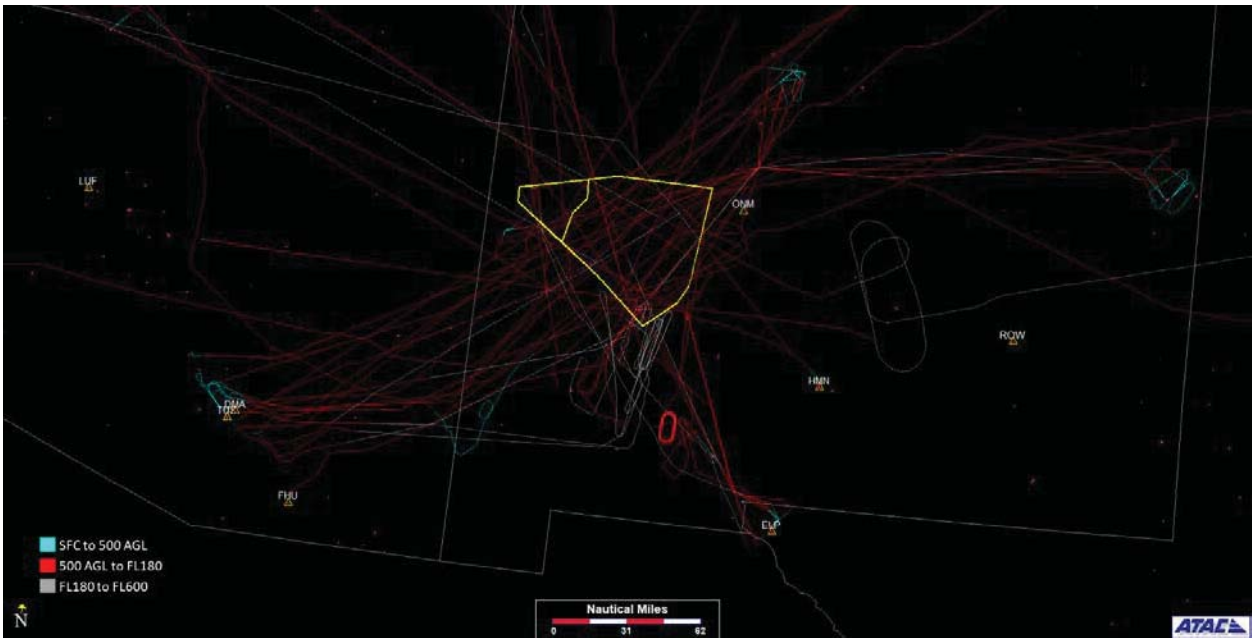


Figure 2-41: Military Traffic Flows – New Smitty/Cato MOA

Table 2-196: Origin Airport - Military Flights – New Smitty/Cato MOA

Origin Airport	Count	Percent
Cannon AFB (CVS)	5	9.6%
El Paso International Airport (ELP)	5	9.6%
Tucson International Airport (TUS)	4	7.7%
Grant County Airport (SVC)	4	7.7%
Albuquerque International Sunport (ABQ)	4	7.7%
Santa Fe Municipal Airport (SAF)	3	5.8%
Phoenix Sky Harbor International Airport (PHX)	2	3.8%
Davis Monthan AFB (DMA)	2	3.8%
Biggs Army Airfield (Fort Bliss) (BIF)	2	3.8%
Other*/Unknown	21	40.4%
Total	**52**	**100.0%**

* Less than 3%

Table 2-197: Destination Airport - Military Flights – New Smitty/Cato MOA

Destination Airport	Count	Percent
Cannon AFB (CVS)	7	13.5%
Davis Monthan AFB (DMA)	6	11.5%
Albuquerque International Sunport (ABQ)	6	11.5%
Grant County Airport (SVC)	3	5.8%
Biggs Army Airfield (Fort Bliss) (BIF)	3	5.8%
Tucson International Airport (TUS)	3	5.8%
Holloman AFB (HMN)	2	3.8%
Other*/Unknown	22	42.3%
Total	**52**	**100.0%**

* Less than 3%

2.3.4 New Smitty/Cato ATCAA

Table 2-198 presents the baseline PDARS flight counts for New Smitty/Cato ATCAA, broken out by civilian and military user. Civilian users accounted for approximately 95-98% of total flight counts in New Smitty/Cato ATCAA.

Table 2-198: Monthly Flight Counts FY16 – New Smitty/Cato ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	3,230	95.9%	4,021	97.5%	3,253	96.3%	3,928	98.3%
Military	137	4.1%	102	2.5%	125	3.7%	69	1.7%
Total	**3,367**	**100%**	**4,123**	**100%**	**3,378**	**100%**	**3,997**	**100%**

Table 2-199 presents the average and maximum number of daily flight counts in New Smitty/Cato ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-199: Average and Maximum Daily Flight Counts – New Smitty/Cato ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	104.2	178	129.7	201	108.4	200	126.7	204
Military	4.4	12	3.3	12	4.2	10	2.2	8

The following tables present flight counts for New Smitty/Cato ATCAA by day of week and hour.

Table 2-200: Civilian Flight Counts by Day of Week – New Smitty/Cato ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	630	776	634	789
Monday	370	536	341	476
Tuesday	365	428	321	487
Wednesday	367	376	363	394
Thursday	458	441	338	439
Friday	455	641	554	698
Saturday	585	823	702	645
Total	**3,230**	**4,021**	**3,253**	**3,928**

Table 2-201: Military Flight Counts by Day of Week- New Smitty/Cato ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	13	24	10	5
Monday	24	10	21	9
Tuesday	14	11	20	6
Wednesday	17	7	24	11
Thursday	33	19	19	15
Friday	28	18	21	20
Saturday	8	13	10	3
Total	**137**	**102**	**125**	**69**

Table 2-202: Civilian Flight Counts by Hour – New Smitty/Cato ATCAA

Hour	Oct	Jan	Apr	Jul
0000	96	138	95	148
0100	60	73	62	121
0200	97	124	88	92
0300	66	85	57	115
0400	18	32	20	32
0500	26	31	31	34
0600	35	64	57	122
0700	83	130	130	104
0800	168	187	203	162
0900	239	209	207	221
1000	108	160	160	131
1100	201	297	213	185
1200	177	266	199	144
1300	171	229	154	150
1400	170	188	149	161
1500	160	223	176	164
1600	177	223	188	145
1700	171	246	202	270
1800	148	158	144	208
1900	198	260	169	319
2000	182	209	140	248
2100	225	203	175	294
2200	173	175	120	159
2300	81	111	114	199
Total	**3,230**	**4,021**	**3,253**	**3,928**

Table 2-203: Military Flight Counts by Hour – New Smitty/Cato ATCAA

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	1
0100	0	0	0	0
0200	1	1	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	1	1
0700	1	1	0	3
0800	6	3	1	4
0900	5	13	10	3
1000	13	8	13	10
1100	24	12	18	11
1200	16	6	13	10
1300	15	21	15	4
1400	16	10	9	5
1500	13	6	16	5
1600	8	7	6	0
1700	3	5	7	2
1800	3	4	4	4
1900	3	4	7	3
2000	5	1	1	0
2100	2	0	2	0
2200	1	0	2	2
2300	1	0	0	1
Total	**137**	**102**	**125**	**69**

*Table 2-204 pr*esents the average number of minutes spent transiting New Smitty/Cato ATCAA broken out by civilian and military users. On average, civilian flights through New Smitty/Cato ATCAA ranged from 6.4 to 6.9 minutes. Military flights through New Smitty/Cato ATCAA ranged from 7.7 to 9.0 minutes.

Table 2-204: Average Duration of Flights – New Smitty/Cato ATCAA

User	Oct	Jan	Apr	Jul
Civilian	6.9	6.8	6.9	6.4
Military	9.0	7.7	8.9	8.2

Figure 2-42 presents civilian traffic flows through New Smitty/Cato ATCAA.

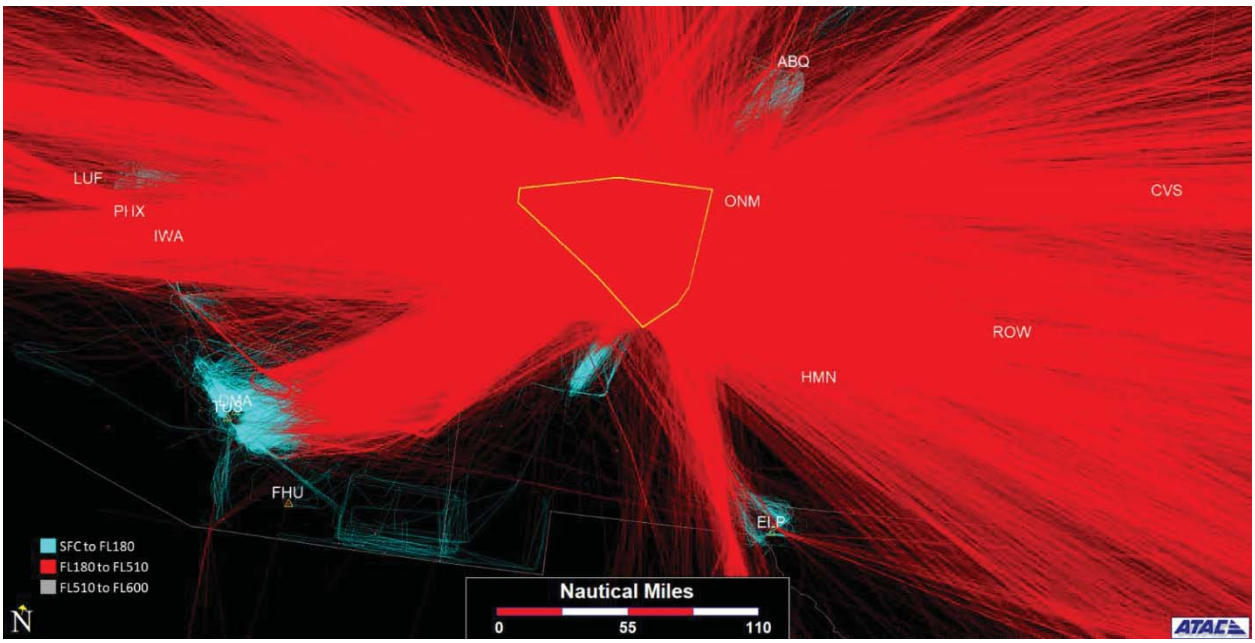


Figure 2-42: Civilian Traffic Flows – New Smitty/Cato ATCAA

The following tables present origin and destination airports for civilian flights in New Smitty/Cato ATCAA.

Table 2-205: Origin Airport - Civilian Flights – New Smitty/Cato ATCAA

Origin Airport	Count	Percent
Phoenix Sky Harbor International Airport (PHX)	1,434	9.9%
Tucson International Airport (TUS)	1,063	7.4%
San Diego International Airport (SAN)	1,013	7.0%
Dallas/Fort Worth International Airport (DFW)	895	6.2%
McCarran International Airport (LAS)	744	5.2%
Los Angeles International Airport (LAX)	710	4.9%
Denver International Airport (DEN)	579	4.0%
Albuquerque International Sunport (ABQ)	481	3.3%
George Bush Intercontinental Airport (IAH)	463	3.2%
Hartsfield–Jackson Atlanta International Airport (ATL)	427	3.0%
Other*/Unknown	6,623	45.9%
Total	**14,432**	**100.0%**

* Less than 3%

Table 2-206: Destination Airport - Civilian Flights – New Smitty/Cato ATCAA

Destination Airport	Count	Percent
Tucson International Airport (TUS)	1,440	10.0%
McCarran International Airport (LAS)	1,282	8.9%
Los Angeles International Airport (LAX)	1,000	6.9%
Dallas/Fort Worth International Airport (DFW)	927	6.4%
San Diego International Airport (SAN)	889	6.2%
Hartsfield–Jackson Atlanta International Airport (ATL)	541	3.7%
Other*/Unknown	8,353	57.9%
Total	**14,432**	**100.0%**

* Less than 3%

Figure 2-43 presents military traffic through New Smitty/Cato ATCAA. Flights may be descending or climbing into or out of the ATCAA, which is why some tracks change color along flight path.

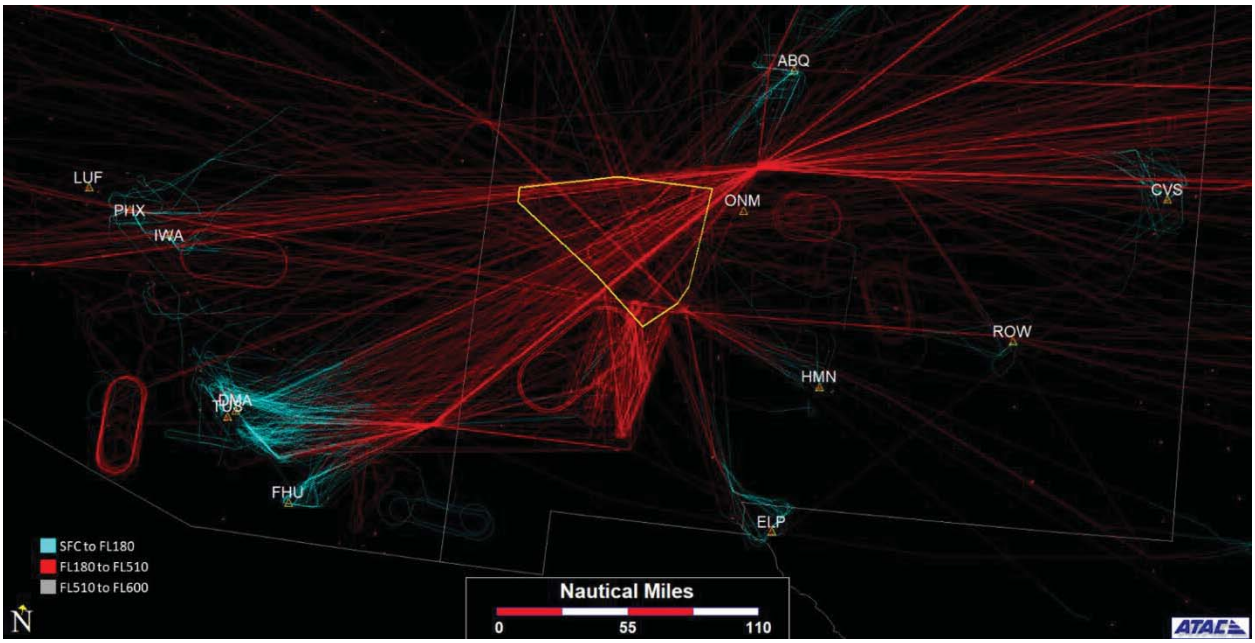


Figure 2-43: Military Traffic Flows – New Smitty/Cato ATCAA

Table 2-207: Origin Airport - Military Flights – New Smitty/Cato ATCAA

Origin Airport	Count	Percent
Davis Monthan AFB (DMA)	86	19.9%
Tucson International Airport (TUS)	27	6.2%
Sierra Vista Municipal Airport (FHU)	21	4.8%
McConnell AFB (IAB)	17	3.9%
Holloman AFB (HMN)	17	3.9%
Phoenix Sky Harbor International Airport (PHX)	15	3.5%
Rosecrans Memorial Airport (STJ)	13	3.0%
Other*/Unknown	237	54.7%
Total	**433**	**100.0%**

Table 2-208: Destination Airport - Military Flights – New Smitty/Cato ATCAA

Destination Airport	Count	Percent
Davis Monthan AFB (DMA)	75	17.3%
Sierra Vista Municipal Airport (FHU)	27	6.2%
Tucson International Airport (TUS)	21	4.8%
McConnell AFB (IAB)	20	4.6%
Rick Husband Amarillo International Airport (AMA)	17	3.9%
Cannon AFB (CVS)	16	3.7%
Albuquerque International Sunport (ABQ)	13	3.0%
Other*/Unknown	244	56.4%
Total	**433**	**100.0%**

* Less than 3%

2.3.5 Lobos High MOA

The following tables present the PDARS flight counts for Lobos High MOA. The majority of flights transiting Lobos High MOA were civilian.

Table 2-209: Monthly Flight Counts FY16 – Lobos High MOA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	264	94.6%	223	91.0%	211	89.0%	222	96.1%
Military	15	5.4%	22	9.0%	26	11.0%	9	3.9%
Total	**279**	**100%**	**245**	**100%**	**237**	**100%**	**231**	**100%**

Table 2-210 presents the daily average and daily maximum number of flights traversing Lobos High MOA.

Table 2-210: Average and Maximum Daily Flight Counts – Lobos High MOA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	8.5	14	7.2	12	7.0	12	7.2	13
Military	0.5	2	0.7	3	0.9	4	0.3	3

The following tables present flight counts for Lobos High MOA broken out by day of week.

Table 2-211: Civilian Flight Counts by Day of Week – Lobos High MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	37	28	24	31
Monday	39	33	30	32
Tuesday	39	33	28	34
Wednesday	45	28	31	34
Thursday	43	32	32	32
Friday	40	38	43	36
Saturday	21	31	23	23
Total	**264**	**223**	**211**	**222**

Table 2-212: Military Flight Counts by Day of Week – Lobos High MOA

Day of Week	Oct	Jan	Apr	Jul
Sunday	0	1	2	0
Monday	1	1	3	3
Tuesday	2	5	6	1
Wednesday	1	1	2	2
Thursday	6	5	5	3
Friday	3	6	6	0
Saturday	2	3	2	0
Total	**15**	**22**	**26**	**9**

The following tables present flights counts in Lobos High MOA by hour of the day.

Table 2-213: Civilian Flight Counts by Hour – Lobos High MOA

Hour	Oct	Jan	Apr	Jul
0000	1	1	1	4
0100	1	3	2	0
0200	0	0	0	0
0300	1	0	1	0
0400	0	0	0	1
0500	0	2	0	0
0600	1	24	28	46
0700	0	2	0	18
0800	29	29	26	6
0900	30	9	5	5
1000	3	4	1	1
1100	24	7	3	6
1200	30	4	8	6
1300	7	3	4	1
1400	27	24	5	4
1500	32	36	27	3
1600	5	12	27	5
1700	4	7	5	22
1800	31	15	21	13
1900	30	29	17	16
2000	3	5	8	28
2100	1	3	9	28
2200	3	2	12	7
2300	1	2	1	2
Total	**264**	**223**	**211**	**222**

Table 2-214: Military Flight Counts by Hour – Lobos High MOA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	0	0
0700	0	0	0	0
0800	0	0	0	1
0900	1	1	2	0
1000	2	1	3	0
1100	0	3	1	0
1200	1	3	0	1
1300	1	2	0	0
1400	3	4	2	1
1500	1	1	1	1
1600	1	0	4	0
1700	2	2	0	0
1800	0	1	2	1
1900	0	0	3	1
2000	0	3	2	3
2100	1	1	5	0
2200	1	0	1	0
2300	1	0	0	0
Total	**15**	**22**	**26**	**9**

The following tables present the average duration of flights transiting Lobos High MOA.

Table 2-215: Average Duration of Flights – Lobos High MOA

User	Oct	Jan	Apr	Jul
Civilian	3.9	3.3	3.9	3.7
Military	4.0	5.7	5.6	2.8

Figure 2-44 present the traffic flows for civilian flights traversing Lobos High and Low MOAs.

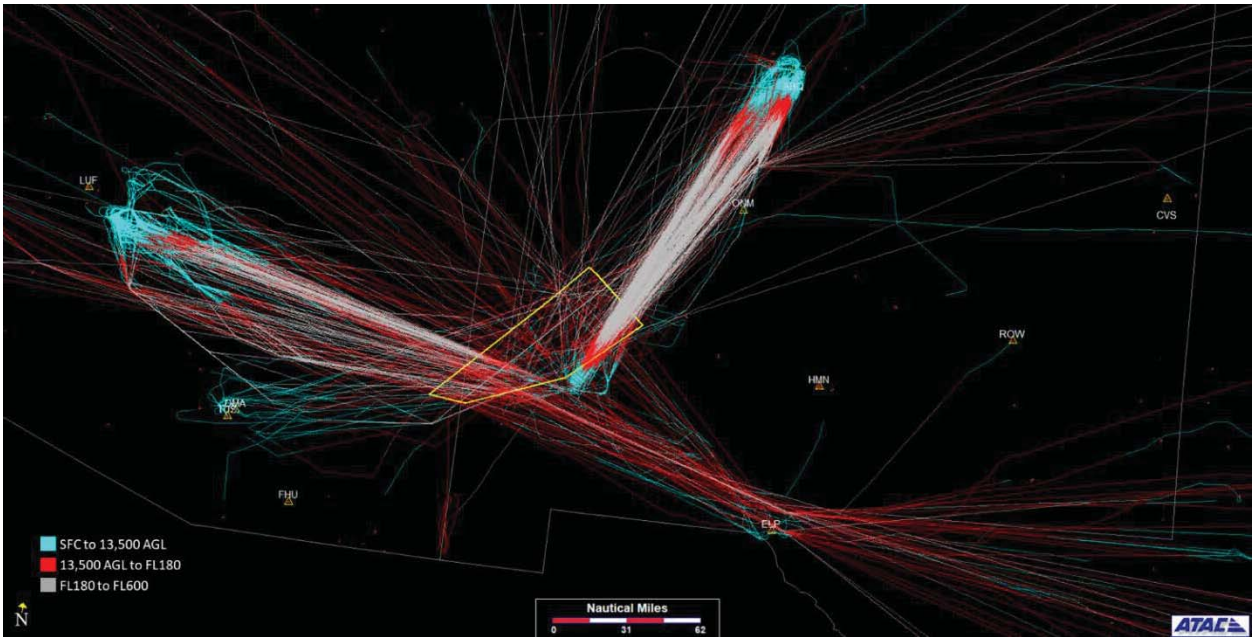


Figure 2-44: Civilian Traffic Flows – Lobos High MOA

The following tables present the origin and destination airports for civilian flights traversing Lobos High MOA. The most common origin and destination airport for civilian flights transiting Lobos High MOA was Grant County Airport.

Table 2-216: Origin Airport - Civilian Flights – Lobos High MOA

Origin Airport	Count	Percent
Grant County Airport (SVC)	356	38.7%
Albuquerque International Sunport (ABQ)	311	33.8%
Phoenix Sky Harbor International Airport (PHX)	101	11.0%
Other*/Unknown	152	16.5%
Total	**920**	**100.0%**

* Less than 3%

Table 2-217: Destination Airport - Civilian Flights – Lobos High MOA

Destination Airport	Count	Percent
Grant County Airport (SVC)	408	44.3%
Albuquerque International Sunport (ABQ)	332	36.1%
Other*/Unknown	180	19.6%
Total	**920**	**100.0%**

* Less than 3%

Figure 2-45 present the traffic flows for military flights in Lobos High MOA.

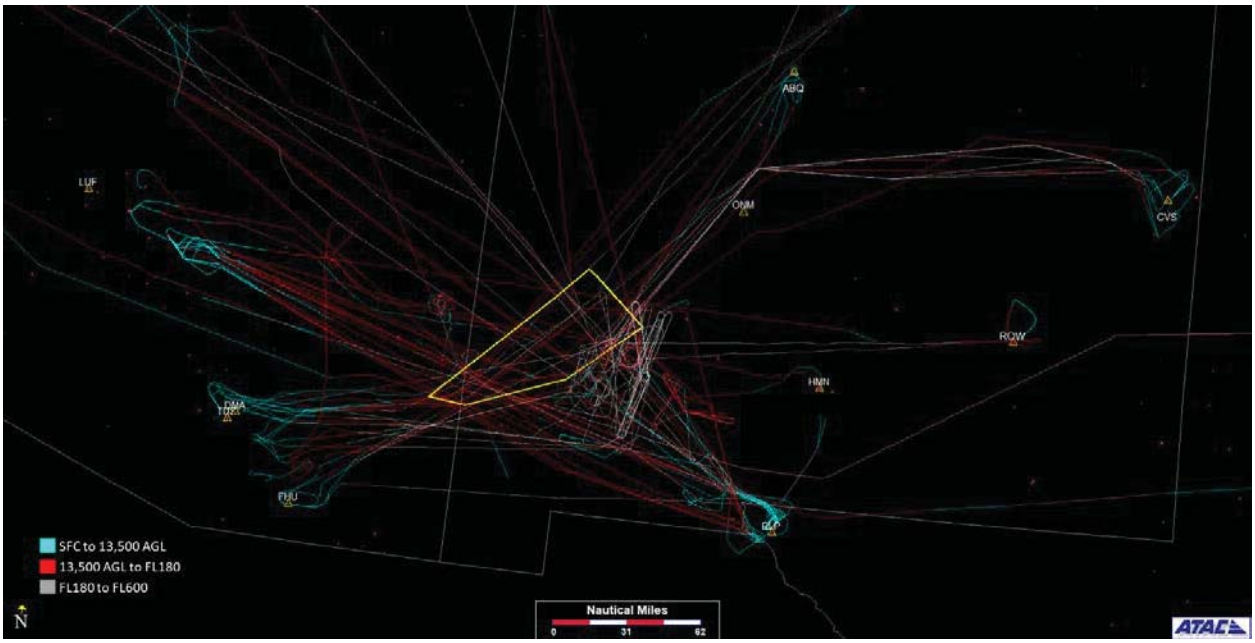


Figure 2-45: Military Traffic Flows – Lobos High MOA

The following tables present the origin and destination airports for military flights traversing Lobos High MOA.

Table 2-218: Origin Airport – Military Flights – Lobos High MOA

Origin Airport	Count	Percent
El Paso International Airport (ELP)	15	20.8%
Davis Monthan AFB (DMA)	7	9.7%
Cannon AFB (CVS)	6	8.3%
Grant County Airport (SVC)	6	8.3%
Phoenix–Mesa Gateway International Airport (IWA)	4	5.6%
Phoenix Sky Harbor International Airport (PHX)	4	5.6%
Santa Fe Municipal Airport (SAF)	3	4.2%
Other*/Unknown	27	37.5%
Total	**72**	**100.0%**

* Less than 3%

Table 2-219: Destination Airport - Military Flights – Lobos High MOA

Destination Airport	Count	Percent
Biggs Army Airfield (Fort Bliss) (BIF)	11	15.3%
Davis Monthan AFB (DMA)	10	13.9%
Phoenix–Mesa Gateway International Airport (IWA)	8	11.1%
Cannon AFB (CVS)	8	11.1%
Albuquerque International Sunport (ABQ)	4	5.6%
Tucson International Airport (TUS)	4	5.6%
Laughlin/Bullhead International Airport (IFP)	3	4.2%
Sierra Vista Municipal Airport (FHU)	3	4.2%
El Paso International Airport (ELP)	3	4.2%
Other*/Unknown	18	25.0%
Total	**72**	**100.0%**

* Less than 3%

2.3.6 Lobos ATCAA

Table 2-220 presents the baseline PDARS flight counts for Lobos ATCAA, broken out by civilian and military user. Civilian users accounted for approximately 98-99% of total flight counts in Lobos ATCAA.

Table 2-220: Monthly Flight Counts FY16 – Lobos ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	9,572	98.0%	10,098	98.4%	9,933	98.4%	11,676	99.0%
Military	199	2.0%	160	1.6%	157	1.6%	113	1.0%
Total	**9,771**	**100%**	**10,258**	**100%**	**10,090**	**100%**	**11,789**	**100%**

Table 2-221 presents the average and maximum number of daily flight counts in Lobos ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-221: Average and Maximum Daily Flight Counts – Lobos ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	308.8	440	325.7	402	331.1	480	376.6	460
Military	6.4	21	5.2	13	5.2	12	3.6	12

The following tables present flight counts for Lobos ATCAA by day of week and hour.

Table 2-222: Civilian Flight Counts by Day of Week – Lobos ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	1,264	1,640	1,436	1,960
Monday	1,325	1,381	1,254	1,558
Tuesday	1,297	1,255	1,367	1,504
Wednesday	1,215	1,243	1,236	1,436
Thursday	1,646	1,391	1,349	1,514
Friday	1,600	1,685	1,871	1,929
Saturday	1,225	1,503	1,420	1,775
Total	**9,572**	**10,098**	**9,933**	**11,676**

Table 2-223: Military Flight Counts by Day of Week- Lobos ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	26	26	17	12
Monday	23	23	25	9
Tuesday	24	18	23	11
Wednesday	29	17	25	16
Thursday	42	23	20	21
Friday	47	35	28	32
Saturday	8	18	19	12
Total	**199**	**160**	**157**	**113**

Table 2-224: Civilian Flight Counts by Hour – Lobos ATCAA

Hour	Oct	Jan	Apr	Jul
0000	135	220	212	243
0100	115	145	167	172
0200	179	163	215	183
0300	66	104	130	117
0400	34	53	32	26
0500	26	29	31	45
0600	185	146	221	331
0700	255	373	303	327
0800	500	482	499	513
0900	630	556	530	725
1000	566	837	602	653
1100	673	741	643	757
1200	615	576	660	579
1300	665	751	593	622
1400	640	645	558	637
1500	642	728	645	707
1600	597	788	634	640
1700	493	490	521	747
1800	453	441	402	634
1900	520	514	539	694
2000	603	525	585	804
2100	495	319	523	631
2200	310	304	404	463
2300	175	168	284	426
Total	**9,572**	**10,098**	**9,933**	**11,676**

Table 2-225: Military Flight Counts by Hour – Lobos ATCAA

Hour	Oct	Jan	Apr	Jul
0000	2	1	0	0
0100	0	0	0	0
0200	0	0	0	0
0300	0	0	2	0
0400	0	0	1	1
0500	0	0	0	2
0600	0	0	1	0
0700	0	2	0	1
0800	3	8	4	2
0900	13	10	12	10
1000	39	15	17	14
1100	29	22	9	19
1200	12	13	16	21
1300	27	28	21	9
1400	21	16	14	9
1500	13	7	18	5
1600	9	12	11	4
1700	10	10	14	3
1800	7	3	4	5
1900	7	6	3	1
2000	3	5	3	3
2100	1	2	4	2
2200	2	0	3	2
2300	1	0	0	0
Total	**199**	**160**	**157**	**113**

Table 2-226 presents the average number of minutes spent transiting Lobos ATCAA broken out by civilian and military users. On average, civilian flights through Lobos ATCAA ranged from 3.1 to 3.2 minutes. Military flights through Lobos ATCAA ranged from 7.1 to 8.1 minutes.

Table 2-226: Average Duration of Flights – Lobos ATCAA

User	Oct	Jan	Apr	Jul
Civilian	3.1	3.2	3.2	3.2
Military	7.7	7.1	8.1	7.1

Figure 2-46 presents civilian traffic flows through Lobos ATCAA.

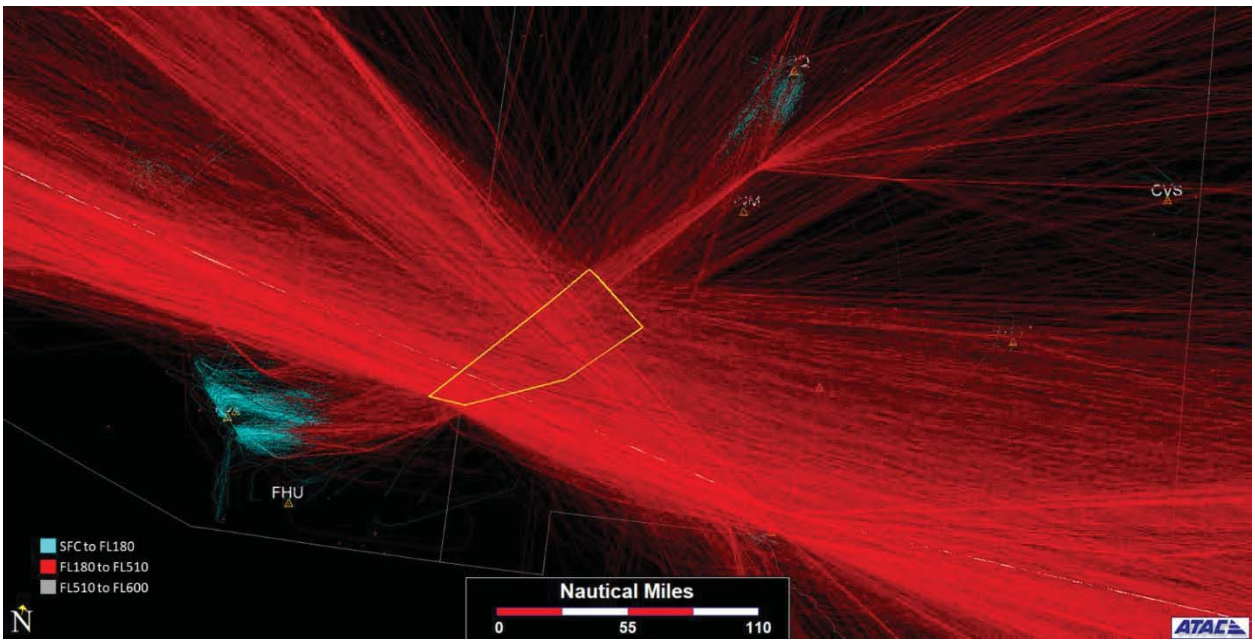


Figure 2-46: Civilian Traffic Flows – Lobos ATCAA

The following tables present origin and destination airports for civilian flights in Lobos ATCAA.

Table 2-227: Origin Airport - Civilian Flights – Lobos ATCAA

Origin Airport	Count	Percent
Phoenix Sky Harbor International Airport (PHX)	6,257	15.2%
Los Angeles International Airport (LAX)	5,647	13.7%
McCarran International Airport (LAS)	3,240	7.8%
George Bush Intercontinental Airport (IAH)	3,110	7.5%
Dallas/Fort Worth International Airport (DFW)	2,057	5.0%
Austin-Bergstrom International Airport (AUS)	1,792	4.3%
San Francisco International Airport (SFO)	1,380	3.3%
Other*/Unknown	17,796	43.1%
Total	**41,279**	**100.0%**

* Less than 3%

Table 2-228: Destination Airport - Civilian Flights – Lobos ATCAA

Destination Airport	Count	Percent
Los Angeles International Airport (LAX)	6,792	16.5%
George Bush Intercontinental Airport (IAH)	3,792	9.2%
Dallas/Fort Worth International Airport (DFW)	3,227	7.8%
McCarran International Airport (LAS)	2,790	6.8%
Austin-Bergstrom International Airport (AUS)	2,613	6.3%
San Antonio International Airport (SAT)	1,586	3.8%
El Paso International Airport (ELP)	1,491	3.6%
San Diego International Airport (SAN)	1,327	3.2%
William P. Hobby Airport (HOU)	1,304	3.2%
Other*/Unknown	16,357	39.6%
Total	**41,279**	**100.0%**

* Less than 3%

Figure 2-47 presents military traffic through Lobos ATCAA. Flights may be descending or climbing into or out of the ATCAA, which is why some tracks change color along flight path.

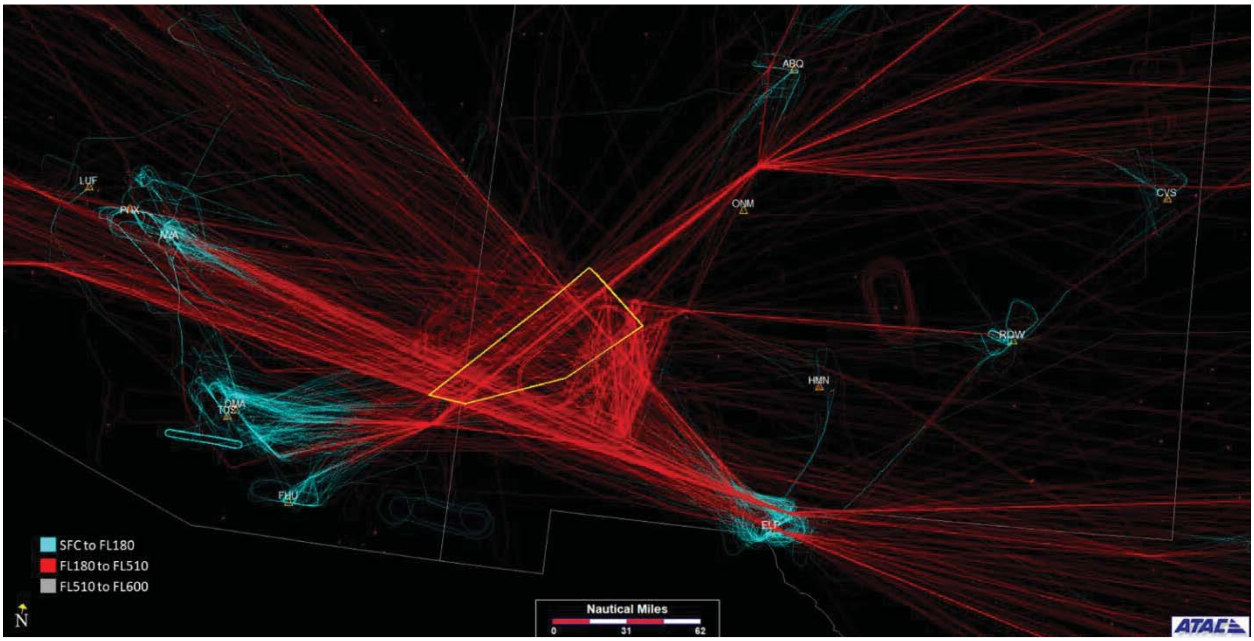


Figure 2-47: Military Traffic Flows – Lobos ATCAA

Table 2-229: Origin Airport - Military Flights – Lobos ATCAA

Origin Airport	Count	Percent
Davis Monthan AFB (DMA)	75	11.9%
El Paso International Airport (ELP)	55	8.7%
Phoenix Sky Harbor International Airport (PHX)	41	6.5%
Phoenix–Mesa Gateway International Airport (IWA)	34	5.4%
Nellis AFB (LSV)	21	3.3%
Sierra Vista Municipal Airport (FHU)	20	3.2%
Travis AFB (SUU)	19	3.0%
Other*/Unknown	364	57.9%
Total	**629**	**100.0%**

* Less than 3%

Table 2-230: Destination Airport - Military Flights – Lobos ATCAA

Destination Airport	Count	Percent
Davis Monthan AFB (DMA)	74	11.8%
El Paso International Airport (ELP)	72	11.4%
Biggs Army Airfield (Fort Bliss) (BIF)	33	5.2%
Sierra Vista Municipal Airport (FHU)	29	4.6%
Phoenix–Mesa Gateway International Airport (IWA)	23	3.7%
Tucson International Airport (TUS)	22	3.5%
Nellis AFB (LSV)	21	3.3%
Phoenix Sky Harbor International Airport (PHX)	20	3.2%
Other*/Unknown	335	53.3%
Total	**629**	**100.0%**

* Less than 3%

2.3.7 Christa ATCAA

Table 2-231 presents the baseline PDARS flight counts for the Christa ATCAA, broken out by civilian and military user. The majority of flights transiting this airspace were civilian.

Table 2-231: Monthly Flight Counts FY16 – Christa ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	2614	96.1%	3600	97.5%	2747	95.6%	3456	98.0%
Military	105	3.9%	94	2.5%	125	4.4%	71	2.0%
Total	**2719**	**100%**	**3694**	**100%**	**2872**	**100%**	**3527**	**100%**

Table 2-232 presents the average and maximum number of daily flight counts in the Christa ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-232: Average and Maximum Daily Flight Counts – Christa ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	84.3	158	116.1	201	91.6	185	111.5	195
Military	3.4	12	3.0	7	4.2	11	2.3	8

Table 2-233 and *Table 2-234* present flight counts for the Christa ATCAA by day of week.

Table 2-233: Civilian Flight Counts by Day of Week – Christa ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	554	738	625	693
Monday	301	486	263	399
Tuesday	255	326	247	383
Wednesday	261	303	271	316
Thursday	348	370	249	358
Friday	367	583	440	688
Saturday	528	794	652	619
Total	**2,614**	**3,600**	**2,747**	**3,456**

Table 2-234: Military Flight Counts by Day of Week- Christa ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	9	17	10	5
Monday	15	10	18	11
Tuesday	10	17	26	5
Wednesday	10	10	23	13
Thursday	26	18	15	12
Friday	27	12	20	23
Saturday	8	10	13	2
Total	**105**	**94**	**125**	**71**

The following tables present flight counts by hour through the Christa ATCAA.

Table 2-235: Civilian Flight Counts by Hour – Christa ATCAA

Hour	Oct	Jan	Apr	Jul
0000	63	94	68	123
0100	46	61	46	107
0200	99	131	93	86
0300	69	87	52	123
0400	16	33	20	26
0500	16	18	17	23
0600	32	24	29	87
0700	84	141	130	92
0800	111	154	127	111
0900	135	205	152	160
1000	75	146	160	97
1100	197	258	209	179
1200	125	235	164	121
1300	147	234	157	181
1400	151	223	167	142
1500	106	170	113	142
1600	151	190	164	131
1700	136	221	181	207
1800	137	155	109	198
1900	176	229	154	303
2000	147	177	102	234
2100	179	172	132	269
2200	162	148	105	130
2300	54	94	96	184
Total	**2,614**	**3,600**	**2,747**	**3,456**

Table 2-236: Military Flight Counts by Hour – Christa ATCAA

Hour	Oct	Jan	Apr	Jul
0000	0	0	0	1
0100	0	0	0	0
0200	0	2	0	0
0300	0	0	0	0
0400	0	0	0	0
0500	0	0	0	0
0600	0	0	1	0
0700	0	1	2	4
0800	3	4	3	4
0900	4	6	6	1
1000	11	7	16	15
1100	17	12	15	10
1200	11	6	8	9
1300	16	15	15	5
1400	11	8	12	6
1500	9	4	15	0
1600	6	7	3	2
1700	3	6	8	3
1800	5	3	5	3
1900	3	7	6	3
2000	3	5	2	1
2100	0	1	5	0
2200	1	0	3	3
2300	2	0	0	1
Total	**105**	**94**	**125**	**71**

Table 2-237 presents the average number of minutes spent transiting the Christa ATCAA broken out by civilian and military users.

Table 2-237: Average Duration of Flights – Christa ATCAA

User	Oct	Jan	Apr	Jul
Civilian	3.1	3.2	3.2	2.9
Military	3.8	6.3	5.7	5.4

Figure 2-48 presents civilian traffic flows through Christa ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

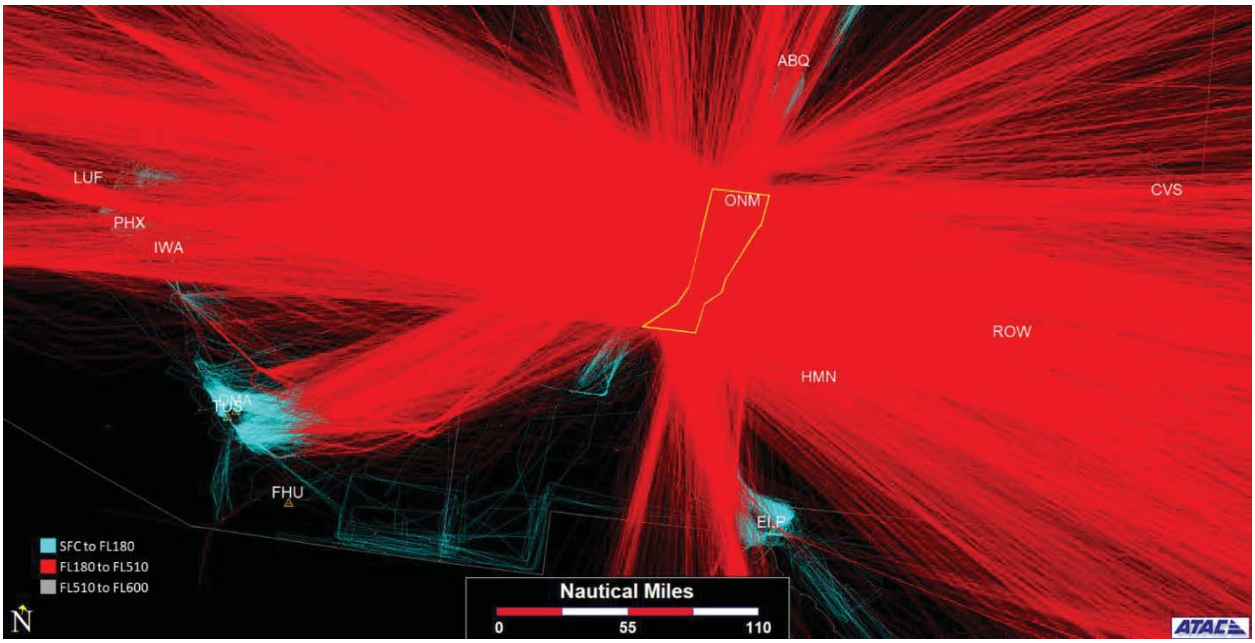


Figure 2-48: Civilian Traffic Flows – Christa ATCAA

The following tables present origin and destination airports for civilian flights in the Christa ATCAA.

Table 2-238: Origin Airport - Civilian Flights – Christa ATCAA

Origin Airport	Count	Percent
Dallas/Fort Worth International Airport (DFW)	901	7.3%
McCarran International Airport (LAS)	867	7.0%
Phoenix Sky Harbor International Airport (PHX)	658	5.3%
Denver International Airport (DEN)	590	4.8%
Tucson International Airport (TUS)	573	4.6%
El Paso International Airport (ELP)	543	4.4%
Los Angeles International Airport (LAX)	538	4.3%
Albuquerque International Sunport (ABQ)	527	4.2%
George Bush Intercontinental Airport (IAH)	484	3.9%
Licenciado Gustavo Díaz Ordaz International Airport (MMPR)	411	3.3%
Other*/Unknown	6,325	50.9%
Total	**12,417**	**100.0%**

* Less than 3%

Table 2-239: Destination Airport - Civilian Flights – Christa ATCAA

Destination Airport	Count	Percent
McCarran International Airport (LAS)	1,311	10.6%
Los Angeles International Airport (LAX)	1,011	8.1%
Tucson International Airport (TUS)	756	6.1%
Denver International Airport (DEN)	623	5.0%
Dallas/Fort Worth International Airport (DFW)	615	5.0%
El Paso International Airport (ELP)	475	3.8%
San Diego International Airport (SAN)	391	3.1%
Other*/Unknown	7,235	58.3%
Total	**12,417**	**100.0%**

* Less than 3%

Figure 2-49 presents military traffic through Christa ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

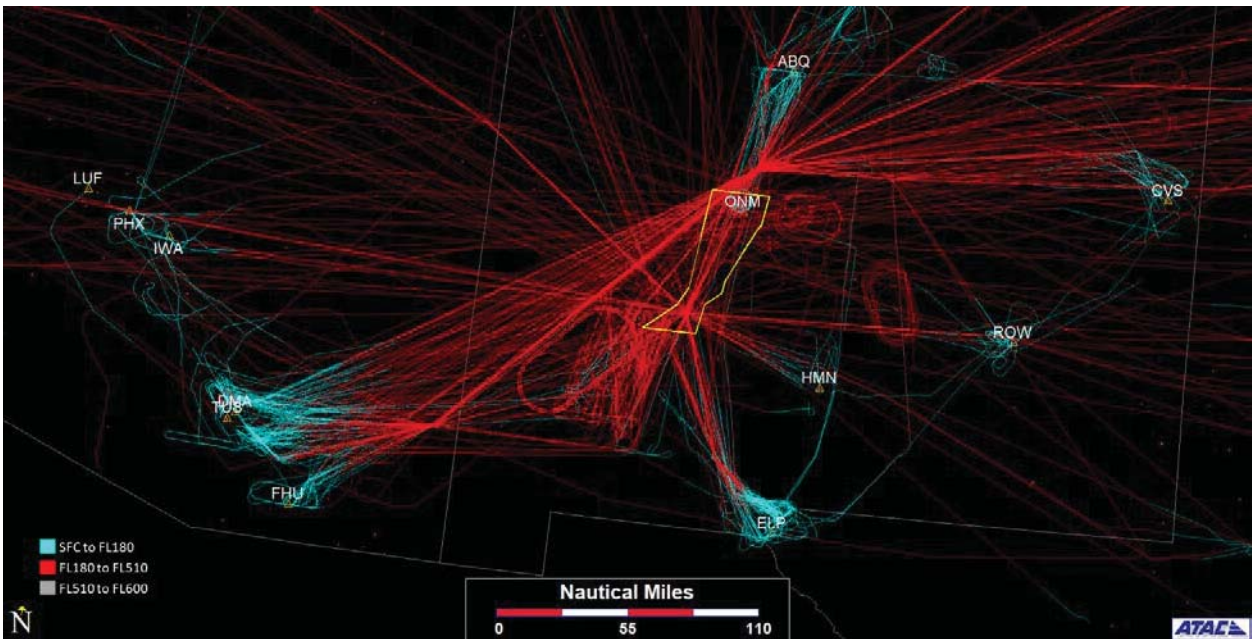


Figure 2-49: Military Traffic Flows – Christa ATCAA

Table 2-240: Origin Airport - Military Flights – Christa ATCAA

Origin Airport	Count	Percent
Davis Monthan AFB (DMA)	63	15.9%
Biggs Army Airfield (Fort Bliss) (BIF)	38	9.6%
Albuquerque International Sunport (ABQ)	22	5.6%
Holloman AFB (HMN)	19	4.8%
Tucson International Airport (TUS)	18	4.6%
Cannon AFB (CVS)	18	4.6%
Sierra Vista Municipal Airport (FHU)	14	3.5%
Rosecrans Memorial Airport (STJ)	13	3.3%
Other*/Unknown	190	48.1%
Total	**395**	**100.0%**

* Less than 3%

Table 2-241: Destination Airport - Military Flights – Christa ATCAA

Destination Airport	Count	Percent
Davis Monthan AFB (DMA)	55	13.9%
Biggs Army Airfield (Fort Bliss) (BIF)	31	7.8%
Sierra Vista Municipal Airport (FHU)	24	6.1%
Albuquerque International Sunport (ABQ)	22	5.6%
Cannon AFB (CVS)	21	5.3%
Tucson International Airport (TUS)	17	4.3%
Other*/Unknown	225	57.0%
Total	**395**	**100.0%**

* Less than 3%

2.3.8 Kendra ATCAA

Table 2-242 presents the baseline PDARS flight counts for the Kendra ATCAA, broken out by civilian and military user. The majority of flights transiting this airspace were civilian.

Table 2-242: Monthly Flight Counts FY16 – Kendra ATCAA

User	Oct		Jan		Apr		Jul	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Civilian	3690	97.7%	4453	98.3%	4000	97.4%	4687	98.8%
Military	85	2.3%	79	1.7%	108	2.6%	57	1.2%
Total	**3775**	**100%**	**4532**	**100%**	**4108**	**100%**	**4744**	**100%**

Table 2-243 presents the average and maximum number of daily flight counts in the Kendra ATCAA broken out by civilian and military users. The maximum represents the highest number of crossings that occurred on any day during that month.

Table 2-243: Average and Maximum Daily Flight Counts – Kendra ATCAA

User	Oct		Jan		Apr		Jul	
	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum
Civilian	119.0	181	143.6	216	133.3	201	151.2	245
Military	2.7	9	2.5	10	3.6	10	1.8	9

Table 2-244 and *Table 2-245* present flight counts for the Kendra ATCAA by day of week.

Table 2-244: Civilian Flight Counts by Day of Week – Kendra ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	584	881	758	920
Monday	505	595	478	600
Tuesday	468	428	450	570
Wednesday	401	465	431	479
Thursday	590	547	455	469
Friday	562	723	745	889
Saturday	580	814	683	760
Total	**3,690**	**4,453**	**4,000**	**4,687**

Table 2-245: Military Flight Counts by Day of Week- Kendra ATCAA

Day of Week	Oct	Jan	Apr	Jul
Sunday	12	10	10	2
Monday	7	9	11	7
Tuesday	8	9	18	3
Wednesday	15	11	15	9
Thursday	23	16	15	10
Friday	15	13	24	23
Saturday	5	11	15	3
Total	**85**	**79**	**108**	**57**

The following tables present flight counts by hour through the Kendra ATCAA.

Table 2-246: Civilian Flight Counts by Hour – Kendra ATCAA

Hour	Oct	Jan	Apr	Jul
0000	59	117	89	116
0100	68	83	95	87
0200	100	98	97	82
0300	33	73	86	89
0400	7	29	18	18
0500	16	22	27	24
0600	76	35	55	87
0700	109	166	154	132
0800	124	138	123	98
0900	206	234	202	239
1000	160	191	180	218
1100	250	332	267	316
1200	195	307	231	201
1300	284	373	272	292
1400	242	342	250	259
1500	222	286	250	263
1600	228	278	278	200
1700	230	286	277	300
1800	156	194	154	274
1900	257	243	215	370
2000	232	217	192	351
2100	221	189	168	323
2200	150	167	188	170
2300	65	53	132	178
Total	**3,690**	**4,453**	**4,000**	**4,687**

Table 2-247: Military Flight Counts by Hour – Kendra ATCAA

Hour	Oct	Jan	Apr	Jul
0000	1	0	0	0
0100	0	1	0	0
0200	0	0	0	0
0300	0	0	2	0
0400	0	0	1	2
0500	0	0	0	1
0600	1	0	0	0
0700	1	3	3	2
0800	0	4	4	5
0900	7	2	6	4
1000	8	8	14	7
1100	12	9	4	7
1200	8	7	11	4
1300	12	9	8	8
1400	8	5	10	2
1500	7	3	8	3
1600	2	14	9	3
1700	7	1	11	2
1800	3	5	3	1
1900	4	3	3	1
2000	3	3	4	1
2100	0	2	4	1
2200	1	0	3	2
2300	0	0	0	1
Total	**85**	**79**	**108**	**57**

Table 2-248 presents the average number of minutes spent transiting the Kendra ATCAA broken out by civilian and military users.

Table 2-248: Average Duration of Flights – Kendra ATCAA

User	Oct	Jan	Apr	Jul
Civilian	5.2	5.1	5.1	5.0
Military	12.1	17.0	9.7	11.5

Figure 2-50 presents civilian traffic flows through Kendra ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

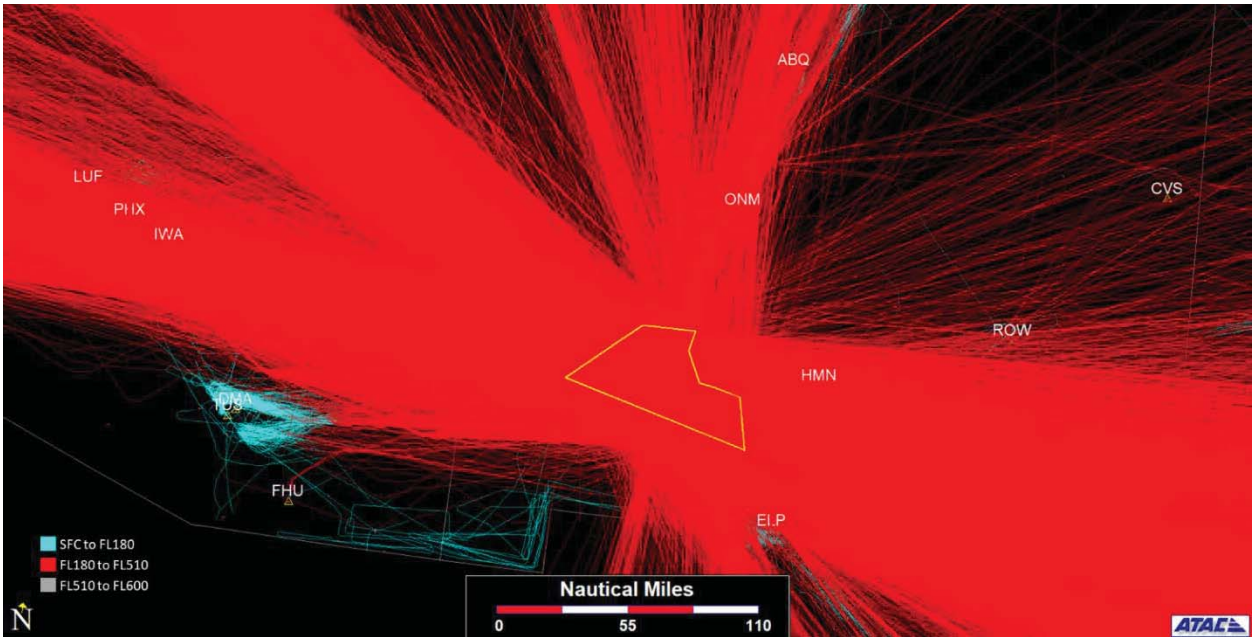


Figure 2-50: Civilian Traffic Flows – Kendra ATCAA

The following tables present origin and destination airports for civilian flights in the Kendra ATCAA.

Table 2-249: Origin Airport - Civilian Flights – Kendra ATCAA

Origin Airport	Count	Percent
McCarran International Airport (LAS)	2,954	17.6%
Los Angeles International Airport (LAX)	1,241	7.4%
George Bush Intercontinental Airport (IAH)	929	5.5%
El Paso International Airport (ELP)	884	5.3%
Phoenix Sky Harbor International Airport (PHX)	791	4.7%
Dallas/Fort Worth International Airport (DFW)	735	4.4%
William P. Hobby Airport (HOU)	595	3.5%
Mexico City International Airport (MMMX)	583	3.5%
Denver International Airport (DEN)	578	3.4%
Austin-Bergstrom International Airport (AUS)	543	3.2%
San Antonio International Airport (SAT)	501	3.0%
Other*/Unknown	6,496	38.6%
Total	**16,830**	**100.0%**

* Less than 3%

Table 2-250: Destination Airport - Civilian Flights – Kendra ATCAA

Destination Airport	Count	Percent
McCarran International Airport (LAS)	2,693	16.0%
Los Angeles International Airport (LAX)	1,210	7.2%
El Paso International Airport (ELP)	805	4.8%
Austin-Bergstrom International Airport (AUS)	788	4.7%
Dallas/Fort Worth International Airport (DFW)	788	4.7%
George Bush Intercontinental Airport (IAH)	734	4.4%
Denver International Airport (DEN)	623	3.7%
Mexico City International Airport (MMMX)	621	3.7%
San Antonio International Airport (SAT)	534	3.2%
William P. Hobby Airport (HOU)	520	3.1%
Other*/Unknown	7,514	44.6%
Total	**16,830**	**100.0%**

* Less than 3%

Figure 2-51 presents military traffic through Kendra ATCAA. Flights may be descending or climbing into or out of the MOA, which is why some tracks change color along flight path.

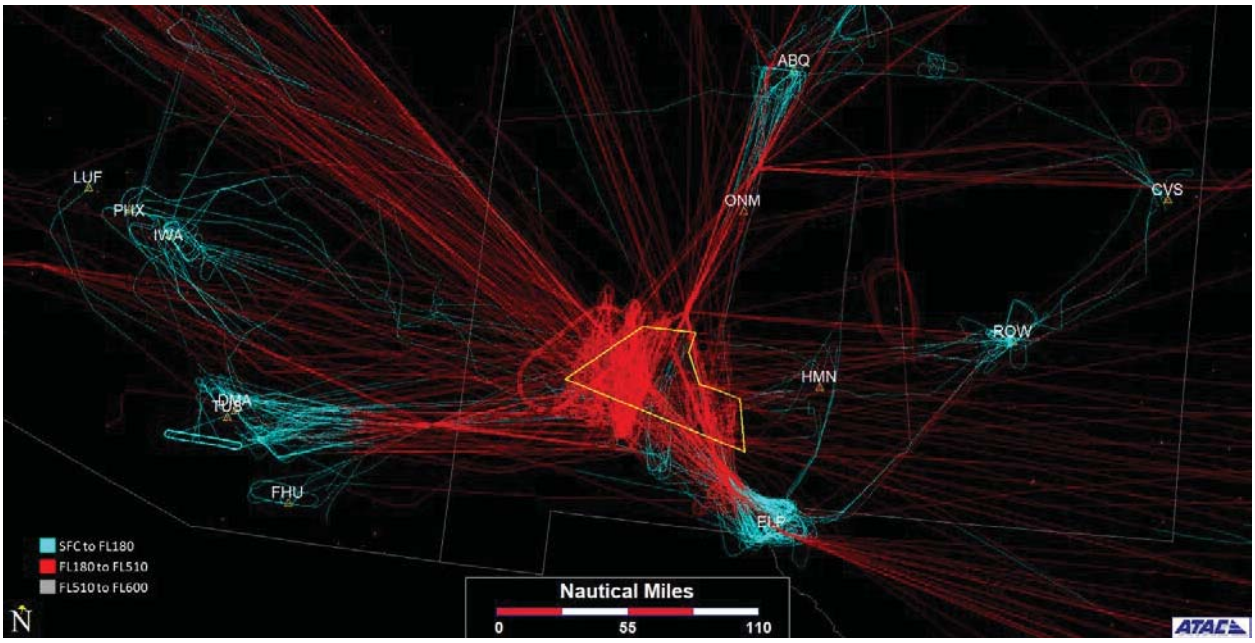


Figure 2-51: Military Traffic Flows – Kendra ATCAA

Table 2-251: Origin Airport - Military Flights – Kendra ATCAA

Origin Airport	Count	Percent
El Paso International Airport (ELP)	46	14.0%
Biggs Army Airfield (Fort Bliss) (BIF)	45	13.7%
Davis Monthan AFB (DMA)	36	10.9%
Nellis AFB (LSV)	17	5.2%
Holloman AFB (HMN)	17	5.2%
Albuquerque International Sunport (ABQ)	14	4.3%
Travis AFB (SUU)	12	3.6%
Las Cruces International Airport (LRU)	11	3.3%
Phoenix–Mesa Gateway International Airport (IWA)	10	3.0%
McCarran International Airport (LAS)	10	3.0%
Other*/Unknown	111	33.7%
Total	**329**	**100.0%**

* Less than 3%

Table 2-252: Destination Airport - Military Flights – Kendra ATCAA

Destination Airport	Count	Percent
Biggs Army Airfield (Fort Bliss) (BIF)	49	14.9%
Davis Monthan AFB (DMA)	40	12.2%
El Paso International Airport (ELP)	33	10.0%
Albuquerque International Sunport (ABQ)	18	5.5%
Nellis AFB (LSV)	16	4.9%
Phoenix–Mesa Gateway International Airport (IWA)	10	3.0%
McCarran International Airport (LAS)	10	3.0%
Other*/Unknown	153	46.5%
Total	**329**	**100.0%**

* Less than 3%

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D3: IMPACTS TO CIVIL AVIATION DETAILED ANALYSIS

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AGL	above ground level
ATCAA	Air Traffic Control Assigned Airspace
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FL	flight level
IFR	Instrument Flight Rules
KTAS	knots true airspeed
MOA	Military Operations Area
MSL	mean sea level
NAVAID	navigation aid
nm	nautical mile
PDARS	Performance Data Analysis and Reporting System
SUA	Special Use Airspace
U.S.	United States
VFR	Visual Flight Rules
WSMR	White Sands Missile Range

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APPENDIX D3: AIRSPACE IMPACTS ANALYSIS

D3.1 INTRODUCTION

This analysis is in support of the EIS for Special Use Airspace Optimization to Support Existing Aircraft at Holloman Air Force Base. This EIS is evaluating a baseline condition and three proposed action alternatives. These are explained in detail in chapter 2 of the EIS. A short summary is offered here. The United States (U.S.) Air Force proposes to optimize the Special Use Airspace (SUA) available for current and anticipated future pilot training at Holloman Air Force Base (AFB). Much of the SUA used by pilots assigned to Holloman AFB was developed for legacy aircraft more than 30 years ago. As such, it does not have the optimum volume or attributes needed to meet the training requirements of pilots flying modern aircraft. Reconfiguring existing airspace and establishing new airspace would improve the availability of suitable training airspace for pilots stationed at Holloman AFB.

This analysis of impacts to airspace supports the Environmental Impact Statement (EIS) for SUA Optimization at Holloman AFB, located in southern New Mexico. Holloman AFB's mission is F-16 pilot training. Each component of training requires airspace that has appropriate area, altitudes, proximity to the base, and attributes, such as ability to use defensive countermeasures or certain types of munitions. Consequently, the features of available airspace determine where training sorties can occur. Air-to-air training activities normally take place in a Military Operations Area (MOA) with an overlying Air Traffic Control Assigned Airspace (ATCAA) requested as needed to expand the MOA's altitude. Air-to-ground training activities that include the release of live ordnance are considered hazardous to non-participating aircraft and must be performed in a Restricted Area associated with a military training range. Some training activities require a combination of MOA and restricted areas. A range of restricted areas and MOAs in the vicinity of Holloman AFB are currently available for F-16 pilot training. The available MOAs are scheduled by Holloman, Cannon, and Kirtland AFBs. The available restricted areas are associated with U.S. Army ranges scheduled by White Sands Missile Range (WSMR) and Fort Bliss.

When airspace appropriate for a specific training mission is not available at the appropriate time during the pilot's training, training is delayed, which disrupts the progress of pilots in training and potentially results in an inability to complete the entire program in a timely manner. The EIS evaluates the impacts of three alternatives for modifying existing airspace and establishing new airspace in order to provide readily available and adequately sized training airspace with appropriate attributes needed to conduct training missions. The baseline and the three alternatives are discussed below.

D3.1.1 Baseline

F-16 aircraft based at Holloman AFB currently use restricted airspace at WSMR and Fort Bliss and MOAs, particularly the existing Talon MOAs (East/West/Low), and Talon ATCAAs (East/West) for training.

D3.1.2 Alternative 1 – Talon MOA and ATCAA

The existing Talon MOA complex would be reconfigured and expanded to the south and east. The low MOA would become two MOAs – the Talon Low A and Talon Low B. The Talon High East and West MOAs would be changed in size and divided into the Talon High A, B, and C MOAs. The floor of the proposed low MOAs would be raised to 500 feet above ground level (AGL) from the existing floor of 300 feet AGL. Up to 10,000 F-16 pilot training sorties annually (3,700 in low MOAs, 6,300 in high

MOAs/ATCAA) would occur in the proposed SUA. Approximately 10% of sorties would include supersonic flight in the ATCAA, above 30,000 feet above mean sea level (MSL). Chaff and flares would be used with restrictions.

D3.1.3 Alternative 2– Smitty/Cato, Lobos MOAs and Lobos, Cato, Kendra, and Christa ATCAAs

Airspace just west of the WSMR would be reconfigured, and new blocks of airspace established. The existing Smitty and overlying Cato MOAs and Cato ATCAA would have new boundaries. The northern portion of these MOAs would be returned to the National Airspace System (NAS) as Class A and Class E airspace. This area of the MOAs is encroached upon by Victor Airway V264 and Jet Route J74, so returning this airspace to the NAS will ease that conflict and facilitate civil use of the area. Additionally, a Lobos High MOA, Lobos Low MOA, and Lobos A/B/C ATCAAs would be established south and west of the existing Cato/Smitty MOAs. Finally, two additional ATCAAs (Christa and Kendra) would be established to bridge from the WSMR to the Cato and Lobos ATCAAs. Up to 9,100 F-16 pilot training sorties would occur annually (3,600 in Lobos Low and Smitty MOAs and 5,500 in Lobos High and Cato MOAs/ATCAAs). Approximately 10% of sorties would include supersonic flight in ATCAAs above 30,000 feet MSL. Chaff and flare would be used with restrictions.

D3.1.4 Alternative 3 – Talon, Smitty/Cato, Lobos MOAs and Talon, Cato, Kendra, Christa ATCAAs

Alternative 3 is a combination of the first two alternatives with a few exceptions: the Talon High C MOA and ATCAA and Lobos Low MOA would not be created. The total proposed aircraft operations and chaff and flare use would be spread across all MOAs. In the Talon MOA, 2,600 F-16 pilot training sorties would occur in low MOAs and 4,200 in high MOAs/ATCAAs. In the Cato/Smitty and Lobos MOAs, 1,100 training flights would occur in Smitty MOA (low) and 2,100 in Cato (high) and Lobos High MOAs/ATCAAs.

D3.2 METHODOLOGY

D3.2.1 Data Source

To analyze the existing traffic in the project's area of influence, a request was made to the Federal Aviation Administration (FAA) to use its Performance Data Analysis and Reporting System (PDARS) data. The PDARS continuously collects flight plan and radar track data from systems located at Air Route Traffic Control Centers, Terminal Radar Approach Control Facilities, and air traffic control towers. To represent one year, four months of data, evenly spaced throughout the year prior to beginning this analysis, were requested: October 2015, January 2016, April 2016, and July 2016. These months are assumed to adequately represent seasonal fluctuations. It is assumed that total counts can be multiplied by three to estimate annual numbers. Only flights using an active Mode III transponder are counted in PDARS dataset. VFR flights that do not use Mode III would be counted by individual airports for their operational totals, but would not show up in the PDARS database.

D3.2.2 Filtering of Flight Tracks

For each area analyzed (proposed locations of SUA), all historical flight tracks from PDARS data that traversed through the proposed SUA during the hours that it would be in use (Monday-Friday from 7:00 a.m. until 10:00 p.m.) were identified. These counts for the representative 4 months were then annualized.

For each of these tracks, 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. The list was reduced to focus on the most frequently occurring airport origin-destination pairings, in order to represent the majority of traffic potentially affected by the Proposed Action and produce a manageable and meaningful analysis.

D3.2.3 Impact to Flights

The distance between each of the most common origin-destination pairings was calculated as a straight line ("great circle" route). 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. A great-circle calculator was used to determine the shortest distance (between two points on a sphere) for the route between the two airports.

Since this great-circle route passed through some portion of the proposed SUA, an additional routing was calculated that would represent flight paths using a navigational aid (NAVAID) or "fix" that would route flights outside the proposed SUA for each alternative. Great-circle routes were identified from origin to fix, and from the fix to the destination, and added together to produce the total distance between the origin and destination that would result from rerouting flights around the proposed SUA for each alternative. The distance change was calculated by comparing to the original straight-line routing, and time change was determined using a speed estimate. For airline traffic, the assumption was a speed of approximately 450 knots true airspeed (KTAS) (0.78 Mach at flight level [FL] 350 [about 35,000 feet]), based on the most frequently observed aircraft in the PDARS dataset. All calculations assume no wind. An example of this can be seen in Figure D3-1.

In this case, the shortest path between Phoenix, AZ and Houston, TX is represented by the green line. During times that the Lobos MOA would be active (under Alternatives 2 and 3), this flight track would intersect the proposed Lobos MOA. Aircraft could instead be re-routed via the San Simon VORTAC (shown on Figure D3-1 as the blue line). This re-routed flight track is 1,018 nautical miles, as opposed to the direct route that is 1,009 nautical miles. This is a 0.9% increase in distance (shown later in this appendix, in Table D3.4-3). This additional distance corresponds to 1.2 extra minutes, with the altitude and speed assumptions above. Note that in this example (and most of the others), since the proposed action is for the new airspace to only operate during times when the White Sands Missile Range (WSMR) is active, nearly all of these flights would already have to be re-routed to avoid the WSMR. As shown in Figure D3-1, the green line (optimal route or the "great circle" route) intersects WSMR, and would have already been routed closer to the blue line anyway under the existing conditions. So the 0.9% change given in the example above would likely be even smaller. This is the methodology used below for the tabular results.

For the low MOAs, most of the non-military traffic is general aviation, much of which is operated under visual flight rules (VFR), which would not be restricted from operating within a MOA. In this case, the approach to analysis was to determine the amount of time (per day) that military traffic could be present, given the operational sortie counts for each alternative.

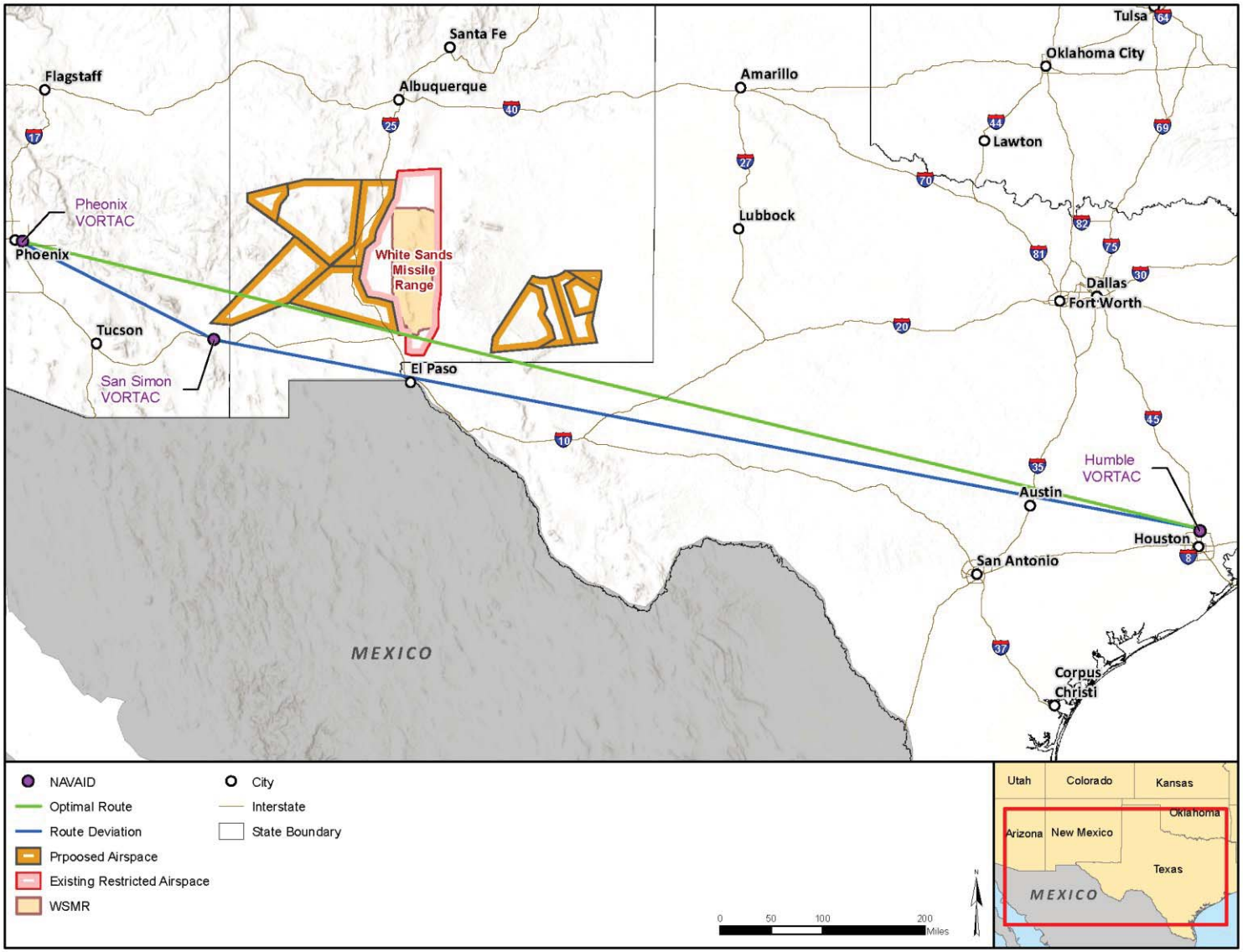


Figure D3-1. Example for routing between Phoenix, AZ and Houston, TX

D3.2.4 Overall Trend

Though not part of the methodology, it is worth noting that the overwhelming majority of flights in the PDARS data operated predominately east-west through the area of interest. The two major areas of proposed airspace change lie immediately east (for the Talon airspace) or west (for the Cato/Smitty/Lobos) of the SUA above the WSMR. Since WSMR is in operation during the same time the proposed SUA would be available (Monday-Friday from 7:00 a.m. until 10:00 p.m.), a great deal of the existing airline traffic already routes around the proposed airspace, as they avoid WSMR.

D3.3 ALTERNATIVE 1– TALON MOA AND ATCAA

D3.3.1 Airline Traffic (Above FL180)

Approximately 57,000 flights per year traverse through the area encompassing the proposed new Talon ATCAA during the times the SUA and overlying ATCAA could be used (Monday-Friday from 7:00 a.m. until 10:00 p.m). Not all of these flights would be affected by military operations in the proposed ATCAA.

Table D3.3-1 shows the number of military sorties in the airspace, the hours per year and day and the percent of time the ATCAAs would be in use under Alternative 1. Alternative 1 would affect this area's airline traffic for about 59% of the training day, on average, including the Holloman-based F-16 use and the transient use of the proposed airspace. The majority of these flights are roughly east-west, and intersect mainly with the edges of the proposed ATCAAs. The proposed Talon ATCAAs are near the WSMR on the east side, and most east-west traffic in the Class A airspace is normally required to go around the WSMR during these hours.

Table D3.3-1. Military Usage of Proposed Talon ATCAAs under Alternative 1

Metric	Talon ATCAAs	Assumptions
Number of Military Sorties	6,930	Includes Holloman F-16 plus transient military
Hours per year	2,310	Assumes 2 aircraft per period for 40 minutes in the airspace
Hours per day	8.9	260 flying days per year
% of training hours affected	59%	15 hours per day from 7:00 a.m. until 10:00 p.m.

Table D3.3-2 lists the types of aircraft included in the PDARs dataset. The most common are either 737 variants (31%) or Airbus (312/320/321) variants (17%). This mix of aircraft was typical in each alternative evaluated, and is the reason for the assumption (in **Section D3.2.3**) that the speed used was 0.78M/450 KTAS for converting distance to time.

Table D3.3-2 Aircraft Types Intersecting Proposed Talon ATCAAs under Alternative 1

737-800	14%
A-321	11%
737-700	11%
A-320 Prestige	6%
VC-1 ACJ	5%
Embraer 170	4%

Table D3.3-2 Aircraft Types Intersecting Proposed Talon ATCAAs under Alternative 1 (cont.)	
757-200	4%
737-300	3%
767-300	3%
737-900	3%
Challenger 870	2%
MD-83	2%
Challenger 890	2%
Eagle	1%
MD-82	1%
A-300B4-600	1%
C-26 Metro	1%
ERJ-145XR	1%
560XL Citation Excel	1%
MD-11	1%
200 Super King Air	1%
560 Citation 5	1%
BAe-125-700	1%
Mystare 20	1%
757-300	1%
525 Citation CJ1	1%
C-20F Gulfstream 4	1%
750 Citation 10	1%
BD-100 Challenger 300	1%
MD-90	1%
CL-600 Challenger 650	1%
Others	15%

For this dataset, there were 398 origin airports, and 418 destination airports, making possible more than 166,000 origin-destination pairings, a number too large for meaningful individual analysis. The most frequent pairings were used to represent the impacts to the largest number of flights and travelers. The analysis of impacts to airline traffic evaluated routes that traversed the proposed Talon ATCAA leaving from the five most common origin airports to each of their five most common destinations (for a total of twenty-five route combinations). Each row in **Table D3.3-3** shows an origin airport and the shaded areas in the rows are the destination airports (and the return routes would be the opposite). In each cell, the topmost number is the great-circle optimum route length (rounded to nearest nautical mile [nm]). Below that is NAVAID or fix used to estimate the re-route (shown as "via" in the table), and the route length adjusted around the proposed ATCAA (which is the sum of two great-circle routes: Origin to the fix, and fix to destination). The "delta" is the percent difference between the optimum and re-routed route lengths, and finally, the extra minutes required to fly the extended route, based on the airspeed assumptions listed

in **Section D3.2.3**. Route lengths vary from about 700 to over 2,000 nm. The average required change in distance would be 0.25 %, and the average additional required minutes of travel are approximately 21 seconds. The largest deviation required is less than 3 minutes.

These small deviations in route length and time are attributable to the large distances between origin and destination airports, which allow for very small angular (heading) changes to avoid the proposed ATCAA. Most of the flights in the area would have already routed to avoid the WSMR during the times of concern, and planned flight tracks may have traversed the very edges of the proposed ATCAA; therefore changing routes requires a relatively tiny correction. For several origin-destination pairings, the re-route distance was exactly the same as the optimum flight track distance – this was a case for routes that passed through the extreme edges of the proposed airspace or where the actual aircraft flight paths flown were not near the optimal route already (such as historical diversions for weather). On those routes (such as DFW to LAS, the re-routing NAVAID is listed as "n/a").

Table D3.3-3. Most Common Commercial Airport Pairings Intersecting Proposed Talon ATCAAs under Alternative 1[1]

Origin	Destination									
ATL	PHX	1379	TUS	1339	LAX	1691	SAN	1644	ELP	1114
	via: CME	1384	via: CME	1340	via: n/a	1691	via: n/a	1644	via: INK	1118
	delta	0.4%	delta	0.1%	delta	0.0%	delta	0.0%	delta	0.4%
	extra minutes	0.67	extra minutes	0.13	extra minutes	0.00	extra minutes	0.00	extra minutes	0.53
DAL	PHX	764	LAX	1083	SAN	1027	ELP	488	SDL	759
	via: CME	764	via: n/a	1083	via: n/a	1027	via: INK	491	via: n/a	759
	delta	0.0%	delta	0.0%	delta	0.0%	delta	0.6%	delta	0.0%
	extra minutes	0.00	extra minutes	0.00	extra minutes	0.00	extra minutes	0.40	extra minutes	0.00
DFW	LAX	1073	SAN	1017	PHX	754	SNA	1047	TUS	706
	via: n/a	1073	via: n/a	1018	via: n/a	754	n/a	1047	via: CME	710
	delta	0.0%	delta	0.1%	delta	0.0%	delta	0.0%	delta	0.6%
	extra minutes	0.00	extra minutes	0.13	extra minutes	0.00	extra minutes		extra minutes	0.53
IAH	ABQ	744	LAX	1379	LAS	1222	SNA	1346	SFO	1635
	via: MAF-CME	763	via: INK-EWM	1382	via: MAF-CME	1228	via: EWM	1347	via: SSO	1642
	delta	2.6%	delta	0.2%	delta	0.5%	delta	0.0%	delta	0.4%
	extra minutes	2.53	extra minutes	0.40	extra minutes	0.80	extra minutes	0.13	extra minutes	0.93
LAX	DFW	1073	MSY	1670	MIA	2342	IAH	1379	ATL	1946
	via: n/a	1073	via: CME	1671	via: CME	2345	via: INK-EWM	1382	via: n/a	1946
	delta	0.0%	delta	0.1%	delta	0.1%	delta	0.2%	delta	0.0%
	extra minutes	0.00	extra minutes	0.13	extra minutes	0.40	extra minutes	0.40	extra minutes	0.00

Note: [1] In each destination airport cell, the topmost number is the great-circle optimum route length (rounded to nearest nm). The row "via" is the estimated re-route distance using a NAVAID or fix. The "delta" is the percent difference between the optimum and re-routed route lengths. The "extra minutes" is the added time to re-route the flight.

Legend: Airport and NavAid codes: ABQ - Albuquerque; ATL - Atlanta; CME - Chisum; DAL - Dallas-Love; DFW - Dallas-Ft Worth; ELP - El Paso; EWM - Newman; IAH - Houston-Bush; INK - Wink; LAS - Las Vegas; LAX - Los Angeles; MAF - Midland; MIA - Miami; MSY - New Orleans; PHX - Phoenix; SAN - San Diego; SDL - Scottsdale; SFO - San Francisco; SNA - Orange County; SSO – San Simon; TUS - Tucson; VNY - Van Nuys.

D3.3.2 MOA Traffic

D3.3.2.1 Talon Low A/B MOAs

The impact of using the proposed Talon Low A MOA would be roughly the same as using the existing Talon Low MOA. It is located in roughly the same position and has a slightly different shape. The proposed Talon Low B MOA would be new SUA from 500 feet AGL up to 12,500 feet MSL in an area that does not

currently have SUA. There would be a relatively low military demand for the low MOA airspace compared to the higher airspace blocks. It is assumed that the proposed Talon Low B MOA would have half of the traffic for the Talon Low A and B combined. Adding transient military use to the Holloman-based F-16s, results in the use numbers shown in **Table D3.3-4**. The Talon Low B is expected to be in use by military aircraft for about 678 hours per year, or about 2.6 hours per day on the average training day. This represents about 17% of the available time (Monday-Friday from 7:00 a.m. until 10:00 p.m.).

Table D3.3-4. Proposed Military Usage of Talon Low B MOA under Alternative 1

Metric		Assumptions
Number of Military Sorties	2,035	Includes Holloman F-16 plus transient military
Hours per year	678	Assumes 2 aircraft per period for 40 minutes in the airspace
Hours per day	2.6	260 flying days per year
% of hours affected	17%	15 hours per day from 7:00 a.m. until 10:00 p.m.

Legend: MOA – Military Operations Area

PDARS data show that under current conditions about 2,100 civilian flights per year use this airspace proposed to become the Talon Low B MOA. The aircraft types in that historical dataset are shown in **Table D3.3-5**.

Table D3.3-5. Aircraft Types Intersecting Proposed Talon Low B MOA under Alternative 1

Super King Air 350	18%
A36 Bonanza 36	12%
Cessna 210	6%
58 Baron	5%
560XL Citation Excel	4%
Cessna 421	4%
Cessna 182	3%
35 Bonanza	2%
Cessna 206	2%
Falcon 2000	2%
Seneca	2%
Cessna 310	2%
Eagle	2%
200 Super King Air	2%
525B Citation CJ3	2%
525 Citation CJ1	2%
18 (piston)	2%
Cessna 172	2%
SR-22	2%
650 Citation 3	1%
Archer 2	1%
560 Citation 5	1%
59 other aircraft	36%

Table D3.3-6 shows the origin-destination airport pairings for the most common flights that crossed through the area of the proposed Talon Low B MOA, in order of the most to least common. The distance between airports was calculated as straight-line using a great-circle distance as described in **Section D3.2.3**. The re-route NAVAID column shows the NAVAIDs or fixes that would be required to avoid the Talon Low B airspace, and the following columns show the longer re-routed distance, the change in distance, the percentage that change represents, and the possible time in minutes that the new routing would add (assuming 180 KTAS). Aircraft flying using both Instrument Flight Rules (IFR) and VFR would rarely fly the exact great-circle route, but this measure provides a good comparison of the ideal (straight-line) route to the re-route that would be required when the Talon B MOA would be active if the aircraft is under IFR. VFR aircraft would not have to re-route, but if the pilots chose to avoid the MOA, the change would be as shown in **Table D3.3-6**. These route modifications would be required when the proposed Talon Low B was active under the Alternative 1, which would be about 17% of the time between Monday-Friday from 7:00 a.m. until 10:00 p.m.

Table D3.3-6 Top Civil Airport Pairings in Proposed Talon Low B MOA under Alternative 1

Origin Airport	Destination Airport	Number per year	Number per week	Great-Circle Distance	Re-route NAVAID	Re-route Distance (nm)	Delta (nm)	% Difference	Time in minutes[1]
MAF	ATS	165	3.2	127	CNM	140	13	10%	4.3
ELP	LBB	150	2.9	256	CNM-HOB	261	5	2%	1.7
ATS	MAF	126	2.4	127	CNM	140	13	10%	4.3
LBB	ELP	60	1.2	256	HOB-CNM	261	5	2%	1.7
LBB	ATS	36	0.7	142	HOMEX	169	27	19%	9.0
MAF	SRR	33	0.6	191	HOB-CME	195	4	2%	1.3
ATS	FTW	21	0.4	359	CNM	383	24	7%	8.0
ROW	ODO	21	0.4	136	HOB	138	2	1%	0.7
APA	CNM	18	0.3	434	WUDRU	458	24	6%	8.0
ATS	LBB	18	0.3	142	HOMEX	169	27	19%	9.0
ODO	SRR	18	0.3	184	HOB-CME	189	5	3%	1.7

***Note*:** [1] Time in minutes assume 180 knots true airspeed.
Legend: APA - Denver-Centennial; ATS - Artesia; CME – Chisum; CNM - Cavern City;; ELP - El Paso; FTW - Ft Worth-Meacham; HOB – Hobbs; HOMEX – navigational fix; LBB - Lubbock; MAF - Midland; ODO - Odessa; ROW - Roswell; SRR - Sierra Blanca; WUDRU – navigational fix; Time in minutes assumes 180 knots true airspeed; GC Dist. – Great-Circle distance

D3.3.2.2 Talon High A/B/C MOAs

The Proposed Talon High A MOA would have very similar effects on civil traffic as the existing Talon High East/West MOAs as they are very similar in size and shape. The Proposed Talon High B and C MOAs are almost entirely in airspace that is not currently SUA and would affect local civil traffic to some extent. Of those two, the Talon High B would have regular use, and the Talon C would have occasional use under Alternative 1.

Table D3.3-7 shows the projected use of the proposed Talon High A/B and Talon High C MOAs for Alternative 1. The Talon High A/B and Talon High C MOAs would be active approximately 59% and 3% of the time, respectively, between Monday-Friday from 7:00 a.m. until 10:00 p.m.

Table D3.3-7. Military Usage of Talon High A/B and C MOAs under Alternative 1			
Metric	**Talon High A/B MOAs**	**Talon High C MOA**	**Assumptions**
Number of Military Sorties	6,930	330	Includes Holloman F-16 plus transient military
Hours per year	2,310	110	Assumes 2 aircraft per period for 40 minutes in the airspace
Hours per day	8.9	0.4	260 flying days per year
% of hours affected	59%	3%	15 hours per day from 7:00 a.m. until 10:00 p.m.

PDARS data for the location of the proposed Talon High A/B MOAs for flights during the time period (Monday-Friday from 7:00 a.m. until 10:00 p.m.) when the MOAs could be active, show approximately 2,724 civilian flights annually in this airspace. The distribution of aircraft types appearing in the PDARS data is shown in **Table D3.3-8**.

Table D3.3-8. Aircraft Types Intersecting Proposed Talon High B/C MOA under Alternative 1	
PC-12 Eagle	17%
Super King Air 350	12%
99 Airliner	6%
560XL Citation Excel	4%
200 Super King Air	4%
58 Baron	3%
Falcon 2000	3%
C-26 Metro	3%
Cessna 421	3%
525 Citation CJ1	3%
560 Citation 5	3%
90 (A90) King Air	2%
ERJ-145XR	2%
650 Citation 3	2%
525C Citation CJ4	2%
C-99	2%
525B Citation CJ3	2%
69 other aircraft	27%

Table D3.3-9 shows the airport pairings for the most common flights that crossed through the area of the proposed Talon High B/C MOAs by order of the most to least common. The number of times per year for each route was extrapolated from PDARS data. The distance between airports was calculated straight-line using a great-circle distance. The alteration to the route (the "via" column) shows the NAVAIDs or fixes that would be required to avoid the Talon High B/C airspace, and the following columns show the longer re-routed distance, the change in distance with the percentage that change represents, and the possible time in minutes that the new routing would add (assuming 210 KTAS). Aircraft flying both IFR and VFR would rarely fly the exact great-circle route, but this measure provides a good comparison of the ideal (straight-

line) route to the one that would be required when the Talon High B/C MOAs would be active if the aircraft is under IFR. VFR aircraft would not have to modify their plan, but if the pilots chose to avoid the MOA, the change would be as shown in **Table D3.3-9**. These modifications would be required when the Talon High B/C was active under the Alternative 1, which would be about 17% of the time between Monday-Friday from 7:00 a.m. until 10:00 p.m. **Table D3.3-9** also shows a few routes which would be only required when the Talon High C MOA is active. Those routes would be unaffected by activation of the Talon High B MOA. Some routes are listed with altitude restrictions instead of new routing. Especially for airports that are beneath the proposed Talon High B MOA (Artesia and Cavern City), it would be possible for pilots to remain below the floor of the MOA when flying these routes, eliminating the need for re-routing and not impacting flight time. For instance, the most common airport pairing in the PDARS data is the route from Artesia to Midland, TX. Aircraft departing Artesia could remain below 12,500 feet MSL for the first 30nm of their flight. For many pilots, this restriction would be of no consequence, as they prefer operation at such altitudes.

For those that could operate at higher altitudes, climbs would be delayed until clear of the Talon MOAs. This would apply to IFR traffic and any VFR traffic that opts to remain clear of the MOAs. VFR aircraft are not restricted from flying through MOAs. Recall that the Talon B and C MOAs would be active about 59% and 3% of the time between Monday-Friday from 7:00 a.m. until 10:00 p.m.

This analysis of the Talon High MOAs does not include the case when the Talon Low MOAs would be active at the same time – in that case, aircraft would need to route as described in **Section D3.3.2.1**

Table D3.3-9 Top Civil Airport Pairings in Proposed Talon High B/C MOAs under Alternative 1										
Origin Airport	**Destination Airport**	**Number per year**	**Number per week**	**Great-Circle Distance**	**Re-route NAVAID**	**Distance (nm)**	**Delta (nm)**	**% Difference**	**Time in minutes**	**Stay below 12,500 feet MSL**
ATS	MAF	183	3.5	127						30nm
CNM	DFW	174	3.3	368						20nm
CNM	LBB	132	2.5	147						30nm
CNM	ABQ	90	1.7	200						47nm
HOB	ABQ	78	1.5	220	CAPRO[1]	225	5	2%	1.5	
ABQ	HOB	60	1.2	220	CAPRO[1]	225	5	2%	1.5	
IAH	ROW	51	1.0	510	CAPRO[1]	518	8	2%	2.4	
ATS	LBB	48	0.9	142						32nm
CNM	APA	48	0.9	434	DYETT	467	33	8%	9.9	47nm

Note [1] Only required when proposed Talon High C MOA active.

Legend: ABQ - Albuquerque; APA - Denver-Centennial; ATS - Artesia; CAPRO – navigational fix; CNM - Cavern City; DFW - Dallas/Fort Worth; DYETT – navigational fix; HOB - Lea County; IAH - Houston-; LBB - Lubbock; MAF - Midland; ROW – Roswell

D3.4 ALTERNATIVE 2 – SMITTY/CATO, LOBOS, MOAS AND CATO, LOBOS, KENDRA CHRISTA ATCAAS

D3.4.1 Airline Traffic (Above FL180)

Approximately 74,000 flights per year traverse through the proposed reconfigured Cato ATCAA and newly established Lobos, Christa, and Kendra ATCAAs during the times the SUA and overlying ATCAA could be used (Monday-Friday from 7:00 a.m. until 10:00 p.m). These flights would not, however, all be affected by military operations in the proposed ATCAA.

Table D3.4-1 shows the number of military sorties in the airspace, the hours per year and day and the percent of time the ATCAAs would be in use. Alternative 2 would affect this area's airline traffic for about 39% of the training day, on average, including the Holloman-based F-16 use and the transient use of the proposed airspace.

Table D3.4-1. Military Usage of Cato, Lobos, Christa, and Kendra ATCAAs under Alternative 2

Metric		Assumptions
Number of Military Sorties	6,050	Includes Holloman F-16 plus transient military
Hours per year	1,512	Assumes 2 aircraft per period for 30 minutes in the airspace
Hours per day	5.8	260 flying days per year
% of training hours affected	39%	15 hours per day from 7:00 a.m. until 10:00 p.m.

Table D3.4-2 lists the types of aircraft included in the PDARs dataset. The majority are either 737 variants (40%) or Airbus (312/320/321) variants (23%). This mix of aircraft was typical in each alternative evaluated, and is the reason for the assumption that the speed used was 450 KTAS for converting distance to time (see **Section D3.2.3**).

Table D3.4-2 Aircraft Types Intersecting Proposed ATCAAs under Alternative 2

737-800	18%
737-700	15%
A-320 Prestige	9%
A-321	7%
A-319	7%
Embraer 170	5%
737-900	4%
Challenger 890	3%
757-200	3%
737-300	3%
Eagle	2%
Challenger 870	2%
767-300	1%
MD-83	1%
C-20F Gulfstream 4	1%
750 Citation 10	1%
560XL Citation Excel	1%

Table D3.4-2 Aircraft Types Intersecting Proposed ATCAAs under Alternative 2 (cont.)	
MD-82	1%
BD-100 Challenger 300	1%
757-300	1%
CL-600 Challenger 650	1%
experimental	1%
C-37 Gulfstream 5	1%
MD-11	1%
777-200	1%
Challenger 800	1%
Others	12%

For this alternative, there were 317 origin airports, and 303 destination airports in the dataset, making possible more than 96,000 origin-destination pairings, a number too large for meaningful individual analysis. The most frequent pairings were used to represent the impacts to the largest number of flights and travelers.

The ten busiest origin-destination airport pairings accounted for about a quarter of all of the filtered flights that occurred during the times when the proposed airspace could be active (Monday-Friday from 7:00 a.m. until 10:00 p.m). The analysis of impacts to airline traffic evaluated routes leaving from the five most common origin airports to each of their five most common destinations (for a total of twenty-five route combinations). Since the return routes would be similar, this analysis actually covers 50 of the most common airport pairings. **Table D3.4-3** shows these pairings. Each row in the table represents an origin airport and the shaded areas in the rows are the connecting airport (and the return routes would be the opposite). In each cell, the topmost number is the great-circle optimum route length (rounded to nearest nm). Below that is the NAVAID or fix, in this case an airport, used to estimate the re-route (shown as "via" in the table) and the route length adjusted around the proposed ATCAA (which is the sum of two great-circle routes: origin to the fix, and fix to destination), also in nautical miles. The "delta" is the percent difference between the optimum and re-routed route lengths, and finally, the extra minutes required to fly each extended route are given, based on the airspeed assumptions listed in **Section D3.2.3**. Route lengths vary from a few hundred to over 2,000 nm. The average required change in distance is 0.36 %, and the average additional travel time is approximately 34 seconds. The largest deviation required requires less than two additional minutes of flight time.

These small deviations in route length and time are attributable to the large distances to the origin and destination airports, which allow for very small angular (heading) differences to avoid the proposed ATCAAs. Most of the flights in the area would have already routed to avoid the WSMR during the times of concern, and planned flight tracks may have traversed the very edges of the proposed ATCAAs; therefore changing routes requires a relatively tiny correction. For two airport pairings (DFW to LAS and LAS to MMMX) the re-route distance was exactly the same as the optimum route distance – this was a case for routes that passed through the extreme edges of the proposed airspace or where the actual aircraft flight paths flown were not near the optimal route already (such as historical diversions for weather).

Table D3.4-3. Most Common Commercial Airport Pairings Intersecting Proposed ATCAAs under Alternative 2[1]

Origin	Destination									
PHX	**AUS**	872	**ELP**	347	**HOU**	1020	**IAH**	1009	**SAT**	843
	via: SSO	880	via: SSO	351	via: SSO	1028	via: SSO	1018	via: SSO	847
	delta	0.9%	delta	1.2%	delta	0.8%	delta	0.9%	delta	0.5%
	extra minutes	1.07	extra minutes	0.53	extra minutes	1.07	extra minutes	1.20	extra minutes	0.53
LAX	**AUS**	1242	**DFW**	2342	**IAH**	2342	**MIA**	2342	**MSY**	1670
	via: SSO	1243	via: SSO	2346	via: SSO	2346	via: SSO	2346	via: SSO	1678
	delta	0.1%	delta	0.2%	delta	0.2%	delta	0.2%	delta	0.5%
	extra minutes	0.13	extra minutes	0.53	extra minutes	0.53	extra minutes	0.53	extra minutes	1.07
LAS	**AUS**	1090	**HOU**	1235	**IAH**	1222	**MMMX**	1507	**SAT**	1069
	via: ONM	1095	via: ONM	1238	via: ONM	1223	n/a		via: ONM	1082
	delta	0.5%	delta	0.2%	delta	0.1%	delta	0.0%	delta	1.2%
	extra minutes	0.67	extra minutes	0.40	extra minutes	0.13	extra minutes		extra minutes	1.73
DFW	**LAS**	1055	**ONT**	1188	**PSP**	1126	**SAN**	1171	**SNA**	1205
	n/a		via: ONM	1190	via: ONM	1129	via: SSO	1178	via: SSO	1208
	delta	0.0%	delta	0.2%	delta	0.3%	delta	0.6%	delta	0.2%
	extra minutes		extra minutes	0.27	extra minutes	0.40	extra minutes	0.93	extra minutes	0.40
IAH	**LAS**	1222	**LAX**	1379	**SAN**	1303	**SFO**	1635	**SNA**	1346
	via: ONM	1223	via: SSO	1382	via: SSO	1303	via: ONM	1636	via: SSO	1348
	delta	0.0%	delta	0.2%	delta	0.0%	delta	0.1%	delta	0.1%
	extra minutes	0.13	extra minutes	0.40	extra minutes	0.00	extra minutes	0.13	extra minutes	0.27

Notes: [1] In each destination airport cell, the topmost number is the great-circle optimum route length (rounded to nearest nm). The row "via" is the estimated re-route distance using a NAVAID or fix (in this case an airport). The "delta" is the percent difference between the optimum and re-routed lengths. The "extra minutes" is the added time to re-route the flight.

Legend: Airport list: AUS – Austin; DFW – Dallas; ELP - El Paso; HOU - Houston-Hobby; IAH - Houston-Bush; LAS - Las Vegas; LAX - Los Angeles; MIA – Miami; MMMX - Mexico City; MSY - New Orleans; ONM – Socorro; ONT - Ontario, CA; PHX – Phoenix; PSP - Palm Springs; SAN - San Diego; SAT - San Antonio; SFO - San Francisco; SNA - John Wayne-Orange County; SSO – San Simon

One specific example considered involves the loss of use of the J-104 route during times that the Lobos ATCAA would be active. This ATS route is used for traffic travelling in the Tuscon area to and from the northwest. For example, PDARS data showed routes from Tucson-Albuquerque 12 times per year, Tucson-Denver 192 times per year, and Tucson-Chicago (Midway) 78 times per year during the times of day when the Lobos ATCAA would potentially be scheduled. Flights to or from locations west of Tucson would typically route nearer Phoenix, and travel to the west and north of the adjacent Outlaw and Jackal MOAs (via ATS routes such as J-18 rather than passing south of those MOAs and using the J-104). Figure D3-2 shows the area between Tucson and the Socorro VORTAC. East out of Tucson, the J-104 goes to San Simon, then direct to Socorro (shown by the green line in the figure During the times when Lobos ATCAA would be active under the proposed action, aircraft on this route would have to proceed from San Simon to Silver City, then Truth or Consequences, then to Socorro (shown by the blue line in the figure). This adds 12 nautical miles to the distance from Tucson to Socorro. Under the previous assumptions for type aircraft, altitude, and speed, this would add 1.6 minutes to this route segment. For an aircraft travelling between Tucson and Albuquerque, this is a 5% increase. For one travelling between Tucson and Denver, this is a 2% increase, and between Tucson and Midway, it is less than a 1% change. Of note, this new route (in blue) traverses the proposed Christa and Kendra ATCAAs. If the Lobos ATCAA was activated along with the Christa and Kendra ATCAAs at all altitudes at the same time, this civil traffic could not re-route in this manner.

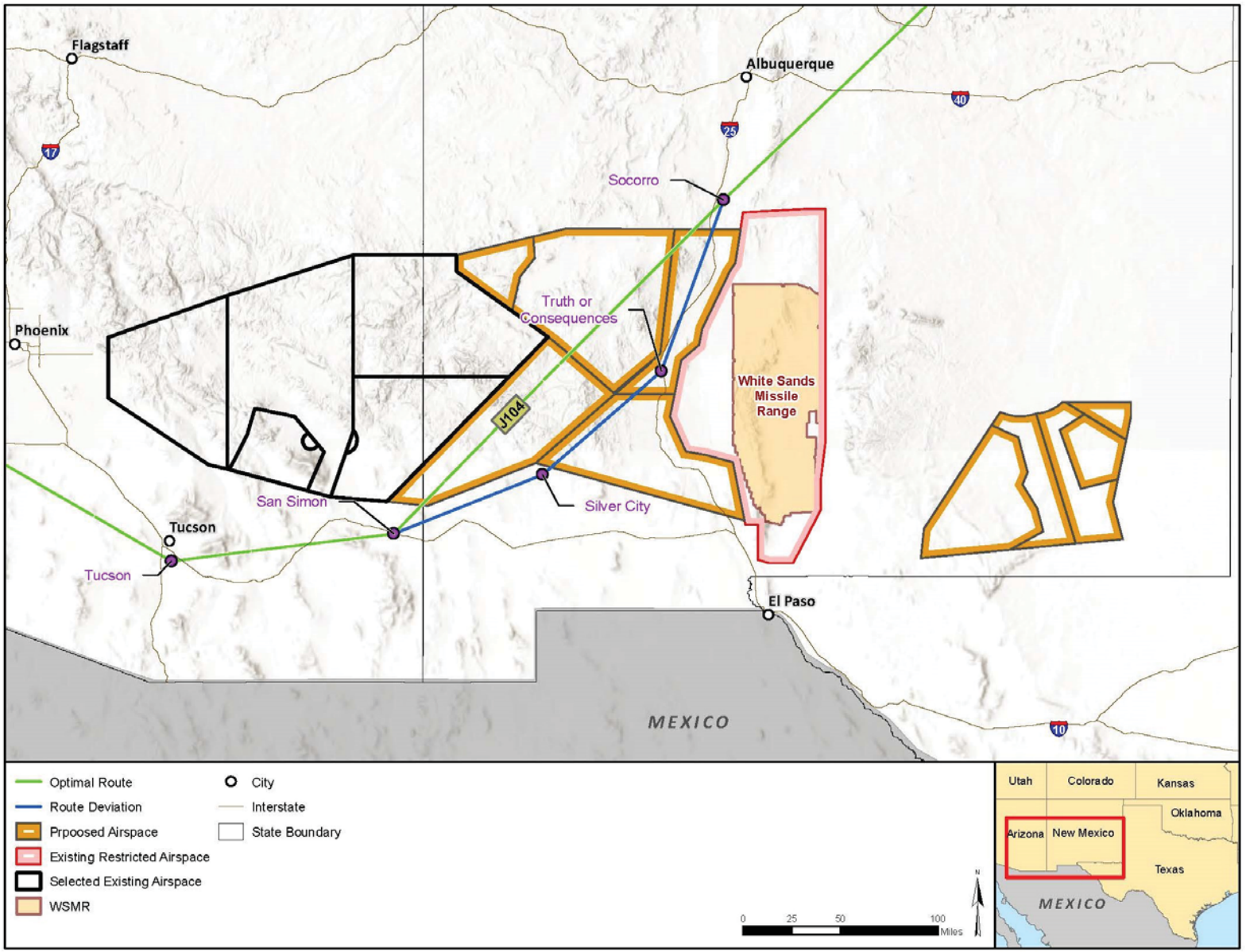


Figure D3-2. Rate Deviation to use of J-104 in Vicinity of Socorro VORTAC

Since the Christa and Kendra ATCAAs are intended as "bridges" to connect the Cato and Lobos airspace with the WSMR airspace, it is evident that procedures would have to be in place (in the LOA that establishes the ATCAAs) to allow certain altitude blocks to remain clear for civil traffic. It is assumed that such an agreement can be reached. One example possibility would be to activate the Christa and Kendra ATCAAs from FL180 to FL290 when the Lobos ATCAA is active, leaving the Class A airspace at FL300 and above for use by commercial airlines.

D3.4.2 MOA Traffic

The Lobos MOA and new portion of the Smitty and Cato MOAs occupy airspace from 500 feet AGL up to 13,500 feet MSL (Lobos Low and Smitty MOAs) and from 13,500 feet MSL up to 18,000 feet MSL (Lobos High and Cato MOAs). There would be a low military demand for the low MOA airspace and few sorties would occur in the Smitty and Lobos Low MOAs. The projected military sorties (both from Holloman AFB F-16 and other transient military use), the estimated number of hours per year and day, and percent of time military activity would occur are presented in **Table D3.4-4**. For Alternative 2, military activity in the Lobos Low MOA would occur only 5% of the time Monday-Friday from 7:00 a.m. until 10:00 p.m., less than one hour per day. The Smitty MOA would be active 20% of those hours, or approximately 3 hours per day.

Table D3.4-4. Proposed Military Usage of Lobos Low and Smitty MOAs under Alternative 2

Metric	Lobos Low MOA	Smitty MOA	Assumptions
Number of Military Sorties	770	3190	Includes Holloman F-16 plus transient military
Hours per year	193	798	Assumes 2 aircraft per period for 30 minutes in the airspace
Hours per day	0.7	3.1	260 flying days per year
% of hours affected	5%	20%	15 hours per day from 7:00 a.m. until 10:00 p.m.

For the Lobos High and Cato MOAs, the sortie counts are projected to be similar to those for the ATCAAs (See **Section D3.4.1**). **Table D3.4-5** shows the total anticipated military sorties, hours per year and per day the airspace would be active, and the percent of time the airspace would be active. The Lobos High and Cato MOAs would be active approximately 39% of the time Monday-Friday from 7:00 a.m. until 10:00 p.m. The proposed Lobos High and Cato MOAs would be activated and used together, so the proposed sorties apply to the total high airspace.

Table D3.4-5. Proposed Military Usage of Lobos High and Cato MOAs under Alternative 2

Metric		Assumptions
Number of Military Sorties	6,050	Includes Holloman F-16 plus transient military
Hours per year	1,512	Assumes 2 aircraft per period for 30 minutes in the airspace
Hours per day	5.8	260 flying days per year
% of hours affected	39%	15 hours per day from 7:00 a.m. until 10:00 p.m.

PDARS data for the proposed Lobos, Cato, and Smitty MOAs for flights during the time period (Monday-Friday from 7:00 a.m. until 10:00 p.m.) when the MOAs could be active, show about 3,000 flights annually in both the low and high blocks. **Table D3.4-6** shows the type of civil aircraft represented in the PDARS data.

The types of aircraft historically present in the area would largely not operate in conflict with the high MOAs (above 13,500 feet MSL) as many are unpressurized and would typically not have onboard oxygen. Therefore, the following analysis for the proposed MOAs assumes that the vast majority of the existing civil air traffic would use the low MOAs (Smitty and Lobos Low) instead of the high MOAs (Lobos High and Cato), but both are analyzed.

Table D3.4-6 Aircraft Types Intersecting Proposed Lobos, Cato, and Smitty MOAs under Alternative 2

Eagle	57%
200 Super King Air	3%
Cessna 182	2%
Chieftain	2%
SR-22	2%
Cessna 206	2%
Cessna 210	2%
A36 Bonanza 36	2%
Cessna 172	2%
35 Bonanza	1%
90 (A90) King Air	1%
Archer 2	1%
Cherokee Six	1%
58 Baron	1%
55 Baron	1%
Commander 200	1%
Comanche	1%
Cessna 310	1%
425 Conquest 1	1%
M-20	1%
Malibu	1%
experimental	1%
TBM-850	1%
300 (B300) Super King Air 350	1%
33 Bonanza	1%
Cessna 340	1%
Cessna 421	1%
69 other aircraft	10%

Well over two-thirds of the aircraft identified in PDARS data would operate in the low MOAs using either VFR or IFR. The VFR traffic would not be restricted from operating as they do now. For pilots operating under VFR who wish to avoid the proposed MOA airspace, flights could be conducted along routes similar to those discussed below for IFR.

The most common airport pairings represented in the PDARS data are listed in **Table D3.4-7**. A large majority of them are between Grant County (SVC) and Albuquerque (ABQ). Some of these pairings are already required to account for existing MOAs (Cato/Smitty/Morenci/Reserve) on routes such as from Albuquerque to Tucson (TUS). The vast majority of traffic through this corridor is between Grant County (SVC) and Albuquerque (ABQ). The other pairings would have a similar path as the Grant County and Albuquerque flights when transiting through this area.

Table D3.4-7. Most Common Civil Airport Pairings in Proposed Lobos, Cato, and Smitty MOAs under Alternative 2

Origin	Destination	number per year	number per week
ABQ	SVC	669	12.9
SVC	ABQ	591	11.4
SVC	PHX	192	3.7
PHX	SVC	186	3.6
PHX	ELP	24	0.5
ABQ	TUS	18	0.3
94E	ABQ	15	0.3
TUS	ABQ	15	0.3
ELP	SDL	12	0.2

***Legend*:** 94E - Whiskey Creek; ABQ – Albuquerque; ELP - El Paso; PHX – Phoenix; SDL – Scottsdale; SVC - Grant County; TUS - Tucson

The straight-line distance from Grant County to Albuquerque is 163 nm. This flight track would traverse the proposed Lobos Low MOA and the proposed Smitty MOA, but would require flying over terrain that is in excess of 10,000 feet MSL. To better estimate the realistic existing route distance, the flight track length was calculated from origin airport, Grant County or Whiskey Creek, and proceeding roughly east past the higher terrain of the Mimbres Mountains, then roughly proceeding north along the Rio Grande River Valley to Albuquerque. That distance is approximately 175 nm. The reason for this routing is that most of the civil aircraft operating in the area based on the PDARS dataset would be unable to operate at higher altitudes (above the mountain ranges) due to lack of oxygen and pressurization.

Under Alternative 2, an IFR aircraft that could operate above 13,000 feet MSL, proceeding from Grant County to Albuquerque, could route approximately 179 nm using the following NAVAIDS or fixes: SVC-V202-TCS-V611-ABQ-KABQ. This is a flight routing going Grant County, then Victor Airway 202 to Truth or Consequences, then Victor Airway 611 to the Albuquerque VORTAC navigational aid, then to the Albuquerque airport.

For those aircraft that cannot operate at or above 13,000 feet MSL (the overwhelming majority of the aircraft listed in **Table D3.4-6**), a probable IFR routing to avoid the highest terrain would be approximately 194 nm using the following NAVAIDS or fixes: SVC-WUMEX-V110-TCS-V611-ABQ-KABQ. This is a flight routing going Grant County then direct to navigational fix WUMEX, then Victor Airway 110 to Truth or Consequences, then Victor Airway 611 to the Albuquerque VORTAC navigational aid, then to the Albuquerque airport.

Since Grant County Airport (SVC) lies beneath the proposed Lobos MOAs, either of these routings begins beneath the proposed Lobos MOAs. Alterative 2 would require that a procedure for departing Grant County and Whiskey Creek airports under IFR be established.

IFR traffic from outside the area, passing through the gap between the proposed Lobos/Cato/Smitty and the existing WSMR airspace would not be able to use Victor Airway 202 between San Simon (SSO) and Truth or Consequences (TCS) during the time the MOAs were active approximately 32% of the time (Monday-Friday from 7:00 a.m. until 10:00 p.m.). Instead, this traffic would have to route via Deming (DMN), via Victor Airway 94 and Victor Airway 110, a change from 119 to 147 nm, or a difference of 28 nm. At 150 KTAS, that re-route would take approximately 11 minutes. At 250 KTAS, the re-route would add a little under 7 minutes. However, a very small number of flights would require this re-routing. There were so few in the PDARS data that none made the list at a level of even once every 5 weeks (see **Table D3.4-7**). Any traffic through the area during times when the SUA is not active (approximately 68% of the time), there would be no change to routing or flight time. For aircraft operating under VFR, there would be no change required, as VFR traffic would be free to follow the same tracks they do currently.

To summarize, existing traffic in the area is mostly light aircraft, which must operate at lower altitudes. This altitude restriction prevents them from taking a straight-line route, requiring a diversion around high mountains, and then east toward the Rio Grande Valley. This routing directs most existing traffic around the proposed Lobos and reconfigured Cato/Smitty MOAs. For the IFR traffic with the capability to fly directly between airports, the longest re-routing would result in a delay of less than 7 minutes.

D3.5 ALTERNATIVE 3 - TALON, SMITTY/CATO, LOBOS MOAS AND TALON, CATO, LOBOS, KENDRA, CHRISTA ATCAAS

Alternative 3 is a combination of Alternatives 1 and 2, with the same number of total operations spread out over the areas east (Talon MOAs/ATCAAs) and west (Lobos/Cato/Smitty MOAs, Lobos/Cato/Christa/Kendra ATCAAs) of Holloman AFB. The following sections describe the differences that result from reducing the use of all the individual airspace blocks and the reduced impacts to airspace use as compared to Alternatives 1 and 2.

D3.5.1 Eastern Areas

D3.5.1.1 ATCAAs

Under Alternative 3, the ATCAA use in the Talon A/B ATCAAs would mirror the use of the Talon A/B ATCAAs under Alternative 1. Under Alternative 3, there would be no Talon C ATCAA. Alternative 3 would see the usage of the Talon A/B ATCAAs drop from 59% to 40% of the time (Monday-Friday from 7:00 a.m. until 10:00 p.m.) when compared to Alternative 1 (see **Table D3.3-1**). During that active time, the impacts to civil aviation (nearly all airliners) would be minimal. The routes dominating the PDARS data averaged an increase in distance of about a quarter of one percent, and added extra flight time of less than a half a minute. Very few of these routes would require significant navigational changes.

D3.5.1.2 MOAs

Under Alternative 3, the proposed Talon High C MOA would not be established, and the use of the Talon High and Low A/B MOAs would be less than that proposed for Alternative 2. The impacts to civil aviation would be similar to those described for Alternative 1 for any aircraft affected by activation of the MOAs with the following exceptions: the Talon High C impacts shown in **Table D3.3-9** would not occur at all,

and all the other impacts would happen less often than projected for Alternative 1. The Talon Low A/B impacts would be applicable for about 17% of the time (between Monday-Friday from 7:00 a.m. until 10:00 p.m.) under Alternative 1 and only 12% of the time under Alternative 3. The largest of these impacts would affect IFR traffic into and out of Artesia and Cavern City, which would have to be routed around the Talon Low B while active, as shown in **Section 3.3.2.1** of this Appendix. Under Alternative 3, this would happen about a third less often than it would under Alternative 1.

The Talon High A/B MOAs would be created the same as under Alternative 1. The impacts to individual civil aircraft under Alternative 3 would be similar to that described for Alternative 1, but impacts would occur less frequently. The Talon High A/B MOAs would operate 39% of the time under Alternative 3 (Monday-Friday from 7:00 a.m. until 10:00 p.m.), whereas under Alternative 1, they would be operating for 59% of the same time period. Alternative 3 is a 30% reduction from Alternative 1.

D3.5.2 Western Areas

D3.5.2.1 ATCAAs

Under Alternative 3, the proposed western ATCAAs (Lobos, Cato, Christa, and Kendra) would be active much less than under Alternative 2. The time of use would drop from 39% to 15% of the time between Monday-Friday from 7:00 a.m. until 10:00 p.m., for a 60% reduction, compared to Alternative 2. The impacts to the majority of the civil traffic (at these altitudes, nearly all airliners) would be very minimal. As described in **Section D3.4.1**, there would be less than average of 1% change in distance, and a time change of less than a minute. These small numbers reflect the fact that during the SUA operating hours, most air traffic already routes to avoid the WSMR.

D3.5.2.2 MOAs

Under Alternative 3, the Lobos Low MOA would not be established, so the airspace below 13,500 feet MSL beneath the Lobos High MOA would be normal Class E/G airspace. The impacts described in **Section D3.4.2** resulting from the establishment of the Lobos Low MOA would not occur. Air traffic operating below 13,500 feet MSL in and out of Grant County and Whiskey Creek airports would be unaffected. The routing between Grant County and Albuquerque would still be potentially impacted by the activation of the Smitty MOA, with the caveats listed in **Section D3.4.2**. But whereas under Alternative 2, the Smitty MOA would be active for an average of approximately 3 hours per day, under Alternative 3, it would be reduced to just over one hour per day. Most aircraft operating between these airports would likely route to the east around the Mimbres Mountains and then north up the Rio Grande River Valley, rather than attempt to fly over the high mountainous terrain. Therefore, this alternative would have little to no impact on this traffic. Alternative 3 would reduce the proposed Smitty MOA activity by more than half compared to Alternative 2.

Civil traffic operating between 13,500 feet and 18,000 feet MSL, in the high MOAs could be affected. IFR traffic would go around as described in **Section D3.4.2**, albeit at a reduced rate. While Alternative 2 would have the high MOAs active about 39% of the time, under Alternative 3, that figure drops to 15% of the time (Monday-Friday from 7:00 a.m. until 10:00 p.m.). The impacts to individual aircraft operating at those altitudes would be similar, but would happen much less often.

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APPENDIX E
SPECIAL-STATUS SPECIES

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Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Birds						
Abert's towhee	*Melozone aberti*	-	T	SGCN	-	X
Arizona Bell's vireo	*Vireo bellii arizonae*	-	-	SGCN	-	X
American bittern	*Botaurus lentiginosus*	-	-	SGCN	-	X
Arizona Boterri's sparrow	*Peucaea botterii arizonae*	-	-	SGCN	-	X
Arizona grasshopper sparrow	*Ammodramus savannarum ammolegus*	-	E	-	-	X
Arctic peregrine falcon	*Falco peregrinus tundrius*	-	T	-	X	X
Baird's sparrow	*Ammondramus bairdii*	-	T	-	X	X
Bald eagle	*Haliaeetus leucocephalus*	-	T	SGCN	X	X
Bell's vireo	*Vireo bellii*	-	T	-	X	X
Blue-throated hummingbird	*Lampornis clemenciae*	-	-	SGCN	-	X
Broad-billed hummingbird	*Cynanthus latirostris*	-	T	SGCN	X	X
Brown pelican	*Pelecanus occidentalis*	-	E	-	X	X
Buff-collared nightjar	*Antrostomus ridgwayi*	-	E	-	-	X
Common black hawk	*Buteogallus anthracinus*	-	T	-	X	X
Common ground dove	*Columbina passerine*	-	E	-	X	X
Costa's hummingbird	*Calypte costae*	-	T	-	-	X
Dusky-capped flycatcher	*Myiarchus tuberculifer*	-	-	SGCN	-	X
Elegant Trogon	*Trogon elegans*	-	E	SGCN	X	X
Evening grosbeak	*Coccothraustes vespertinus*	-	-	SGCN	-	X
Ferruginous hawk	*Buteo regalis*	-	-	SGCN	-	X
Gila woodpecker	*Melanerpes uropygialis*	-	T	SGCN	-	X
Golden eagle	*Aquila chrysaetos*	-	-	SGCN	-	X
Gould's wild turkey	*Melagris gallopavo Mexicana*	-	T	-	-	X
Gray vireo	*Vireo vicinior*	-	T	-	X	X
Interior Least Tern	*Sterna antillarum*	E	E	-	X	X
Lincoln's sparrow	*Melospiza lincolnii*	-	-	SGCN	-	X
Lucifer hummingbird	*Calothorax lucifer*	-	T	-	X	X
Mexican spotted owl	*Strix occidentalis lucida*	T	-	SGCN	X	X
Mountain pygmy owl	*Glaucidium gnoma gnoma*	-	-	SGCN	-	X
Neotropic cormorant	*Phalacrocorax brasilianus*	-	T	-	X	X

Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Northern Aplomado falcon	*Falco femoralis septentrionalis*	EX/NE	E	SGCN	X	X
Northern beardless-tyrannulet	*Camptostoma imberbe*	-	E	-	X	X
Northern goshawk	*Accipiter gentilis*	-	-	SGCN	-	X
Pacific wren	*Troglodytes pacificus*	-	-	SGCN	-	X
Peregrine falcon	*Falco peregrinus*	-	T	SGCN	X	X
Piping plover	*Charadrius melodus*	T	T	-	X	X
Rivoli's hummingbird	*Eugenes fulgens*	-	-	SGCN	-	X
Savannah sparrow	*Passerculus sandwichensis*	-	-	SGCN	-	X
Southwestern willow flycatcher	*Empidonax traillii extimus*	E	E	SGCN	X	X
Sprague's pipit	*Anthus spragueii*	-	-	SGCN	-	X
Sulfur-bellied flycatcher	*Myiodynastes luteiventris*	-	-	SGCN	-	X
Thick-billed kingbird	*Tyrannus crassirostris*	-	E	SGCN	X	X
Varied bunting	*Passerina versicolor*	-	T	-	X	X
Violet-crowned hummingbird	*Amazilia violiceps*	-	T	SGCN	-	X
Western burrowing owl	*Athene cunicularia hypugaea*	-	-	SGCN	-	-
Western grasshopper sparrow	*Ammodramus savannarum perpallidus*	-	-	SGCN	-	X
Whiskered screech-owl	*Megascops trichopsis*	-	T	-	-	X
White-eared hummingbird	*Hylocharis leucotis*	-	T	-	X	X
Wood duck	*Aix sponsa*	-	-	SGCN	-	X
Yellow-billed cuckoo	*Coccyzus americanus*	T	-	SGCN	X	X
Yellow-eyed junco	*Junco phaeonotus*	-	T	-	X	X
Amphibians and Reptiles						
Arid land ribbonsnake	*Thamnophis proximus*	-	T	-	X	-
Arizona striped whiptail	*Aspidoscelis arizonae*	-	-	SGCN	-	X
Arizona toad	*Anaxyrus microscaphus*	-	-	SGCN	-	X
Chiricahua leopard frog	*Rana chiricahuensis*	T	-	SGCN	-	X
Desert box turtle	*Terrapene ornate luteola*	-	-	SGCN	-	X
Dunes sagebrush lizard	*Sceloporus arenicolus*	-	E	-	X	-

Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Giant spotted whiptail	*Aspidoscelis stictogramma*	-	T	SGCN	-	X
Gray-banded kingsnake	*Lampropeltis alterna*	-	E	-	X	-
Gray-checkered whiptail	*Aspidoscelis dixoni*	-	E	-	-	X
Great plains narrowmouth toad	*Gastrophryne olivacea*	-	E	-	X	-
Green rat snake	*Senticolis triaspis*	-	T	-	-	X
Lowland leopard frog	*Lithobates yavapaiensis*	-	E	SGCN	-	X
Mottled rock rattlesnake	*Crotalus lepidus lepidus*	-	T	-	X	-
Mountain skink	*Plestiodon callicephalus*	-	T	-	-	X
Narrow-headed gartersnake	*Thamnophis rufipunctatus*	T	T	SGCN	-	X
New Mexican ridge-nosed rattlesnake	*Crotalus willardi obscurus*	T	E	-	-	X
Northern Mexican gartersnake	*Thamnophis eques megalops*	T	E	SGCN	-	X
Northern leopard frog	*Lithobates pipiens*	-	-	SGCN	-	X
Plain-bellied water snake	*Nerodia erythrogaster*	-	E	-	X	-
Reticulate Gila monster	*Heolderma suspectrum suspectum*	-	E	-	-	-
Sacramento mountain salamander	*Aneides hardii*	-	T	-	X	-
Slevin's bunchgrass lizard	*Sceloporus slevini*	-	T	-	-	-
Sonoran desert toad	*Incilius alvarius*	-	T	SGCN	-	X
Sonoran desert tortoise	*Gopherus morafkai*	-	-	SGCN	-	X
Twin-spotted rattlesnake	*Crotalus pricei*	-	-	SGCN	-	X
Western river cooter	*Pseudemys gorzugi*	-	T	-	X	X
Yellow mud turtle	*Kinosternon flavescens*	-	-	SGCN	-	X
Mammals						
Antelope jackrabbit	*Lepus alleni*	-	-	SGCN	-	X
Arizona montane vole	*Microtus montanus arizonensis*	-	E	SGCN	-	X
Arizona myotis	*Myotis occultus*	-	-	SGCN	-	X
Arizona shrew	*Sorex arizonae*	-	E	-	-	X

Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Brazilian free-tailed bat	*Tadarida brasiliensis*	-	-	SGCN	-	X
California leaf-nosed bat	*Macrotus californicus*	-	-	SGCN	-	X
Cave myotis	*Myotis velifer*	-	-	SGCN	-	X
Gray Wolf	*Canis lupus*	PEX/NE	-	-	-	X
Greater western bonneted bat	*Eumops perotis californicus*	-	-	SGCN	-	X
Jaguar	*Panthera onca*	E	-	-	-	X
Least shrew	*Cryptotis parva*	-	T	-	X	-
Lesser long-nosed bat	*Leptonycteris curasoae yerbabuenae*	-	-	SGCN	-	X
Mexican long-nosed bat	*Leptonycteris nivalis*	E	E	-	-	X
Mexican wolf	*Canis lupus baileyi*	EX/NE	E	SGCN	-	X
New Mexico meadow jumping mouse	*Zapus hudsonius luteus*	E	E	SGCN	X	X
Mt Graham red squirrel	*Tamiasciurus hudsonicus grahamensis*	-	-	SGCN	-	X
Oscura mountains Colorado chipmunk	*Tamias quadrivittatus oscuraensis*	-	T	-	-	X
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	-	-	SGCN	-	X
Penasco least chipmunk	*Tamias minimus atristriatus*	C	E	-	X	-
Pocket free-tailed bat	*Nyctinomops macrotis*	-	-	SGCN	-	X
Southern pocket gopher	*Thomonmys umbrinus*	-	T	-	-	X
Spotted bat	*Euderma maculatum*	-	T	-	X	X
Western red bat	*Lasiurus blossevillii*	-	-	SGCN	-	X
Western yellow bat	*Lasiurus xanthinus*	-	T	SGCN	-	X
White-bellied long-tailed vole	*Microtus longicaudus leucophaeus*	-	-	SGCN	-	X
White-sided jackrabbit	*Lepus callotis*	-	T	-	-	X
Yuma myotis	*Myotis yumanensis*	-	-	SGCN	-	X
Fish						
Apache trout	*Oncorhynchus apache*	-	-	SGCN	-	X
Beautiful shiner	*Cyprinella Formosa*	T	T	-	-	X
Bigscale logperch	*Percina macrolepida*	-	T	-	X	-
Blue sucker	*Cycleptus elongates*	-	E	-	X	-
Chihuahua chub	*Gila nigrescens*	T	E	-	-	X
Desert pupfish	*Cyprinodon macularius*	-	-	SGCN	-	X

Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Desert sucker	*Catostomus clarkia*	-	-	SGCN	-	X
Gila chub	*Gila intermedia*	E	E	SGCN	-	X
Gila longfin dace	*Agosia chrysogaster chrysogaster*	-	-	SGCN	-	X
Gila topminnow	*Poeciliopsis occiendentalis*	E	T	SGCN	-	X
Gila trout	*Oncorhynchus gilae*	T	T	SGCN	-	X
Gray redhorse	*Moxostoma congestum*	-	E	-	X	-
Greenthroat darter	*Etheostoma lepidum*	-	T	-	X	-
Headwater chub	*Gila nigra*	PT	E	-	-	X
Loach minnow	*Tiaroga cobitis*	E	E	SGCN	-	X
Mexican tetra	*Mexican tetra*	-	T	-	X	-
Pecos bluntnose shiner	*Notropis simus pecosensis*	T	E	-	X	-
Pecos gambusia	*Gambusia nobilis*	E	E	-	X	-
Pecos pupfish	*Cyprinodon pecosensis*	-	T	-	X	-
Razorback sucker	*Xyrauchen texanus*	E	-	SGCN	-	X
Rio Grande silvery minnow	*Hybognathus amarus*	E	E	-	-	X
Roundtail chub	*Gila robusta*	PT	E	SGCN	-	X
Sonora sucker	*Catostomus insignis*	-	-	SGCN	-	X
Speckled dace	*Rhinichthys osculus*	-	-	SGCN	-	X
Spikedace	*Meda fulgida*	E	E	SGCN	-	X
Suckermouth minnow	*Phenacobius mirabilis*	-	T	-	X	-
White sands pupfish	*Cyprinodon Tularosa*	-	T	-	X	X
Woundfin	*Plagopterus argentissiumus*	EX/NE	-	-	-	X
Invertebrates						
Alamosa springsnail	*Tyronia alamosae*	E	E	-	-	X
Bylas springsnail	*Pyrgulopsis arizonae*	-	-	SGCN	-	X
California floater	*Anodonta californiensis*	-	-	SGCN	-	X
Chupadera springsnail	*Pyrgulopsis chupaderae*	E	E	-	-	X
Clark Peak talussnail	*Sonorella christenseni*	-	-	SGCN	-	X
Gila springsnail	*Pyrgulopsis gilae*	-	T	-	-	X
Gila tryonia	*Tryonia gilae*	-	-	SGCN	-	X
Hacheta grande woodlandsnail	*Ashmunella hebardi*	-	T	-	-	X
Koster's springsnail	*Juturnia kosteri*	E	E	-	X	-
Mimic talussnail	*Sonorella imitator*	-	-	SGCN	-	X
Mineral creek moutainsnail	*Oreohelix pilsryi*	-	T	-		X
New Mexico hot springsnail	*Pyrgulopsis thermalis*	-	T	-	-	X
Noel's amphipod	*Gammarus desperatus*	E	E	-	X	-
Ovate vertigo snail	*Vertigo ovata*	-	T	-	X	-

Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Pecos assiminea snail	*Assiminea pecos*	E	E	-	X	-
Pecos springsnail	*Pyrgulopsis pecosensis*	-	T	-	X	-
Pinaleno mountainsnail	*Oreohelix grahamensis*	-	-	SGCN	-	X
Pinaleno talussnail	*Sonorella grahamensis*	-	-	SGCN	-	X
Roswell springsnail	*Pyrgulopsis roswellensis*	E	E	-	X	-
Shortneck snaggletooth snail	*Gastrocopta dalliana*	-	T	-	-	X
Socorro isopod	*Thermosphaeroma thermophiles*	E	E	-	-	X
Socorro springsnail	*Pyrgulopsis neomexicana*	E	E	-	-	X
Texas hornshell	*Popenaias popeii*	PE	E	-	X	-
Wet Canyon talussnail	*Sonorella macrophallus*	-	-	SGCN	-	X
Wrinkled marshsnail	*Stagnicola caperata*	-	E	-	X	-
Plants						
Chihuahua scurfpea	*Pediomelum pentaphyllum*	-	E	-	-	X
Crested coralroot	*Hexalectris spicata*	-	E	-	X	X
Duncan's pincushion cactus	*Escobaria duncanii*	-	E	-	-	-
Golden lady's slipper	*Cypripedium parviflorum var. pubescens*	-	E	-	-	X
Goodding's onion	*Allium gooddingii*	-	E	-	-	X
Gypsum scalebroom	*Lepidospartum burgessii*	-	E	-	X	-
Gypsum wild-buckwheat	*Eriogonum gypsophilum*	T	E	-	X	-
Hess' fleabane	*Erigeron hessii*	-	E	-	-	X
Kuenzler hedgehog cactus	*Echinocereus fendleri var. kuenzleri*	E	E	-	X	-
Lee pincushion cactus	*Coryphantha sneedii var. leei*	T	E	-	X	-
Night-blooming cereus	*Peniocereus greggii*	-	E	-	-	X
Parish's alkali grass	*Puccinellia parishii*	-	E	-	-	X
Pecos sunflower	*Helianthus paradoxus*	T	E	-	X	X
Sacramento mountains thistle	*Cirsium cinaceum*	T	E	-	X	-
Sacramento prickly poppy	*Argemone pleiacantha spp. pinnatisecta*	E	E	-	X	-
Sand prickly pear	*Opuntia arenaria*	-	E	-	-	X
Schneer's pincushion cactus	*Coryphantha scheeri var. scheeri*	-	E	-	X	X
Shining coralroot	*Hexalectris nitida*	-	E	-	X	-
Slender spiderflower	*Periotma multicaulis*	-	E	-	-	X

Special-Status Species Potentially Under Proposed Airspace						
Common Name	**Scientific Name**	**Federal Status**	**New Mexico State Status**	**Arizona State Status**	**Potentially occurs under the Proposed Talon MOA[1]**	**Potentially occurs under the Proposed Cato, Smitty and Lobos MOAs[1]**
Sneed's pincushion cactus	*Coryphantha sneedii var. sneedii*	E	E	-	X	-
Tharp's bluestar	*Amsonia tharpii*	-	E	-	X	-
Todsen's pennyroyal	*Hedeoma todsenii*	E	E	-	X	X
Villard's pinchusion cactus	*Escobaria villardii*	-	E	-	X	-
Wilcox pincushion cactus	*Mammillaria wrigthtii var. wilcoxii*	-	E	-	-	X
Wood lily	*Lilium philadelphicum*	-	E	-	X	-
Wright's marsh thistle	*Cirsium wrightii*	C	E	-	X	X
Zuni fleabane	*Erigeron rhizomatus*	T	E	-	-	X

Sources: USFWS 2018; EMNRD 2017; NMGF 2017

Note: [1] State listed species data is available at the county level. An "X" in these columns means the species is listed in a county that corresponds with the counties beneath airspace.

Legend: E = endangered; T = threatened; C = candidate; PE = proposed endangered; PT = proposed threatened; EX/NE = experimental population, non-essential; PEX/NE = proposed experimental population, non-essential; SGCN = Species of Greatest Conservation Need; X = potential occurrence

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APPENDIX F
NOISE REPORT

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NOISE ANALYSIS

FOR

SPECIAL USE AIRSPACE OPTIMIZATION AT HOLLOMAN AIR FORCE BASE ENVIRONMENTAL IMPACT STATEMENT

October 2019

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ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
ANSI	American National Standards Institute
ATCAA	Air Traffic Control Assigned Airspace
CDNL	C-weighted Day-Night Average Sound Level
dB	decibel
dBA	A-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
FL	Flight Level
L_{dnmr}	Onset Rate Adjusted Day-Night Average Sound Level
L_{max}	Maximum Sound Level
MOA	Military Operations Area
MRNmap	Military Operating Area and Range Noise Model
MTR	military training route
MSL	mean sea level
POI	Point of Interest
SEL	sound exposure level
SUA	Special Use Airspace
U.S.	United States
WSMR	White Sands Missile Range

1.0 INTRODUCTION

1.1 BACKGROUND

The United States (U.S.) Air Force proposes to optimize the Special Use Airspace (SUA) available for current and anticipated future pilot training at Holloman Air Force Base (AFB). Much of the SUA used by pilots assigned to Holloman AFB was developed for legacy aircraft more than 30 years ago. As such, it does not have the optimum volume or attributes needed to meet the training requirements of pilots flying modern aircraft. Reconfiguring existing airspace and establishing new airspace would improve the availability of suitable training airspace for pilots stationed at Holloman AFB.

This noise study supports the *Environmental Impact Statement for Special Use Airspace Optimization at Holloman Air Force Base*. Holloman AFB is located in southern New Mexico, six miles west of the city of Alamogordo (**Figure 1.1-1**). Holloman AFB's current mission is to train F-16 pilots. F-16 pilot training requires both air-to-air and air-to-ground training, and each pilot must fly multiple sorties (a sortie is the flight of a single aircraft consisting of a takeoff, mission, and landing). Each training sortie flown is conducted to meet a specific training requirement. The particular training requirement can only be accomplished in airspace that has appropriate area, altitudes, proximity to the base, and attributes (such as ability to use defensive countermeasures or certain types of munitions). Consequently, the features of available airspace determine which training sorties can occur. Air-to-air training activities normally take place in a Military Operations Area (MOA) with an overlying Air Traffic Control Assigned Airspace (ATCAA) requested as needed to expand the MOA's altitude. Air-to-ground training activities that include the release of live ordnance are considered hazardous to non-participating aircraft and must be performed in a restricted area associated with a military training range. Some training activities require a combination of MOA and restricted areas. A range of restricted areas and MOAs in the vicinity of Holloman AFB are currently available for F-16 pilot training (**Table 1.1-1** and **Figure 1.1-2**). The available MOAs are scheduled by Holloman, Cannon, and Kirtland AFBs. The available restricted areas are associated with U.S. Army ranges scheduled by White Sands Missile Range (WSMR) and Fort Bliss.

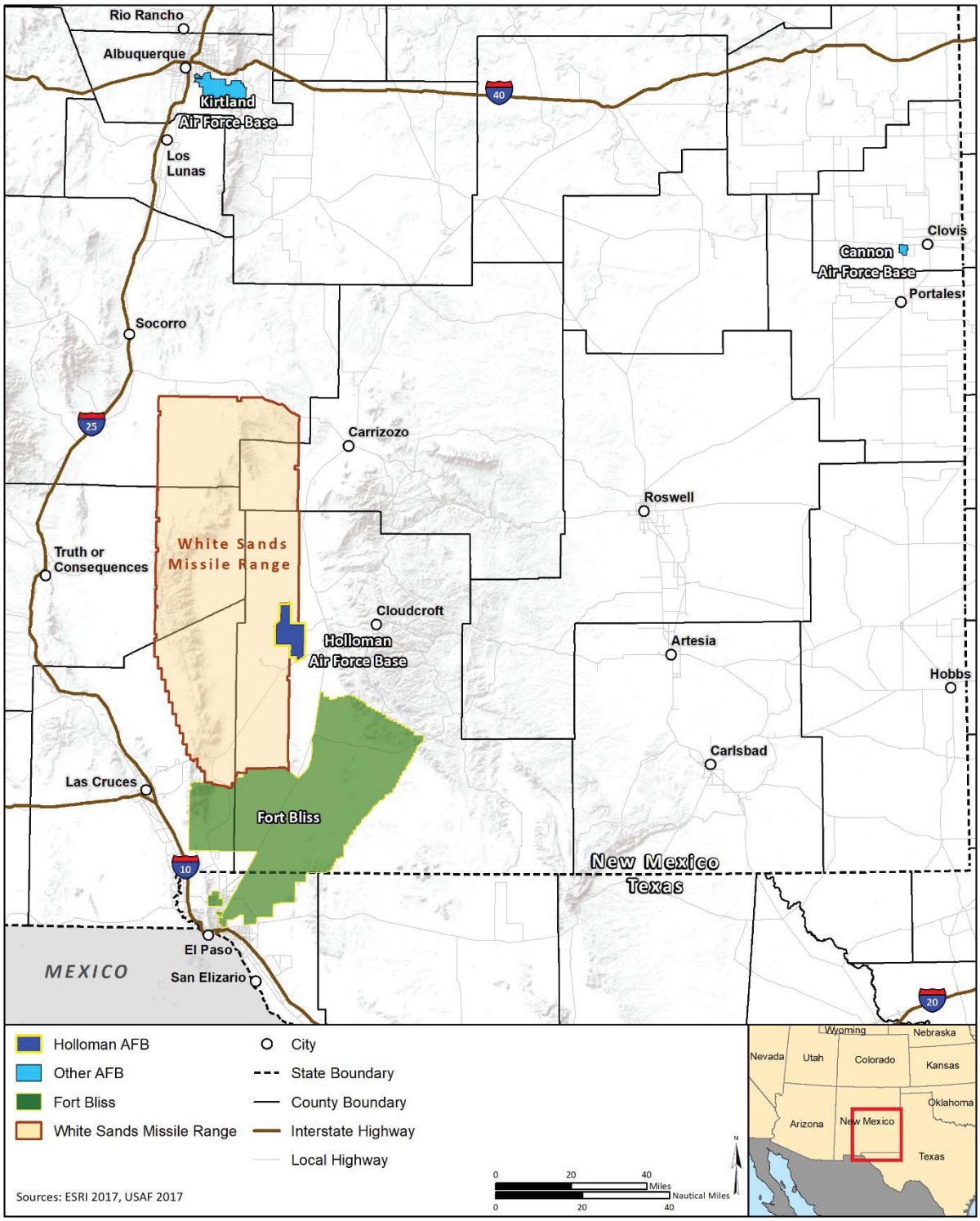


Figure 1.1-1. Location of Holloman Air Force Base

Table 1.1-1. Airspace Currently Available for F-16 Pilot Training		
Airspace	**Scheduled By**	**Annual F-16 Pilot Training Sorties[1]**
Restricted Areas		
R5107 and R5111	WSMR	4,962
R5103	Fort Bliss	611
R5107	Fort Bliss	0
MOAs (with associated ATCAAs)		
Beak	Holloman AFB	2,569
Bronco	Cannon AFB	0
Pecos	Cannon AFB	26
Valentine	Holloman AFB	0
Talon	Holloman AFB	831
Cato	Kirtland AFB	1
Smitty	Kirtland AFB	15

Notes: [1] The number of annual sorties were derived from airspace utilization data for a representative year (June 2017 to June 2018). The actual sorties vary from year to year depending on the training mission and the airspace available.
Legend: AFB=Air Force Base; ATCAA=Air Traffic Control Assigned Airspace; MOA=Military Operations Area; WSMR=White Sands Missile Range.

1.2 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 the baseline condition (No Action Alternative). Section 4.0 provides the modeling data used and the noise exposure for Alternative 1. Section 5.0 provides modeling data used and noise exposure for Alternative 2. Section 6.0 provides the modeling data used and noise exposure for Alternative 3. Section 7.0 summarizes the supplemental noise metrics used and the results calculated for this study.

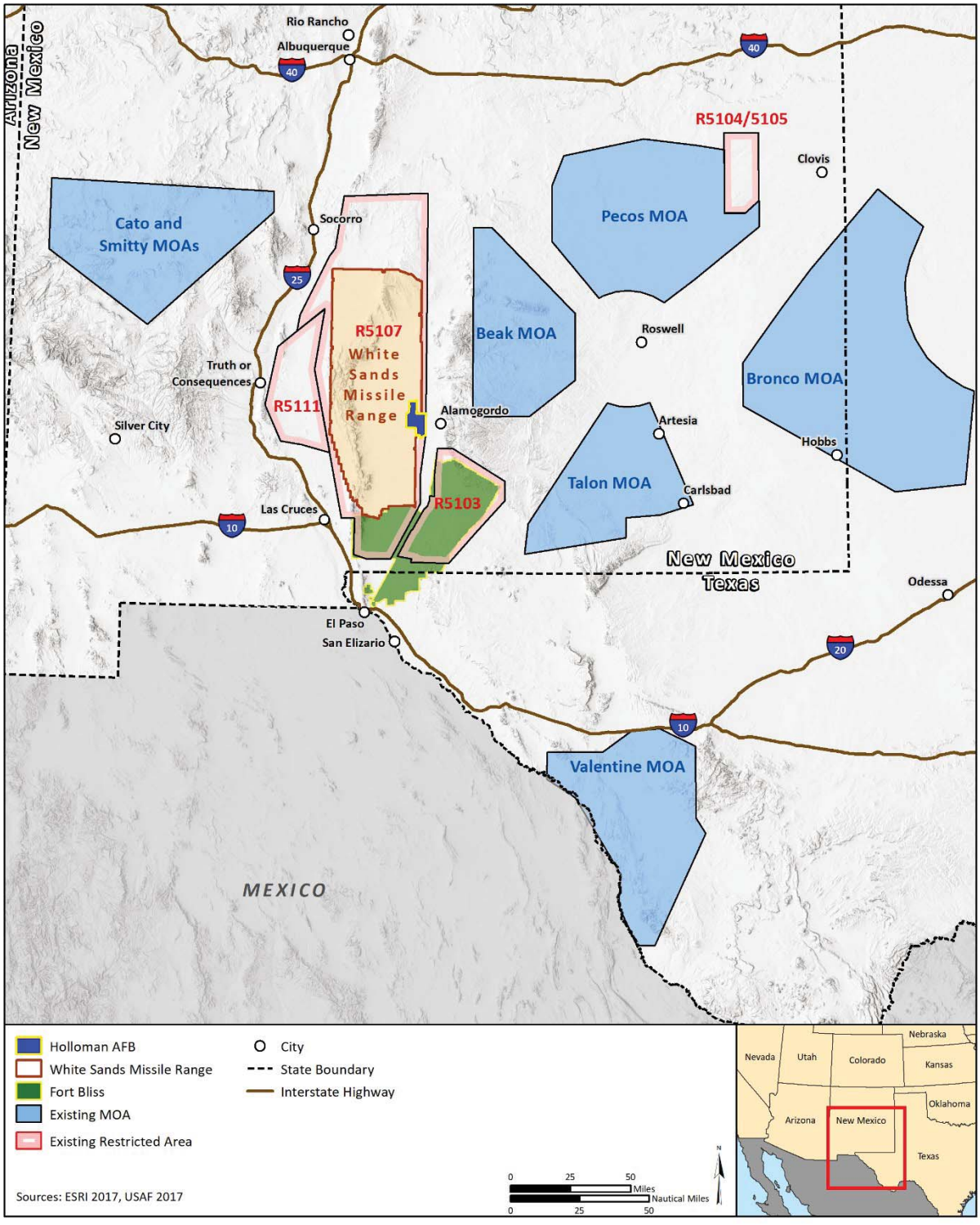


Figure 1.1-2. Special Use Airspace Available for F-16 Pilot Training

2.0 METHODOLOGY

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

- 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 flight and engine maintenance activity: Day-Night Average Sound Level (L_{dn}, also written as DNL), and
- A cumulative measure of noise levels in military airspace: Onset-rate adjusted monthly Day-Night Average Sound Level (L_{dmnr})

Human hearing sensitivity to differing sound pitch, measured in cycles per second or hertz (Hz), 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.

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 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 1,000 feet.

Additionally, use of the BOOMAP96 program allows computation of C-weighted Day-Night Average Sound Level (CDNL) generated by supersonic flight operations in SUA.

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	1,000 ft in x and y	
Metrics	Primary: L_{dnmr}, DNL (for FAA), CDNL (for sonic booms) Secondary: SEL, L_{max} L_{eq},	
Basis	Busy Month[1] (MR_NMAP) Busy Month[1] (BOOMAP)	
Modeled Weather (Monthly Averages 2015 -2017; April selected)		
Temperature	70.3 °F	
Relative Humidity	62.0%	
Barometric Pressure	30.04 in Hg	

Source*:* Cardno 2019.

Note: [1] In this case, due to the steady nature of the training at Holloman, Busy Month is the same as Average Annual Day. We've maintained 'Busy Month' in the table to be technically correct for the metric.

Legend: ft = feet; DNL = Day-Night Average Sound Level; L_{dnmr} Onset-Rate Adjusted Monthly Day-Night Average Sound Level; SEL = Sound Exposure Level; L_{max} = maximum sound level; L_{eq} = Equivalent Sound Level; CDNL = C-weighted Day-Night Average Sound Level; AAD = Average Annual Day; °F = degrees Fahrenheit; in Hg = inches Mercury.

2.1.1 DNL and 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), the metric is labeled L_{dnm}. 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 11dB, depending on the rapidity of the rise in noise. Use of the busy month standard is useful to the Defense Department to characterize the impact that occurs at some air bases due to the cyclic nature of training, where certain military training exercises may be very intense at some times, and non-existent at other times. The Defense Department uses L_{dnmr} for this reason and also to account for the onset rate, especially for low-altitude tactical aircraft. In the case of this analysis, the F-16 pilot training mission at Holloman AFB does not vary significantly by month, so there are no months that are significantly busier than others. The FAA uses straight DNL by standard. Because this noise study is in support of an EIS that will be considered both by the USAF and the FAA, both metrics were calculated. Note that DNL is always less than or equal to L_{dnmr}. In this study, the fact that there is steady use (meaning that on average, every month is about the same) and the scarcity of operations that result in an onset-rate adjustment caused the results to be the same, when rounded to a whole decibel. So, while DNL and L_{dnmr} are different metrics, in this case they end up providing the same numerical result for the training addressed in this noise study and EIS. For the remainder of this analysis, the reader can read the L_{dnmr} results as equal to DNL.

DNL is the U.S. Department of Defense standard for modeling the cumulative noise exposure and assessing community noise impacts. DNL has two time periods of interest: 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" 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. For the remainder of this noise study, "nighttime" means "environmental night".

2.1.2 CDNL

CDNL is similar to DNL, in that it is based on C-weighted noise, which emphasizes lower frequency sound vibrations. C-weighting better targets the lower frequencies that are "felt," instead of "heard", usually impulsive noise caused by activities like explosions. 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 occur from aircraft flying at supersonic speeds.

2.2 SUPPLEMENTAL METRICS

While a cumulative metric such as DNL is used to predict the overall noise environment, it can also be of interest to know more about the most impactful events in noise sensitive locations. The Department of Defense Noise Working Group (DNWG) provides guidelines to supplement cumulative DNL, as described in this section (DNWG 2009). Supplemental noise metric results are discussed in Section 7.0.

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 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 Sound Exposure Level (SEL) takes all of the sound energy from a single event and compresses it as if the entire event occurred over one 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 all of the sound energy into a 1-second timeframe, including perhaps dozens of seconds' worth of noise occurring both before and after the loudest moment, making the value larger than the L_{max} value.

3.0 BASELINE CONDITIONS

This section details the baseline data inputs to the model and the resultant baseline noise exposure in the SUA where F-16s based at Holloman AFB would train. In this Noise Study, the baseline conditions also represent the No Action Alternative addressed in the EIS.

3.1 SUBSONIC MODELING DATA

Table 3.1-1 summarizes total aircraft activity currently occurring in the existing Talon MOA and ATCAAs by F-16s from Hollman AFB and transient aircraft (those not stationed at Holloman AFB). The Talon MOA/ATCAA is currently only used for 831 sorties per year by Holloman AFB F-16 aircraft for training. 90 percent of operations occur during daytime hours (7 a.m. to 10 p.m.). Annual operations were modeled instead of busy month. As discussed in Section 2.1.1, Holloman AFB is a training base with a steady training tempo, without large spikes in operational activity.

Table 3.1-1. Baseline Talon Airspace Annual Sorties

Airspace	F-16 Sorties	Transient Sorties
Talon East MOA/ATCAA	344	533
Talon West MOA/ATCAA	172	267
Talon Low MOA	315	200
Totals	**831**	**1000**

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

Profiles for the F-16 use of SUA were developed in conjunction with operations representatives from the 54th Fighter Group at Holloman AFB. Their syllabus mission requirements for each squadron are shown in **Table 3.1-2**. For each of these missions a "profile group", and a set of altitude and power settings were assigned. The F-16 use of airspace was modeled using these data for the baseline condition and each of the proposed action alternatives, with the differences among alternatives being the number and location of proposed sorties. Profiles are built for each type of mission (by profile group), altitude block, and power setting, as illustrated in **Table 3.1-3**. Profiles are also broken down by engine type (F-16C Block 40 – 55% and Block 42 – 45%).

Table 3.1-2. F-16 Airspace Requirements									
Mission		**L x W (nm)**	**Altitude Floor[1]**	**Altitude Ceiling[1]**	**# of Sorties**	**% of Events**	**IP&Re-Fly**	**Total Sorties**	**Profile Group**
TR	Transition	20x20	10,000	30,000	180	9.38%	336	516	4
INST	Instrument	20x20	10,000	30,000	90	4.69%	168	258	4
NTR	Night Transition	20x20	10,000	30,000	45	2.34%	84	129	4
AHC	Advanced Handling Characteristics	25x25	10,000	30,000	45	2.34%	84	129	3
BFM	Basic Fighter Maneuver	30x30	5,000	20,000	360	18.75%	671	1031	3
ACM	Air Combat Maneuver	40x30	5,000	20,000	108	5.63%	201	309	3
TI	Tactical Intercept	55x35	5,000	40,000	183	9.53%	341	524	3
NTI	Night Tactical Intercept	55x35	5,000	40,000	69	3.59%	129	198	3
ACT	Air Combat Training	85x35	500	50,000	39	2.03%	73	112	3
LASDT	Low Altitude Step Down Training	45x35	500	30,000	69	3.59%	129	198	2
BSA[2]	Basic Surface Attack	30x30	500	25,000	156	8.13%	291	447	1
PGM[2]	Precision Guided Munitions	30x30	500	30,000	93	4.84%	173	266	1
AI[2]	Air Interdiction	30x30	500	30,000	74	3.85%	138	212	1
AI	Air Interdiction	30x30	500	30,000	19	0.99%	35	54	1
SAN[2]	Surface Attack-Night	55x35	1,000	30,000	69	3.59%	129	198	1
SAT[2]	Surface Attack Tactics	55x35	1,000	30,000	87	4.53%	162	249	1
CAS[2]	Close Air Support	30x30	500	25,000	138	7.19%	257	395	5
LFE[3]	Large Force Exercise	100x35	500	50,000	24	1.25%	45	69	3
IPUG[3,4]	Instructor Pilot Upgrade	55x35	500	40,000	24	1.25%	45	69	-
WIC[3,4]	Weapons Instructor Course	55x35	500	40,000	24	1.25%	45	69	-
Pilot Upgrd[4]	Pilot Upgrade	55x35	500	40,000	24	1.25%	45	69	-
TOTALS					**1920**	**100.00%**	**3580**	**5500**	

Notes:

1. Altitudes shown as 500', 1,000' and 5,000' are AGL, 10,000 is MSL, all ceilings are MSL.
2. Events require munitions range. These would go to a restricted area, and not a MOA by itself.
3. In addition to range, requires combination of various airspace.
4. IPUG, WIC, and Pilot Upgrade sorties are assumed to require ranges in proportion to the rest of the syllabus.

Table 3.1-3. Altitude and Power Profiles for F-16C by Profile Group

	Profile Group																	
	1HL			1H			2			3			4			5		
Altitude block	Alt Dist	Power	Power Dist	Alt Dist	Power	Power Dist	Alt Dist	Power	Power Dist	Alt Dist	Power	Power Dist	Alt Dist	Power	Power Dist	Alt Dist	Power	Power Dist
30k-50k	10%	MAX	5%	14%	MAX	5%				15%	MAX	10%	5%	MAX	0%			
		Mil	25%		Mil	25%					Mil	85%		Mil	50%			
		85%	70%		85%	70%					85%	5%		85%	50%			
24k-30k	10%	MAX	5%	14%	MAX	5%				20%	MAX	10%	25%	MAX	0%			
		Mil	25%		Mil	25%					Mil	50%		Mil	50%			
		85%	70%		85%	70%					85%	30%		85%	50%			
18k-24k	10%	MAX	5%	14%	MAX	5%				20%	MAX	10%	30%	MAX	10%			
		Mil	25%		Mil	25%					Mil	50%		Mil	40%			
		85%	70%		85%	70%					85%	30%		85%	50%			
15k-18k	20%	MAX	5%	29%	MAX	5%				20%	MAX	25%	20%	MAX	10%			
		Mil	25%		Mil	25%					Mil	75%		Mil	40%			
		85%	70%		85%	70%					85%	0%		85%	50%			
10k-15k	20%	MAX	10%	29%	MAX	10%				15%	MAX	15%	20%	MAX	0%	25%	MAX	5%
		Mil	40%		Mil	40%					Mil	85%		Mil	50%		Mil	40%
		85%	50%		85%	50%					85%	0%		85%	50%		85%	45%
5000A-10k	10%	MAX	10%				5%	MAX	5%	5%	MAX	10%				15%	MAX	5%
		Mil	40%					Mil	35%		Mil	90%					Mil	45%
		85%	50%					85%	60%		85%	0%					85%	40%
2000a-5000a	5%	MAX	20%				20%	MAX	10%	3%	MAX	10%				20%	MAX	5%
		Mil	40%					Mil	45%		Mil	90%					Mil	60%
		85%	40%					85%	45%		85%	0%					85%	35%
500a-2000a	15%	MAX	20%				75%	MAX	10%	2%	MAX	10%				40%	MAX	5%
		Mil	40%					Mil	60%		Mil	90%					Mil	65%
		85%	40%					85%	30%		85%	0%					85%	30%
	100%			100%			100%			100%			100%			100%		

Transient sorties represent the intermittent use of the airspace by a range of aircraft not based at Holloman AFB including FA-18C, F-16, F-15 and other fighter aircraft. The modeling surrogate for these transient aircraft is the FA-18C. Twenty percent of the transient sorties utilize the Talon Low MOA, and the rest are in the Talon East and West MOAs/ATCAAs. Ten percent of their activity is during nighttime hours (10 p.m. until 7 a.m.). Transient aircraft are modeled with similar altitude requirements to those of the F-16, as depicted in **Tables 3.1-2 and 3.1-3.**

Transient aircraft use of the proposed airspace is included to ensure that the full cumulative effects are represented in the analysis. Transient aircraft are those that schedule and use the airspace, but are not based at Holloman AFB. Some squadrons operate on a temporary basis in various locations in order to take advantage of training opportunities that may be different than those at their home locations. With the expectation that optimization of the proposed airspace would probably increase the number of transient users, the Air Force estimated that the number of annual transient sorties would be as many as 1,000 per year. One of the typical users of the existing airspace associated with Holloman AFB is the Canadian Air Force (FA-18 aircraft), who participate in local training as a part of bilateral training events and other detachments. Other transient sorties by aircraft such as F-15 and F-16 would also be expected and are included in the overall 1,000 sortie number.

In addition to the regular use of training airspace, there are MTRs that cross the study area (**Figures 3.1-1 and 3.1-2**). Four different MTRs in the region have regular use. **Table 3.1-4** shows the number of annual sorties on each of the MTRs.

Table 3.1-4. Baseline Annual MTR usage in the Region

MTR	Associated Airspace	Aircraft	Annual Sorties
VR-176	Existing and proposed Cato/Smitty MOA Proposed Lobos MOA	F-16[1]	223
		C-130[2]	34
IR-192	Existing and proposed Talon MOA	F-16[1]	17
IR-194	Existing and proposed Talon MOA	F-16[1]	4
IR-195	Existing and proposed Talon MOA	F-16[1]	**6**

Notes [1.] F-16 accounts for two thirds of all jet aircraft, and is used as a surrogate for the other third, which includes A-10, AV-8, F-16, T-45, and T-38.

[2.] C-130 represents three quarters of all non-jet aircraft, and is used as a surrogate for the other quarter, that includes C-12, V-22, and T-6.

For the MTRs, the noise model calculated in both DNL and L_{dnmr} to determine whether onset-rate was significant. The results showed that these metrics were the same, due to the low numbers of sorties involved and the steady operations tempo. It is expected that MTR sorties could produce some "startle effect" for observers directly under the route, but the numbers of operations are small enough that the difference is incalculable on an annual basis (such as for DNL and $L_{dnmr)}$. The MTR noise results were added to the MOA results. While results are reported in the DoD-standard L_{dnmr}, it should be noted that in the case of this analysis, they are the same as DNL, due to the operations tempo being steady across the entire year. Therefore, these metrics are treated as equal throughout this document.

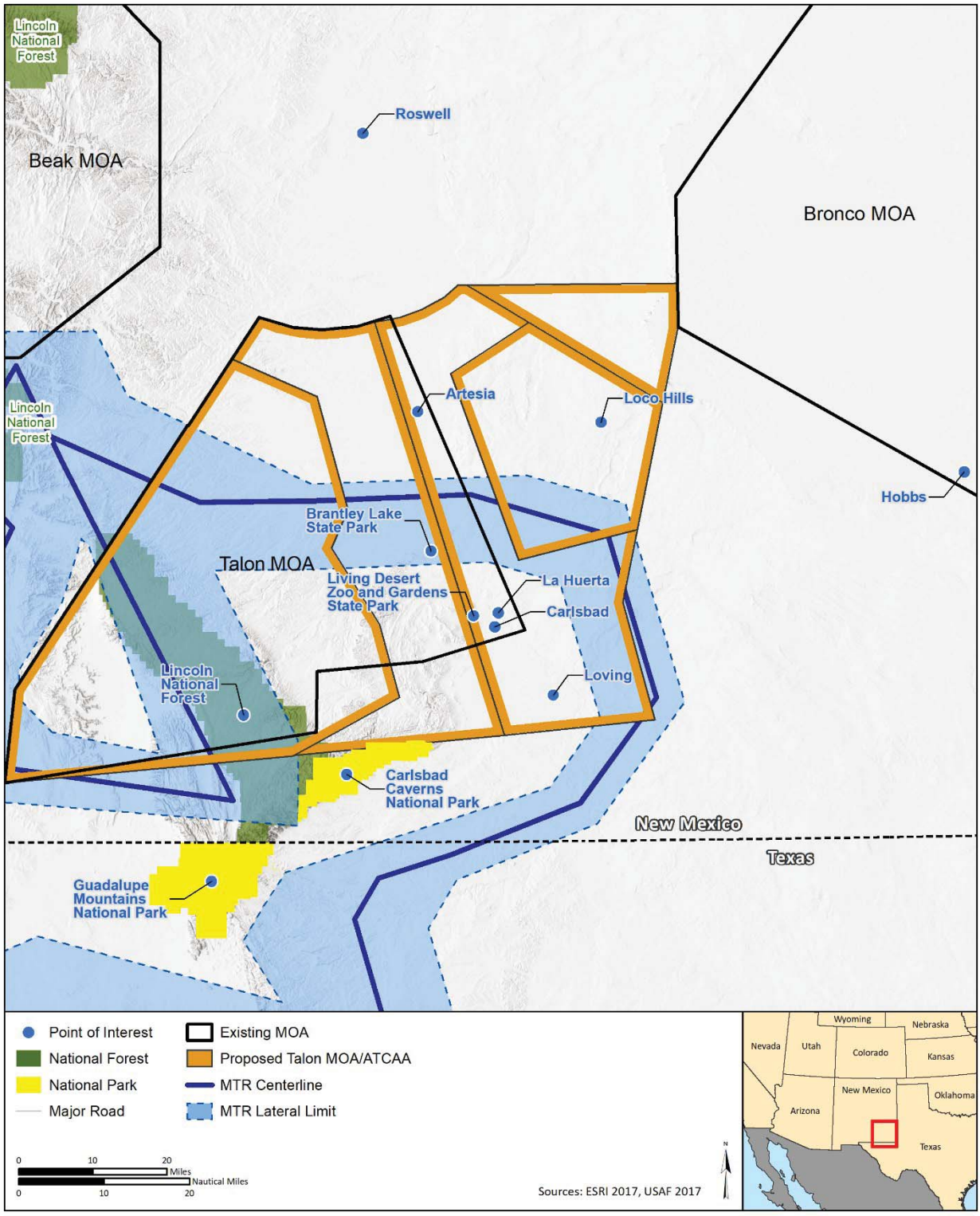


Figure 3.1-1. Points of Interest and Military Training Routes Transiting through Talon MOA

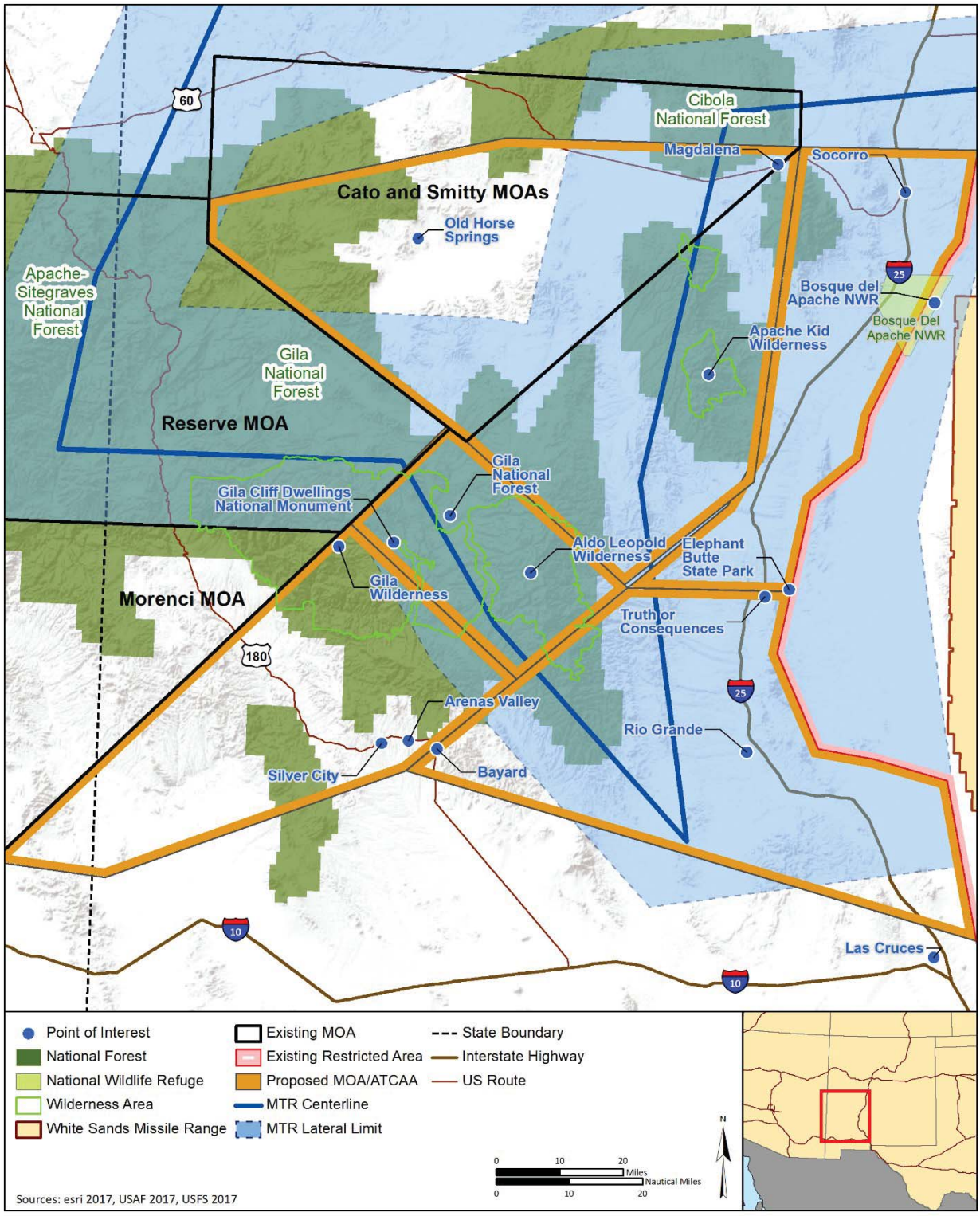


Figure 3.1-2. Points of Interest and Military Training Routes Transiting through West Airspace

3.2 SUBSONIC NOISE EXPOSURE

Table 3.2-1 shows the L_{dnmr} levels for baseline conditions within the existing Talon MOA airspace. **Figure 3.2-1** shows the existing Talon airspace used by Holloman AFB, as well at the MTRs that transit that airspace. The greatest L_{dnmr} value under the baseline conditions is 54 dB beneath the Talon Low MOA where the MTR crosses through the MOA. **Table 3.2-2** shows the calculated L_{dnmr} values for the 12 POIs identified within the vicinity of the Talon airspace. Lincoln National Forest experiences the highest L_{dnmr} values, at 53 dB, with the next highest L_{dnmr} value being 41 dB at Brantley Lake State Park and the town of La Huerta, New Mexico. Six of the 12 POIs have L_{dnmr} values of <35 dB.

There is currently no military aircraft operations within the Cato and Smitty MOAs, so there is no aircraft noise contribution from the MOA, however there is an MTR that transits the proposed Cato, Smitty, and Lobos MOAs as shown in **Figure 3.2-1.** The baseline condition in this area accounts for the aircraft activity along the MTR (**Table 3.2-2**). The noise levels computed in **Table 3.2-2** 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 (American National Standards Institute [ANSI] 2013).

MRNMap software does not calculate values below 35dB 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 35dB 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 35dB. 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. The majority values reported as less than 35 dB are actually very close to zero, but some would be closer to 35 dB and may be perceptible under the right circumstances when no masking noise is present. It is important to note that the model only accounts for aircraft generated noise and does not take into account any ambient, or background noise that exists.

Table 3.2-1. Baseline L_{dnmr} Beneath SUA

Existing Airspace	Baseline L_{dnmr} (dBA)
Talon East MOA/ATCAA	41
Talon West MOA/ATCAA	47
Talon Low MOA	54

Source: Cardno 2019.
Legend: dBA = A-weighted decibel; Onset-Rate Adjusted Day-Night Average Sound Level; ATCAA=Air Traffic Control Assigned Airspace; MOA=Military Operations Area.

Table 3.2-2. Baseline Noise Attributable to Aircraft Modeled for Points of Interest beneath or near Proposed Airspace	
Name	**L_{dnmr} (dBA)**
Eastern Points of Interest	
Carlsbad, New Mexico	40
Artesia, New Mexico	40
Loving, New Mexico	<35
Loco Hills, New Mexico	<35
La Huerta, New Mexico	40
Hobbs, New Mexico	<35
Roswell, New Mexico	<35
Carlsbad Caverns National Park	<35
Guadalupe Mountains National Park	<35
Lincoln National Forest	53
Living Desert Zoo and Gardens State Park	41
Brantley Lake State Park	41
Western Points of Interest	
Gila Cliff Dwellings National Monument	<35
Socorro, New Mexico	<35
Truth or Consequences, New Mexico	<35
Las Cruces, New Mexico	<35
Magdalena, New Mexico	<35
Bayard, New Mexico	<35
Old Horse Springs, New Mexico	<35
Arenas Valley, New Mexico	<35
Silver City, New Mexico	<35
Gila Wilderness	<35
Elephant Butte State Park	<35
Gila National Forest	49
Aldo Leopold Wilderness	<35
Apache Kid Wilderness	45
Bosque del Apache National Wildlife Refuge	<35
Rio Grande	<35

Source: Cardno 2019.
Note: These L_{dnmr} values are equal to the calculated DNL values as explained earlier.
Legend: dB = decibel; L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level.

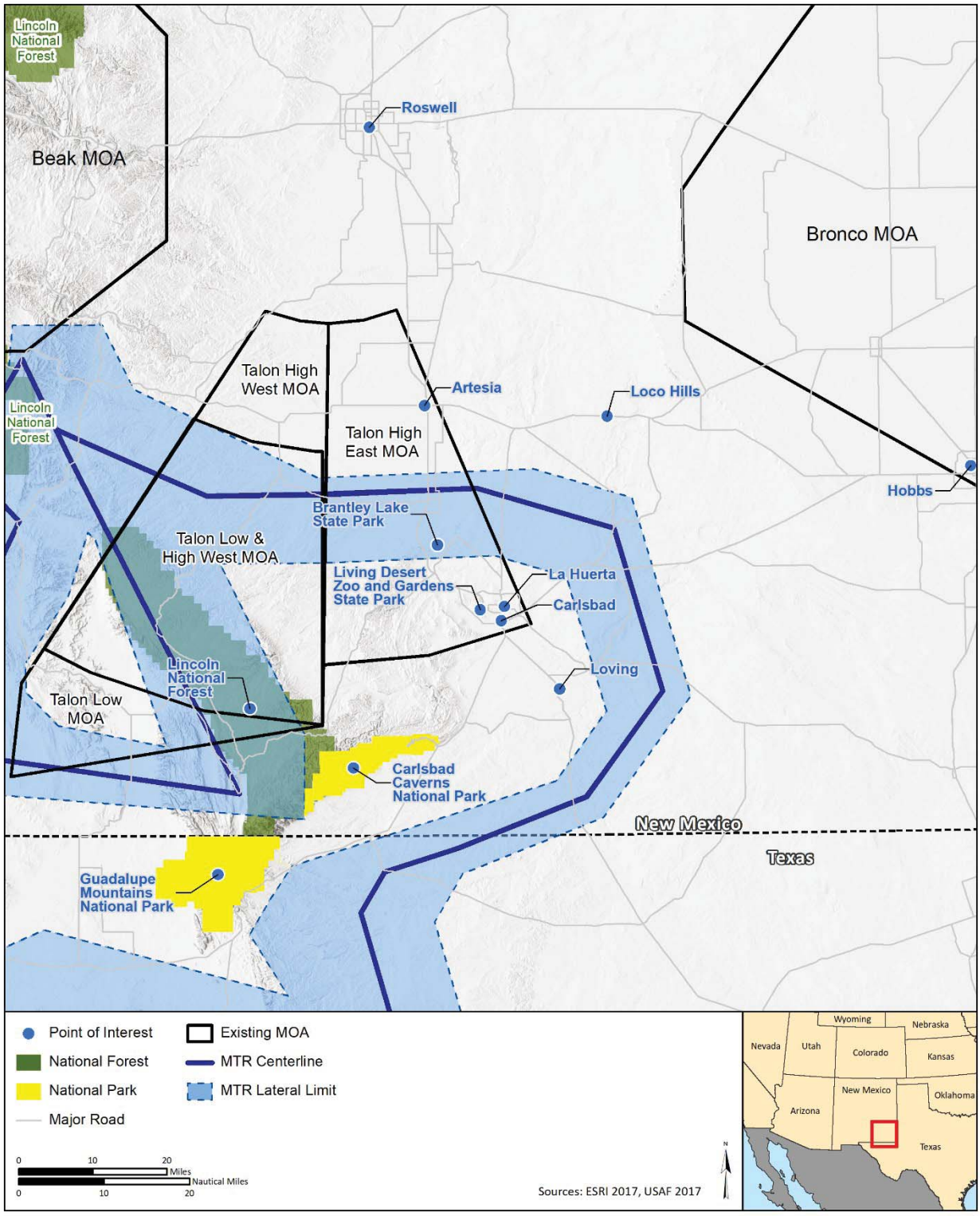


Figure 3.2-1. Existing Talon Airspace under Baseline Conditions

3.3 SUPERSONIC MODELING DATA

The majority of existing Holloman AFB-based F-16 supersonic activity occurs in the WSMR airspace and ranges, which are not part of this study. The annual supersonic sorties in the existing Talon East/West ATCAAs are shown in **Table 3.3.1**.

Table 3.3-1 Baseline Supersonic Sorties

Airspace	*F-16 Sorties*
Talon East/West ATCAA	60

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

3.4 SUPERSONIC NOISE EXPOSURE

Table 3.4-1 shows the calculated baseline supersonic noise values. The small number of baseline supersonic sorties result in the CDNL being less than 35dB at all of the points of interest for the Talon airspace.

Table 3.4-1. Baseline Values

Description	Baseline CDNL(dB)
Carlsbad, New Mexico[1]	<35
Artesia, New Mexico[1]	<35
Loving, New Mexico[2]	<35
Loco Hills, New Mexico[2]	<35
La Huerta, New Mexico[1]	<35
Hobbs, New Mexico[3]	<35
Roswell, New Mexico[3]	<35
Carlsbad Caverns National Park[2]	<35
Guadalupe Mountains National Forest[3]	<35
Lincoln National Forest[1]	<35
Living Desert Zoo and Gardens State Park[1]	<35
Brantley Lake State Park[1]	<35

Notes: [1]Lies beneath existing and proposed Talon MOA.
[2]Lies beneath proposed Talon MOA.
[3]Does not lie beneath existing or proposed Talon MOA.

4.0 ALTERNATIVE 1 SCENARIO

This section details the modeling data and the expected noise exposure for Alternative 1, where F-16s based at Holloman AFB would use the reconfigured Talon airspace for training. The use of the Talon MOAs would increase from baseline levels to 10,000 sorties by F-16 aircraft from Holloman AFB. **Figure 4.1-1** shows the reconfigured Talon MOAs under Alternative 1. All other aircraft operations remain unchanged from those described in **Section 3.0**, *Baseline Conditions*.

4.1 SUBSONIC MODELING DATA

Table 4.1-1 summarizes total aircraft activity in the Proposed Talon MOA/ATCAAs which includes 10,000 sorties per year. Approximately 90 percent of operations would occur during environmental day (7 a.m. to 10 p.m.). Transient sorties represent the intermittent use of the airspace by a range of aircraft not based at Holloman AFB including FA-18C, F-16, F-15 and other fighter aircraft. The modeling surrogate for these transient aircraft is the FA-18C. The overall number of transient operations does not change from the baseline, however these sorties would occur within the new Talon airspace boundaries resulting in low altitude transient sorties being dispersed throughout the Talon Low A and Talon Low B MOAs. Ten percent of transient activity would occur during nighttime hours (10 p.m. to 7 a.m.). Transient aircraft are modeled with similar altitude profiles as those of the F-16, as depicted previously in **Tables 3.1-2 and 3.1-3.**

Table 4.1-1. Alternative 1 Proposed Annual Operations

Airspace	F-16 Sorties	Transient Sorties
Talon High A MOA/ATCAA	4,025	533
Talon High B MOA/ATCAA	2,012	267
Talon High A/B/C MOA/ ATCAA	275	-
Talon Low A MOA	2,571	100
Talon Low B MOA	1,117	100
Totals	**10,000**	**1,000**

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

As with the baseline, the Alternative 1 model is based on annual operations instead of a busy month because Holloman is a training base that would have an even training tempo, with no large spikes in operational activity. MTR usage included in the baseline would continue to occur under Alternative 1 and is accounted for in the model (see **Table 3.1-4**).

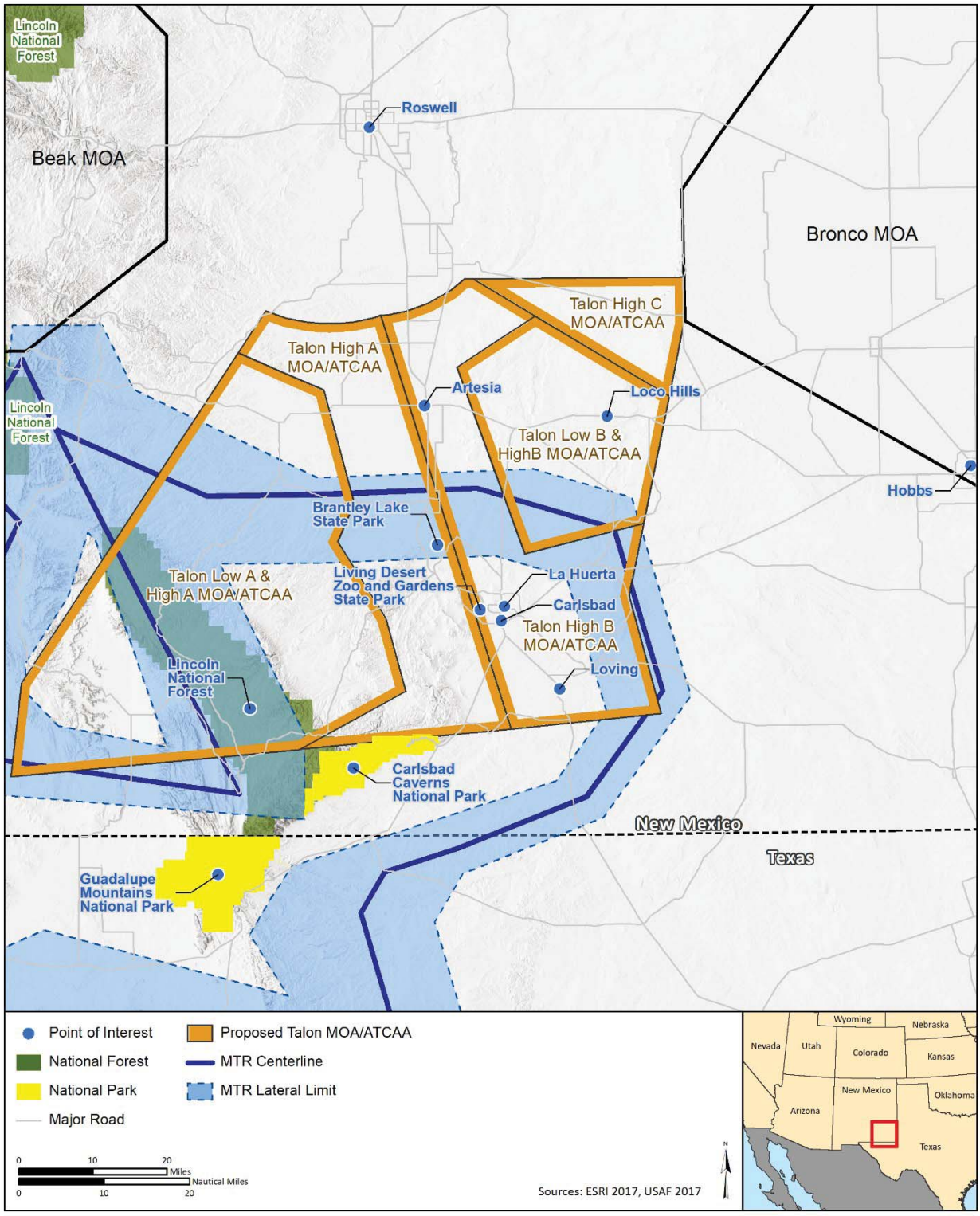


Figure 4.1-1. Proposed Talon Airspace under Alternative 1

4.2 SUBSONIC NOISE EXPOSURE

Table 4.2-1 shows the L_{dnmr} levels for baseline conditions and Alternative 1 within the existing and proposed Talon MOA/ACTAA. While a direct comparison cannot be made between the airspace, as Alternative 1 would reconfigure the size and shape of the Talon airspace, the greatest L_{dnmr} value under Alternative 1 would be 58 dB within the Talon High B/Low B MOA/ATCAA. This would represent an increase of 4 dB from the existing Talon Low MOA which has a baseline L_{dnmr} of 54 dB (see **Table 3.2-1**). However, when comparing the reconfigured areas of airspace, the greatest change in DNL occurs under the Talon High B/Low B MOA (planes would use both areas during one training event), with an increase in DNL of 15 dB. While this increase in DNL is large, all values would remain well below the 65 dB threshold used by the DoD for land use planning restrictions with regard to noise. **Table 4.2-2** shows the calculated L_{dnmr} values for the 12 POIs identified within the vicinity of proposed Talon airspace. The community of Loco Hills and the Lincoln National Forest would experience the highest L_{dnmr} values, at 56 dB. The greatest calculable increase in L_{dnmr} would occur with Lincoln National Forest, with an increase of 3 dB. For Loving and Loco Hills, there would be an increase in aircraft generated noise. However, the increase cannot be calculated because the baseline values are below what the noise model can reliably predict (values below 35 dB). Because the baseline value is unknown, a change value cannot be calculated.

The noise levels computed in **Table 4.2-2** 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).

Table 4.2-1. Projected Noise Levels Attributable to Aircraft Operations in Talon MOA under Alternative 1

Proposed Airspace Unit	Baseline L_{dnmr} (dBA)	Projected L_{dnmr} (dBA)
Talon High A/Low A MOA	54	57
Talon High A MOA	47	47
Talon High B/Low B MOA	43	58
Talon High B MOA	47	47
Talon High CMOA	<35	39

Source: Cardno 2019.

Legend: MOA – Military Operations Area; dBA = A-weighted decibel; L_{dnmr} = Onset-Rate Adjusted Day-Night Average Sound Level.

Table 4.2-2. Baseline and Projected Noise Levels Attributable to Aircraft Operations at Selected Points of Interest Beneath or Near Talon MOA under Alternative 1		
Name	**Baseline L_{dnmr} (dBA)**	**Projected L_{dnmr} (dBA)**
Carlsbad, New Mexico[1]	40	42
Artesia, New Mexico[1]	40	42
Loving, New Mexico[2]	<35	42
Loco Hills, New Mexico[2]	<35	56
La Huerta, New Mexico[1]	41	42
Hobbs, New Mexico[3]	<35	<35
Roswell, New Mexico[3]	<35	<35
Carlsbad Caverns National Park[2]	<35	<35
Guadalupe Mountains National Forest[3]	<35	<35
Lincoln National Forest[1]	53	56
Living Desert Zoo and Gardens State Park[1]	41	41
Brantley Lake State Park[1]	41	42

Source: Cardno 2019.
Notes: [1]Lies beneath existing and proposed Talon MOA, [2]Lies beneath proposed Talon MOA, [3]Does not lie beneath existing or proposed Talon MOA.
Legend: dB = decibel; L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level.

4.3 SUPERSONIC MODELING DATA

Under Alternative 1, with increased use of the reconfigured Talon ATCAAs, supersonic training would occur more frequently. **Table 4.3-1** shows the numbers of training sorties that would include supersonic flight. There would be no supersonic flight in the MOAs.

Table 4.3-1 Alternative 1 Supersonic Sorties	
Airspace	***Sorties***
Talon A ATCAA	403
Talon B ATCAA	201
Talon ABC ATCAAs	275
Total	**879**

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

4.4 SUPERSONIC NOISE EXPOSURE

With increased number of supersonic sorties in the airspace, there would be an increase in the number of sonic boom events. 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 inside the depicted CDNL contours would experience some infrequent, low-level booms. Under this proposal, the aircraft would be supersonic only at high altitudes, reducing the impact on the ground. **Figure 4.4-1** shows the predicted CDNL contours attributed to annual supersonic activity for Alternative 1. CDNL values gradually increase toward the center of the airspace, but do not exceed 42 CDNL.

Table 4.4-1 shows the resulting CDNL values at the POIs in the vicinity of the Talon MOA. The projected CDNL from sonic booms would have no quantifiable change at 9 of the 12 POIs. There would be minor increases at the remaining 3 POIs. Noise at this level is difficult to accurately measure and would not be

perceptibly different from the baseline conditions. Of the 12 POIs in the area potentially affected by Alternative 1, none would experience a CDNL value greater than 38 dB from the proposed operations.

Table 4.4-1. Baseline and Proposed CDNL at Points of Interest

Description	Baseline CDNL(dBC)	Alternative1 CDNL(dBC)
Carlsbad, New Mexico[1]	<35	35
Artesia, New Mexico [1]	<35	38
Loving, New Mexico [2]	<35	<35
Loco Hills, New Mexico [2]	<35	<35
La Huerta, New Mexico [1]	<35	36
Hobbs, New Mexico [3]	<35	<35
Roswell, New Mexico [3]	<35	<35
Carlsbad Caverns National Park[2]	<35	<35
Guadalupe Mountains National Forest[3]	<35	<35
Lincoln National Forest[1]	<35	<35
Living Desert Zoo and Gardens State Park[1]	<35	<35
Brantley Lake State Park[1]	<35	<35

Notes: [1]Lies beneath existing and proposed Talon MOA.
[2]Lies beneath proposed Talon MOA.
[3]Does not lie beneath existing or proposed Talon MOA.

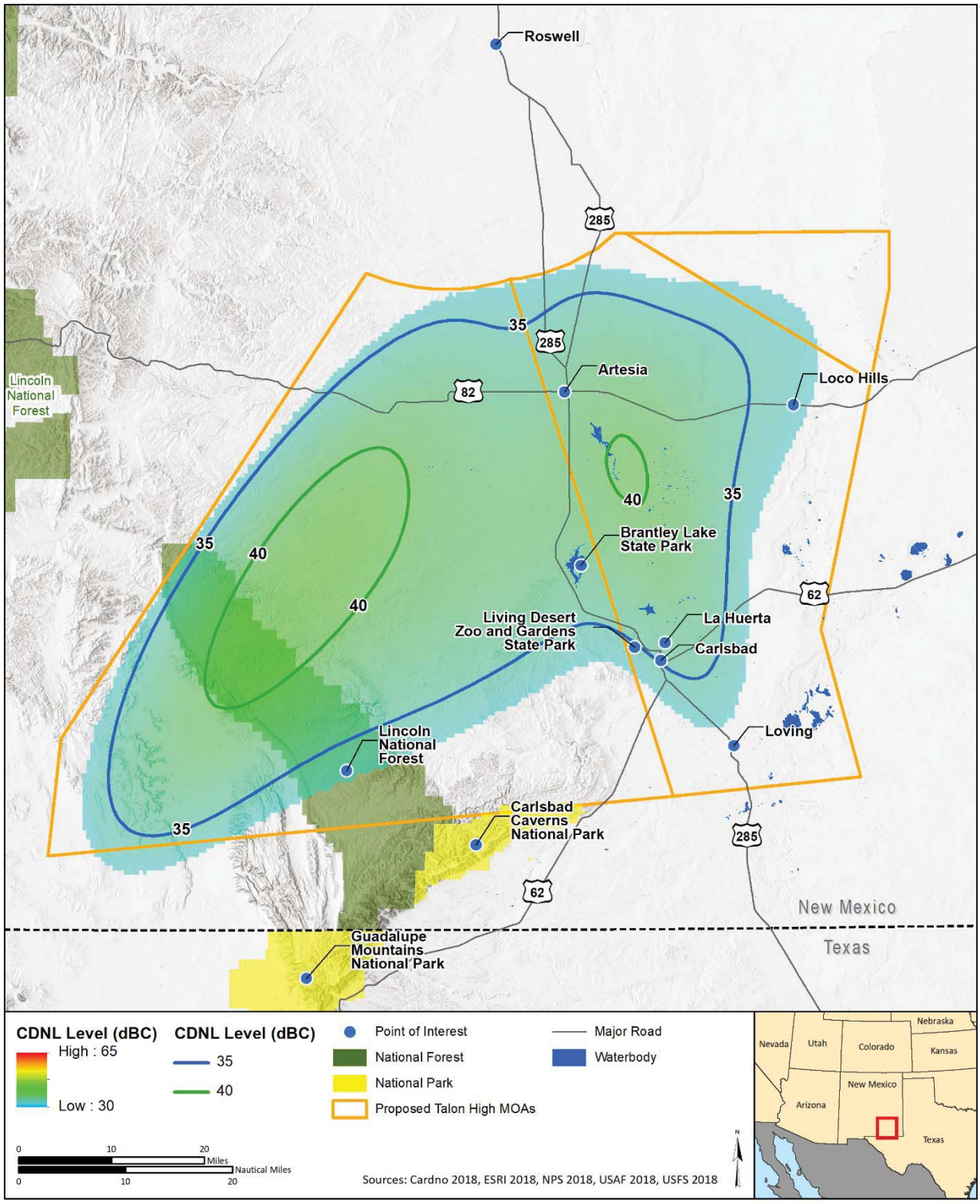


Figure 4.4-1. CDNL Contours under Alternative 1

5.0 ALTERNATIVE 2 SCENARIO

This section details the modeling data and the resultant noise exposure for the Alternative 2 scenario, in which F-16s from Holloman AFB would use new and reconfigured airspace to the west of WSMR restricted areas (consisting of a reconfigured Smitty MOA and Cato MOA/ATCAA; and new Lobos Low MOA, Lobos High MOA/ATCAA, and Christa and Kendra ATCAAs), as well as continuing to use the existing Talon MOA. The total use of all of this airspace would increase to 10,000 sorties by F-16s from Holloman AFB. Reconfigured airspace is shown in **Figure 5.1-1**.

5.1 SUBSONIC MODELING DATA

Table 5.1-1 summarizes total aircraft activity in the existing Talon MOAs/ATCAAs and the proposed Lobos and reconfigured Cato/Smitty MOAs and ATCAAs, which includes 10,000 F-16 training sorties per year. Approximately 90 percent of operations would occur during daytime hours (7 a.m. to 10 p.m.).

Transient aircraft would use the reconfigured Cato/Smitty MOAs/ATCAA and the proposed Lobos Low/High MOAs/ATCAA, but not the Christa or Kendra ATCAAs. There are 300 transient sorties listed in **Table 5.1-1** using only the Lobos High MOA/ATCAA. These sorties represent F-35A aircraft from Davis-Monthan AFB, which would be expected to use the Lobos High MOA/ATCAA occasionally if it were created. The remaining 1,000 transient sorties modeled in the larger area represent all the other transient use of the airspace (other military aircraft not based at Holloman AFB). The transient aircraft could use the airspace intermittently and include a variety of fighter aircraft. This analysis used a modeling surrogate of FA-18C for these transient aircraft. Ten percent of transient activity would be during nighttime hours (10 p.m. to 7 a.m.). Transient aircraft (except F-35A) were modeled with similar altitude requirements to those of the F-16 aircraft from Holloman AFB, as depicted previously in **Tables 3.1-2 and 3.1-3**. F-35A would only use high altitudes in this area, and were modeled only in the Lobos High MOA and Lobos A/B/C ATCAAs.

Table 5.1-1. Alternative 2 Proposed Annual Operations

Airspace	F-16 Sorties	Transient Sorties
Existing Talon MOAs/ATCAAs	831	0
Cato and Lobos High MOAs and Cato and Christa ATCAAs	4,064	0
Smitty MOA	2,867	0
Lobos High MOA with Lobos and Kendra ATCAAs	1,522	0
Lobos Low MOA	716	0
Cato/Smitty/Lobos High/Lobos Low MOAs and ATCAAs		1,000[2]
Lobos High MOA/ATCAA		300[1]
Totals	**10,000**	**1,300**

Notes: [1] F-35A from Davis-Monthan AFB, using only Lobos High MOA/ATCAA.
[2] Rest of fighter transients, including A-10, AV-8, F-16, F-15, and F-18.
Legend: ATCAA=Air Traffic Control Assigned Airspace; MOA=Military Operations Area.

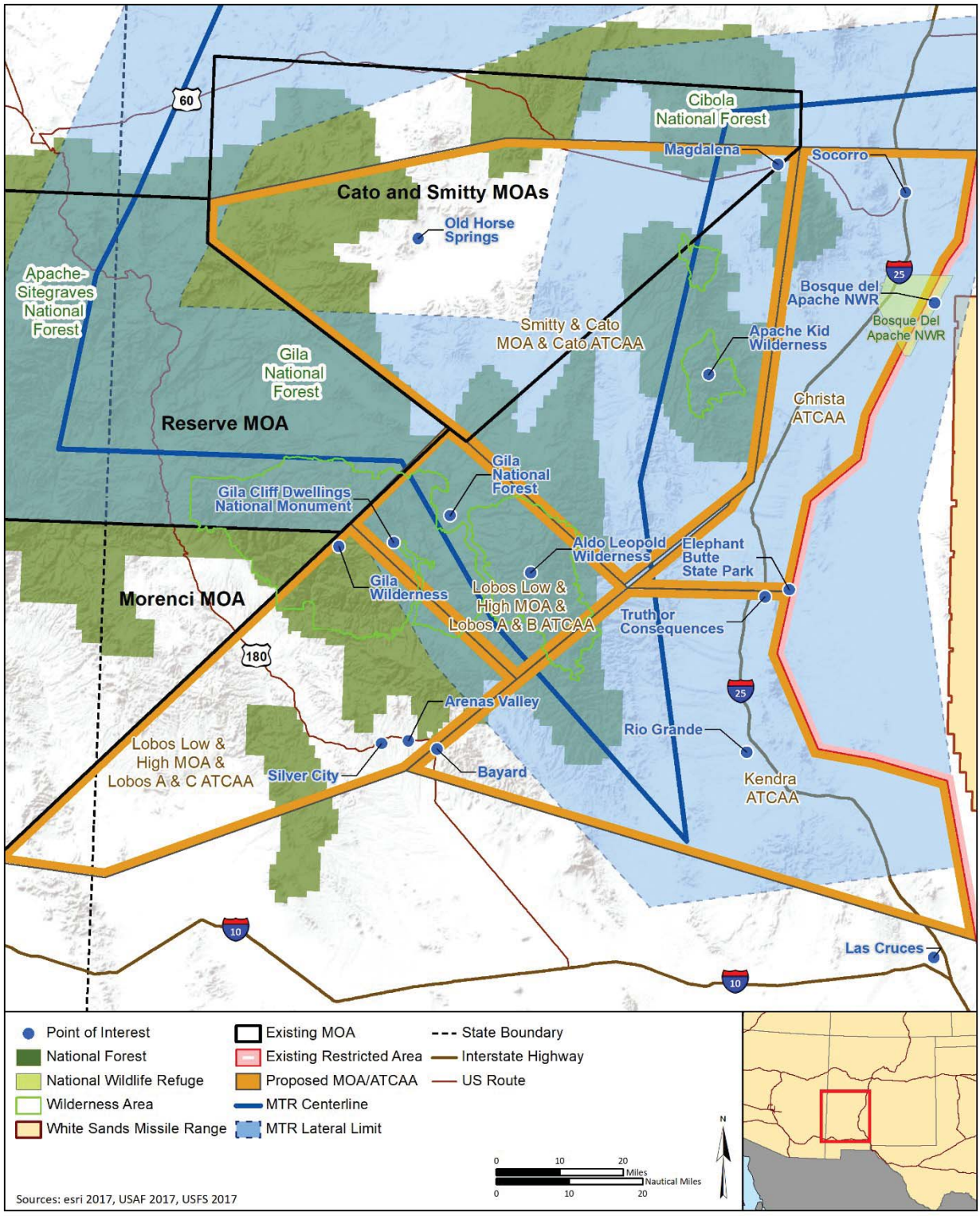


Figure 5.1-1. Reconfigured Airspace under Alternative 2

As with the baseline, the Alternative 2 model is based on annual operations instead of a busy month. This is because Holloman AFB is a training base that would have an even training tempo, with no large spikes in operational activity. MTR usage included in the baseline would continue to occur under Alternative 2 and is accounted for in the model (see **Table 3.1-4**).

5.2 SUBSONIC NOISE EXPOSURE

Table 5.2-1 shows the change in L_{dnmr} levels between the baseline and Alternative 2 conditions within each of the MOAs/ATCAAs. The highest noise exposure would be within the reconfigured Cato and Smitty MOAs with an L_{dnmr} value of 55 dB. Because of existing altitude restrictions in the Smitty MOA (that would continue under Alternative 2), the western portion of the MOA is exposed to less noise than the east. However, the greatest change in DNL does occur in the western portion of the Cato and Smitty MOAs, showing an increase of at least 13 DNL.

Table 5.2-2 shows the calculated L_{dnmr} values for the POIs identified within the proposed SUA. Under Alternative 2, the greatest exposure would be 52 dB at Gila National Forest. All values would remain well below the 65 dB threshold used by the DoD for land use planning restrictions with regard to noise. Eight of the POIs show no change.

The noise levels computed in **Tables 5.2-2 and 5.2-3** 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).

Table 5.2-1. Projected Noise Levels Attributable to Aircraft Operations in Proposed SUA under Alternative 2

Proposed Airspace Unit	Baseline L_{dnmr} (dBA)	Projected L_{dnmr} (dBA)
Cato and Smitty MOAs	47	55
Cato and Smitty MOA West[1]	<35	48
Lobos MOA	50	53
Christa ATCAA	50	50
Kendra ATCAA	50	50

Note*:* [1]Western corner of Cato and Smitty MOA with altitude floor of 1,600 feet AGL.
Legend: MOA = Military Operations Area; ATCAA = Air Traffic Control Assigned Airspace; DNL = Day-Night Average Sound Level; dBA = A-weighted decibel; L_{dnmr} = Onset Rate Adjusted Day-Night Average Sound Level.

Table 5.2-2. Baseline and Projected Noise Levels Attributable to Aircraft Operations in Proposed SUA at Selected Points of Interest under Alternative 2		
Name	**Baseline L_{dnmr} (dBA)**	**Projected L_{dnmr} (dBA)**
Gila Cliff Dwellings National Monument[1]	<35	49
Socorro, New Mexico[2]	<35	<35
Truth or Consequences, New Mexico [2]	<35	<35
Las Cruces, New Mexico [2]	<35	<35
Magdalena, New Mexico [3]	<35	50
Bayard, New Mexico [2]	<35	<35
Old Horse Springs, New Mexico [3]	<35	50
Arenas Valley, New Mexico [1]	<35	47
Silver City, New Mexico [1]	<35	47
Gila Wilderness Area[1]	<35	49
Elephant Butte State Park[2]	<35	<35
Gila National Forest[1]	49	52
Aldo Leopold Wilderness[1]	<35	49
Apache Kid Wilderness[3]	45	49
Bosque del Apache National Wildlife Refuge[2]	<35	<35
Rio Grande[2]	<35	<35

Source*:* Cardno 2019.
Note: [1]Lies beneath proposed Lobos MOA.
[2]Lies outside existing or proposed MOAs.
[3]Lies beneath existing and proposed MOAs.

5.3 SUPERSONIC MODELING DATA

Under Alternative 2, with increased use of the newly configured Cato ATCAA, and the establishment of the Lobos ATCAA, Christa ATCAA, and Kendra ATCAA, supersonic training would occur more frequently. **Table 5.3-1** shows the numbers of training sorties in Alternative 2 that would include supersonic flight. There would be no supersonic flight in the MOAs.

Table 5.3-1 Alternative 2 Supersonic Sorties	
Airspace	**F-16 Sorties**
Cato ATCAA & Christa ATCAA	355
Lobos ATCAA & Kendra ATCAA	152
Cato and Lobos ATCAAs & Christa ATCAA	514
Total	**1,021**

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

5.4 SUPERSONIC NOISE EXPOSURE

With increased number of supersonic sorties in the airspace, there would be an increase in the number of sonic boom events. The standard measure of noise levels produced by supersonic flight is CDNL, the average of all sound energy produced by supersonic flight. 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. Under this proposal, the aircraft would be supersonic only at high altitudes, reducing the impact on the ground. **Figure 5.4-1** shows the CDNL level predicted under Alternative 2, which shows that CDNL increases gradually toward the center of the airspace, but does not

exceed 42 CDNL. These low values are due to the relatively low number of supersonic operations, the altitudes proposed for these operations, and the large area of the airspace.

Table 5.4-1 presents the baseline and projected CDNL attributed to supersonic aircraft activity at the POIs associated with Alternative 2. The highest CDNL values are 40 dB and are seen at Gila National Forest, Aldo Leopold Wilderness, and Apache Kid Wilderness. The projected noise levels attributed to supersonic activity would remain unchanged at 6 of the 17 POIs. The remaining 11 POIs would have a slight increase in noise attributable supersonic flights.

Table 5.4-1. Baseline and Proposed CDNL at Points of Interest

Description	Baseline CDNL (dBC)	Alternative 2 CDNL (dBC)
Gila Cliff Dwellings[1]	<35	39
Socorro[2]	<35	36
Truth or Consequences[2]	<35	<35
Las Cruces[2]	<35	<35
Magdalena[3]	<35	37
Bayard[2]	<35	<35
Old Horse Springs[3]	<35	38
Arenas Valley[1]	<35	35
Silver City[1]	<35	36
Gila Wilderness[1]	<35	37
Elephant Butte State Park[2]	<35	<35
Gila National Forest[1]	<35	40
Aldo Leopold Wilderness[1]	<35	40
Apache Kid Wilderness[3]	<35	40
Bosque del Apache National Wildlife Refuge[2]	<35	35
Rio Grande[2]	<35	<35

Source: Cardno 2019.

Note: [1]Lies beneath proposed Lobos MOA.
[2]Lies outside existing or proposed MOAs.
[3]Lies beneath existing and proposed MOAs.
[4]Change in dB not calculated if baseline value was reported as <35, as that value is unknown.

Legend: dB = decibel; L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level.

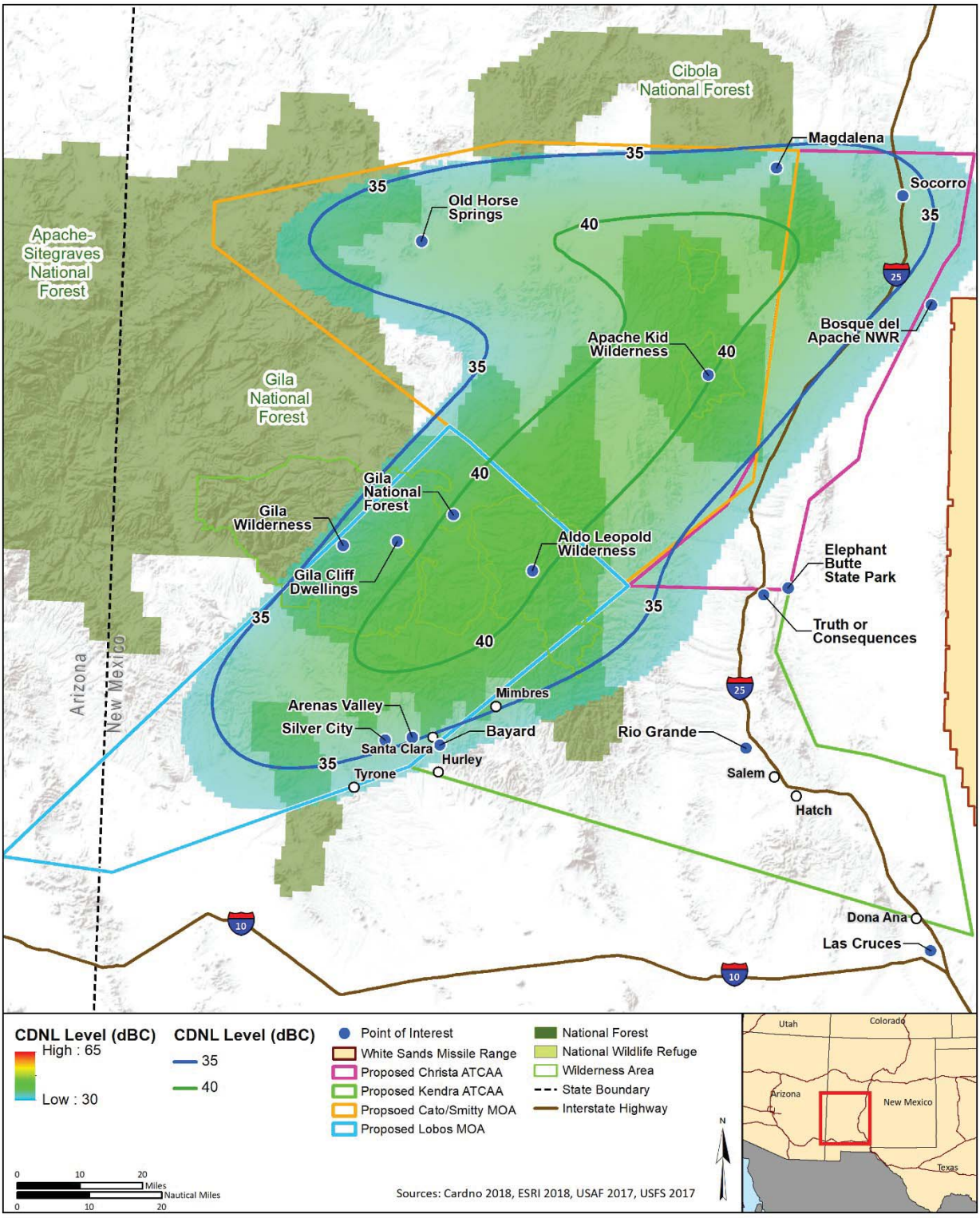


Figure 5.4-1. CDNL Contours under Alternative 2

6.0 ALTERNATIVE 3 SCENARIO

This section details the modeling data and the resultant noise exposure for the Alternative 3 scenario, in which F-16s from Holloman AFB would use new and reconfigured airspace to the west of WSMR restricted areas (consisting of a reconfigured Smitty MOA, Cato MOA/ATCAA, Lobos High MOA/ATCAA, and Christa and Kendra ATCAAs), as well as using the reconfigured Talon MOA/ATCAA. The use of all of the SUA by F-16s from Holloman AFB would increase to 10,000 sorties. In this alternative, there is no Lobos Low MOA, nor is there a Talon High C MOA/ATCAA. **Figures 6.1-1 and 6.1-2** show the reconfigured airspace for Alternative 3.

6.1 SUBSONIC MODELING DATA

Table 6.1-1 summarizes total aircraft activity in the reconfigured Talon MOA/ATCAA and the proposed Lobos, reconfigured Cato/Smitty MOAs and ATCAAs, and proposed Christa and Kendra ATCAAs. Approximately 90 percent of operations would occur during daytime hours (7 a.m. to 10 p.m.).

Transient sorties would use the reconfigured Cato/Smitty MOAs/ATCAA and the proposed Lobos High MOA/ATCAA in the western area, but not the Christa or Kendra ATCAAs. Additionally, there would be transient sorties in the reconfigured Talon MOA/ATCAAs. Just as in Alternative 2, there are 300 transient sorties by F-35A from Davis-Monthan AFB listed in **Table 6.1-1** that would use only the Lobos High MOA/ATCAA/ occasionally if it were created. The remaining transient sorties modeled in the larger area represent all the other transient use of the airspace (other military aircraft not based at Holloman AFB). The transient aircraft could use the airspace intermittently and include a variety of fighter aircraft. This analysis used a modeling surrogate of FA-18C for these transient aircraft. Ten percent of transient activity would be during nighttime hours (10 p.m. to 7 a.m.). Transient aircraft (except F-35A) are modeled with similar altitude requirements to those of the F-16, as depicted previously in **Tables 3.1-2 and 3.1-3**. F-35A would only use high altitudes in this Lobos High MOA and ATCAA.

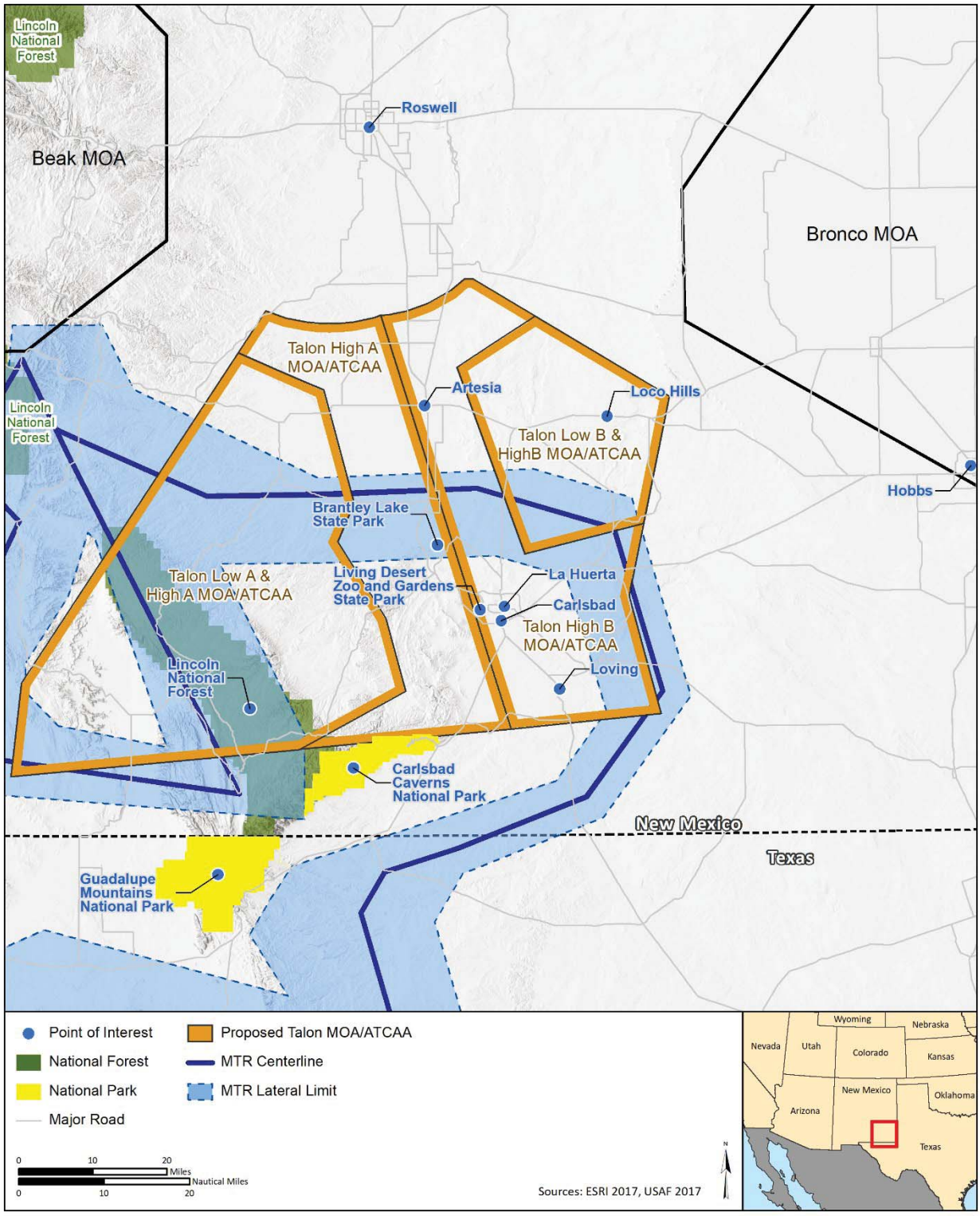


Figure 6.1-1. Proposed Eastern Airspace under Alternative 3

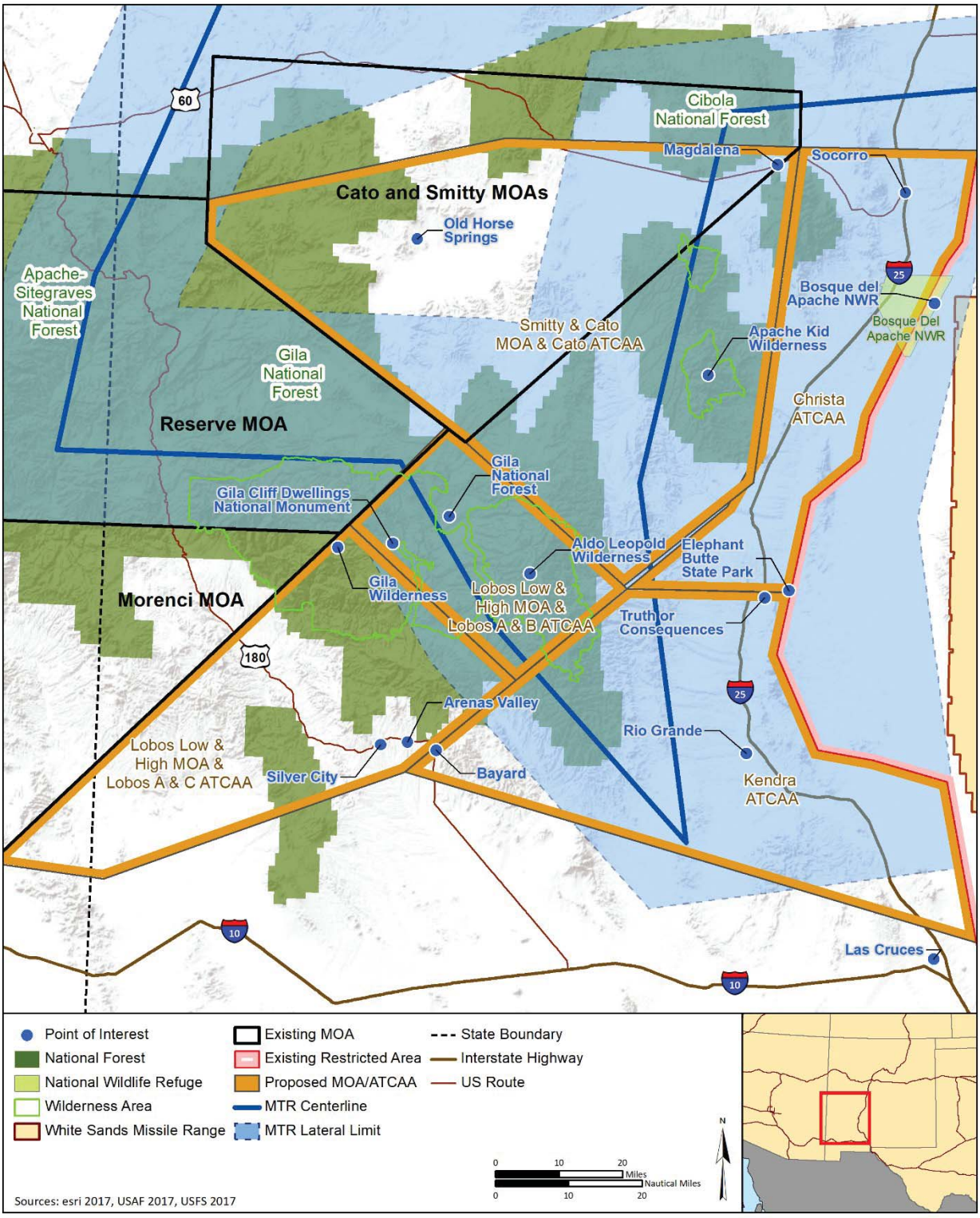


Figure 6.1-2. Proposed Western Airspace under Alternative 3

Table 6.1-1. Alternative 3 Proposed Annual Operations		
Airspace	**F-16 Sorties**	**Transient Sorties**
Talon High A MOA/ATCAA	2,818	373[2]
Talon High B MOA/ATCAA	1,409	187[2]
Talon Low A MOA	2,065	70[2]
Talon Low B MOA	516	70[2]
Cato MOA/ATCAA and Christa ATCAA	1,268	
Smitty MOA	1,106	
Lobos High MOA/ATCAA and Kendra ATCAA	543	
Lobos High MOA/ATCAA and Cato MOA/ATCAA and Christa ATCAA	275	
Cato/Smitty/Lobos High MOA and ATCAAs		300[2]
Lobos High MOA/ATCAA		300[1]
Totals	**10,000**	

Notes: [1] F-35A from Davis-Monthan AFB, using only Lobos High MOA/ATCAA.
[2] Rest of fighter transients, including A-10, AV-8, F-16, F-15, and F-18.
Legend: ATCAA-Air Traffic Control Assigned Airspace; MOA-Military Operations Area.

As with the baseline, the Alternative 3 model is based on annual operations instead of a busy month. This is because Holloman AFB is a training base that would have an even training tempo, without with no large spikes in operational activity. MTR usage included in the baseline would continue to occur under Alternative 3 and is accounted for in the model (see **Table 3.1-4**).

6.2 SUBSONIC NOISE EXPOSURE

Table 6.2-1 shows the calculated L_{dnmr} levels for the baseline and Alternative 3 within each of the MOA/ATCAAs. The highest noise exposure would be within the Talon MOAs with an L_{dnmr} value of 56 dB. The greatest change in DNL occurs within the Talon High B/Low B MOA, with a DNL change of 12 dB (43 dB to 55 dB DNL). While this change is large, the DNL value for the area is well below the 65 DNL threshold used by the DoD for land use recommendations.

The noise levels computed in **Table 6.2-1** 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 (ANSI 2013).

Table 6.2-1. Projected Noise Levels Attributable to Aircraft Operations in SUA under Alternative 3		
Proposed Airspace Unit	**Baseline L_{dnmr} (dBA)**	**Projected L_{dnmr} (dBA)**
Talon High A/Low A MOA	54	56
Talon High A Outside Low A MOA	47	47
Talon High B/Low B MOA	43	55
Talon High B Outside Low B MOA	47	47
Cato and Smitty MOAs	47	52
Cato and Smitty MOA West[1]	<35	43
Lobos High MOA	50	50
Kendra ATCAA	50	50
Christa ATCAA	50	50

Source: Cardno 2019.
Note: [1]Western corner of Cato and Smitty MOA with altitude floor of 1,600 feet AGL.
Legend: MOA = Military Operations Area; ATCAA = Air Traffic Control Assigned Airspace; dBA = A-weighted decibel; Ldnmr = Onset-Rate Adjusted Day-Night Average Sound Level.

Table 6.2-2 shows the calculated L_{dnmr} values for the 28 POIs identified within the vicinity of the proposed airspace. The projected L_{dnmr} at 18 of the POIs would remain unchanged under Alternative 3. Noise levels in the community of La Huerta, New Mexico and Living Desert Zoo and Gardens State Park would both decrease slightly under Alternative 3. The highest projected L_{dnmr} value occurs at Lincoln National Forest (55 dB). The greatest increase in L_{dnmr} value would occur at Loco Hills, New Mexico with a projected 53 dB.

Table 6.2-2. Baseline and Projected Noise Levels Attributable to Aircraft Operations at Selected Points of Interest under Alternative 3		
Name	**Baseline L_{dnmr} (dBA)**	**Projected L_{dnmr} (dBA)**
Eastern Points of Interest		
Carlsbad, New Mexico	40	40
Artesia, New Mexico	40	40
Loving, New Mexico	<35	40
Loco Hills, New Mexico	<35	53
La Huerta, New Mexico	41	40
Hobbs, New Mexico	<35	<35
Roswell, New Mexico	<35	<35
Carlsbad Caverns National Park	<35	<35
Guadalupe Mountains National Forest	<35	<35
Lincoln National Forest	53	55
Living Desert Zoo and Gardens State Park	41	39
Brantley Lake State Park	41	41
Western Points of Interest		
Gila Cliff Dwellings	<35	<35
Socorro, New Mexico	<35	<35
Truth or Consequences, New Mexico	<35	<35
Las Cruces, New Mexico	<35	<35
Magdalena, New Mexico	<35	45
Bayard, New Mexico	<35	<35
Old Horse Springs, New Mexico	<35	45
Arenas Valley, New Mexico	<35	<35
Silver City, New Mexico	<35	<35

Table 6.2-2. Baseline and Projected Noise Levels Attributable to Aircraft Operations at Selected Points of Interest under Alternative 3 (cont.)		
Name	**Baseline L_{dnmr} (dBA)**	**Projected L_{dnmr} (dBA)**
Gila Wilderness	<35	<35
Elephant Butte State Park	<35	<35
Gila National Forest	<35	<35
Aldo Leopold Wilderness	<35	<35
Apache Kid Wilderness	<35	39
Bosque del Apache National Wildlife Refuge	<35	<35
Rio Grande	<35	<35

Source: Cardno 2019.
Note: [1]Change in dB not calculated if baseline value was reported as <35, as that value is unknown.
Legend: dB = decibel; L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level.

6.3 SUPERSONIC MODELING DATA

Under Alternative 3, with increased use of the newly configured Cato ATCAA, the establishment of the Lobos, Christa, and Kendra ATCAAs in the west; and the reconfigured Talon ATCAA in the east, supersonic training would occur more frequently. **Table 6.3-1** shows the numbers of sorties in Alternative 3 that would use supersonic speeds during training flights. There would be no supersonic flight in the MOAs.

Table 6.3-1. Alternative 3 Supersonic Sorties	
Airspace	**F-16 Sorties**
Cato ATCAA & Christa ATCAA	127
Lobos ATCAA & Kendra ATCAA	54
Cato and Lobos ATCAAs & Christa ATCAA	275
Talon A ATCAA	282
Talon B ATCAA	141
Total	**879**

Legend: ATCAA=Air Traffic Control Assigned Airspace

6.4 SUPERSONIC NOISE EXPOSURE

Figures 6.4-1 and 6.4-2 show the CDNL level predicted under Alternative 3. Baseline CDNL values were below 35 CDNL, and therefore do not show up as contours. As can be seen, CDNL values gradually increase toward the center of the airspace, but do not exceed 39 CDNL in any of the airspace. These low values are due to the relatively low number of supersonic operations, the altitudes proposed for these operations, and the large area of the airspace.

Table 6.4-1 presents the baseline and projected CDNL attributed to supersonic aircraft activity at the POIs associated with Alternative 3. The majority of the POIs would have a projected CDNL value less than 35 dB. Four POIs would have a slight increase in noise attributable to supersonic flights, the highest value would be 38 dB. Noise at this level is difficult to accurately measure and would not be perceptibly different from the baseline conditions.

Table 6.4-1. Baseline and Projected Supersonic Noise Levels (CDNL) at Selected Points of Interest under Alternative 3		
Name	**Baseline CDNL (dBC)**	**Projected CDNL (dBC)**
Eastern Points of Interest		
Carlsbad, New Mexico	<35	<35
Artesia, New Mexico	<35	<35
Loving, New Mexico	<35	<35
Loco Hills, New Mexico	<35	<35
La Huerta, New Mexico	<35	<35
Hobbs, New Mexico	<35	<35
Roswell, New Mexico	<35	<35
Carlsbad Caverns National Park	<35	<35
Guadalupe Mountains National Forest	<35	<35
Lincoln National Forest	<35	<35
Living Desert Zoo and Gardens State Park	<35	<35
Brantley Lake State Park	<35	<35
Western Points of Interest		
Gila Cliff Dwellings	<35	37
Socorro, New Mexico	<35	<35
Truth or Consequences, New Mexico	<35	<35
Las Cruces, New Mexico	<35	<35
Magdalena, New Mexico	<35	<35
Bayard, New Mexico	<35	<35
Old Horse Springs, New Mexico	<35	<35
Arenas Valley, New Mexico	<35	<35
Silver City, New Mexico	<35	<35
Gila Wilderness	<35	<35
Elephant Butte State Park	<35	<35
Gila National Forest	<35	38
Aldo Leopold Wilderness	<35	37
Apache Kid Wilderness	<35	37
Bosque del Apache National Wildlife Refuge	<35	<35
Rio Grande	<35	<35

Source: Cardno 2019.
Legend: dB = decibel; CDNL = C-weighted Day-Night Average Sound Level.

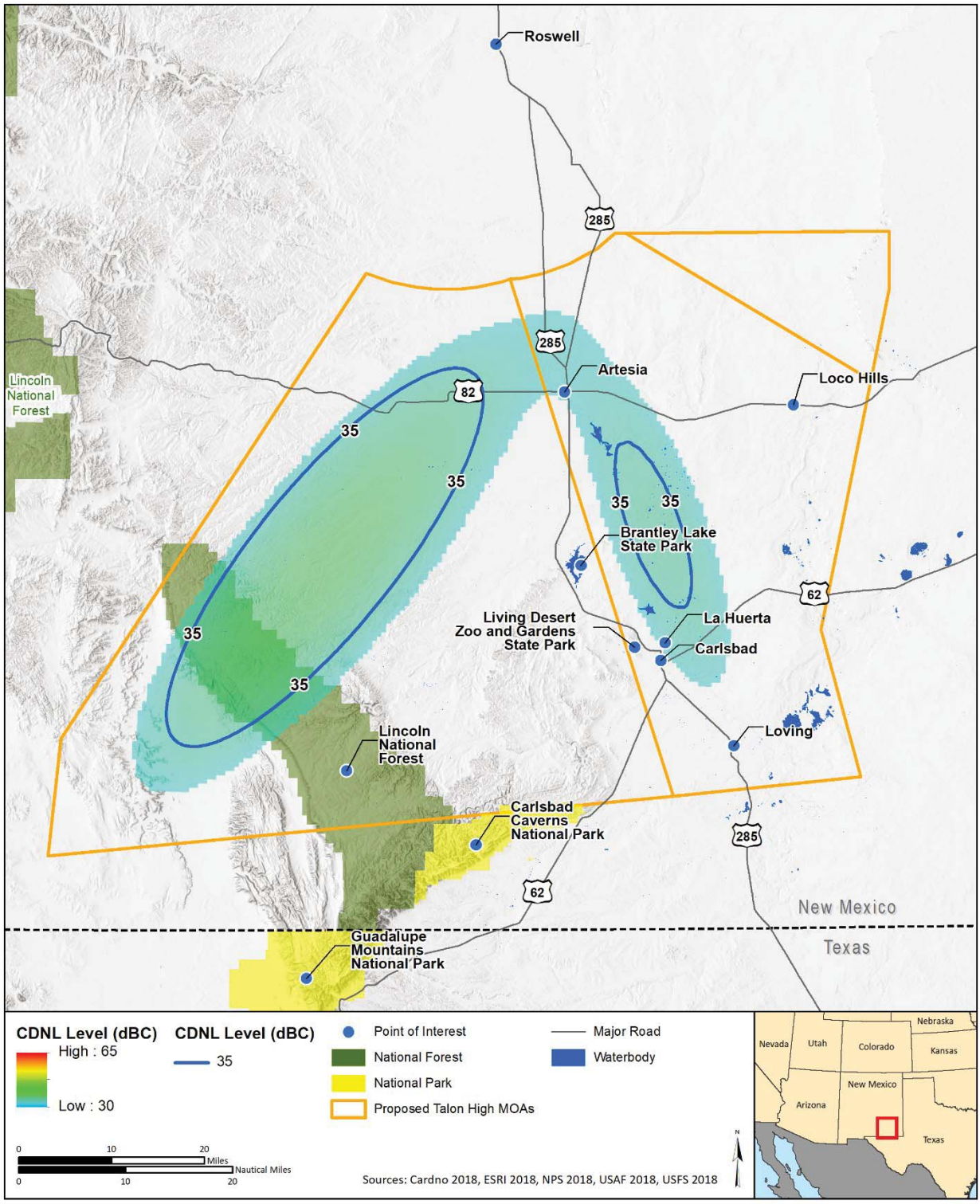


Figure 6.4-1. CDNL Contours under Alterantive 3

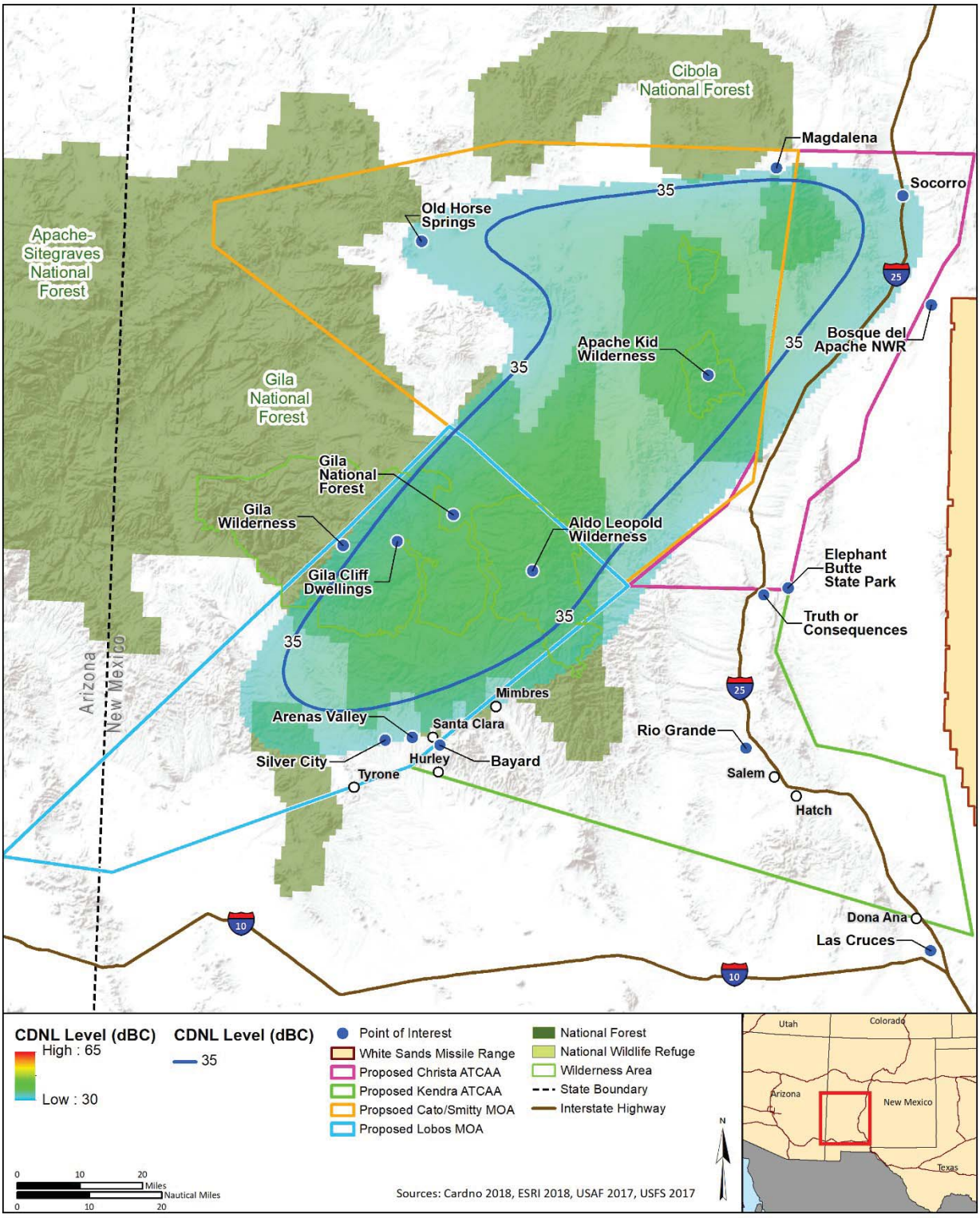


Figure 6.4-2. CDNL Contours under Alternative 3

7.0 SUPPLEMENTAL METRICS RESULTS

Sections 3.0, 4.0, 5.0 and 6.0 of this report provide estimates of noise modeled for baseline conditions as well as the three alternatives scenarios being considered. Noise levels in these sections were provided in L_{dnmr}, a cumulative metric that provides a measure of exposure to noise over a long period of time. Cumulative metrics do not provide information on the "loudness" of an aircraft flying in the vicinity of an observer. To characterize the sound environment that exists when an aircraft flies over a particular point on the ground, a number of overflight scenarios were modeled.

The noise metrics used to characterize the loudness of an overflight include L_{max} and SEL (see **Section 2.2,** *Supplemental 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 fuel consumption and is generally only used in the higher altitudes (above 30,000 feet or FL300).

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, a number of scenarios at three altitudes were developed to quantify the noise levels at various lateral offsets from the overflight:

- *Scenario 1*: An overflight at 500 feet above ground level (AGL), the lowest proposed altitude. Both power settings were included (mil thrust and afterburner); however, use of an afterburner at this altitude would be rare. It should be noted that no overflights at this altitude would occur over populated places in accordance with Federal Aviation Administration (FAA) minimum safe altitudes (14 CFR 91.119) or over designated wilderness areas or National Parks (FAA Aeronautical Information Manual, paragraph 7-4-6). Under the Proposed Action, aircraft operations between 500 feet AGL and 2,000 feet AGL represent less than 10 percent of the proposed training. Therefore, observers are not expected to experience this scenario routinely but it represents the "loudest" scenario.
- *Scenario 2*: An overflight at 2,000 feet AGL. Both power settings were included (mil thrust and afterburner). The FAA requests that pilots not fly over wilderness areas and National Parks less than 2,000 feet AGL (FAA Aeronautical Information Manual, paragraph 7-4-6); therefore, this scenario would not occur over wilderness areas or National Parks beneath the airspace. As stated above, operations between 500 feet AGL and 2,000 feet AGL represent a small percentage of the proposed training.
- *Scenario 3*: An overflight at 10,000 feet AGL. Both power settings were included (mil thrust and afterburner). The majority of the proposed overflights (approximately 80 percent) would be at or above this altitude.

The L_{max} and SEL calculations for these scenarios are provided in **Table 7.1-1.** A graphical representation of the results for the 500 feet overflight (scenario 1) and the 10,000 feet overflight (scenario 3) are provided in **Figures 7.1-1 and 7.1-2**.

Figure 7.1-1 provides a graphical depiction of the L_{max} data for an overflight at 500 feet AGL. The thickness of the orange band on each graph shows the variety of values possible from the 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. Afterburner use at this altitude would be rare. The L_{max} (which is the peak noise level) occurs for about 1/8 of a second. To provide a frame of reference, three lines are shown to illustrate the average noise level for common noise sources: a lawnmower, a vacuum cleaner 10 feet away, and a garbage disposal. As illustrated, the peak noise level (L_{max}) from an F-16 flying at 500 feet altitude would typically be louder than the noise of a lawnmower to an observer within a half mile (if the aircraft is using an afterburner) or within a mile of the overflight (if the aircraft is using military power). An observer over 2 miles from the overflight would experience noise levels below the common noise sources (lawnmower, vacuum cleaner, and garbage disposal).

Figure 7.1-2 provides a graphical depiction of the L_{max} data for an overflight at 10,000 feet. The peak noise level (L_{max}) for an observer within a mile of an overflight at this altitude would be similar to the noise level produced by a vacuum cleaner or garbage disposal.

Table 7.1-1. L_{max} and SEL Values for F-16 Overflights at Different Power Settings, Altitudes and Lateral Offsets[1]												
Offset (feet lateral distance)	**Scenario 1: Scenario 1:Aircraft Altitude - 500 feet AGL**				**Scenario 2: Aircraft Altitude - 2,000 feet AGL**				**Scenario 3: Aircraft Altitude - 10,000 feet AGL**			
	L_{max}		**SEL**		**L_{max}**		**SEL**		**L_{max}**		**SEL**	
	Mil thrust	**Afterburner**	**Mil thrust**	**Afterburner**	**Mil thrust**	**Afterburner**	**Mil thrust**	**Afterburner**	**Mil thrust**	**Afterburner**	**Mil thrust**	**Afterburner**
0	108 - 111	117 - 121	118-121	110 - 113	92 - 95	102 - 105	98 - 101	106 - 109	70 - 73	80 - 84	79 - 82	87 - 91
1,000	99 - 102	108 - 111	111-114	104 - 106	91 - 94	100 - 104	97 - 100	105 - 108	70 - 73	80 - 84	79 - 81	87 - 90
5,000	79 - 82	89 - 92	95-99	88 - 90	80 - 82	89 - 92	88 - 91	96 - 99	69 - 71	79 - 82	78 - 80	86 - 89
10,000	66 - 69	76 - 79	85-88	76 - 79	70 - 72	80 - 83	80 - 82	88 - 91	65 - 67	75 - 79	74 - 77	83 - 86
20,000	45 - 47	56 - 59	66-69	57 - 59	57 - 59	67 - 71	69 - 71	77 - 81	57 - 59	67 - 71	67 - 69	76 - 79
30,000	36 - 38	47 - 51	58-62	48 - 51	48 - 50	59 - 62	60 - 62	69 - 73	49 - 51	60 - 64	60 - 62	69 - 73

Note: [1] A range of values is provided for each metric since the F-16 variant flown out of Holloman AFB has two different engine types. The speed used for these models was 450 knots.

Legend: AGL = above ground level; L_{max}=maximum sound level; SEL=Sound Exposure Level.

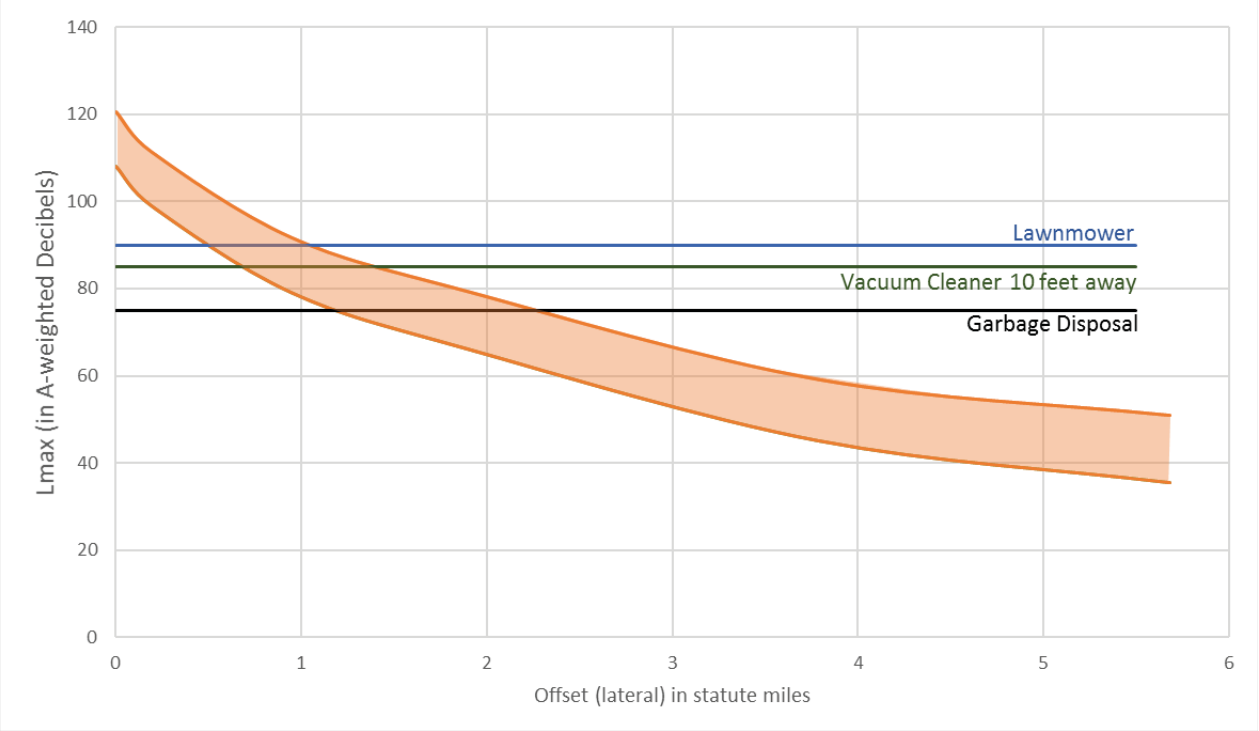


Figure 7.1-1. L_{max} for F-16 Overflight at 500 feet

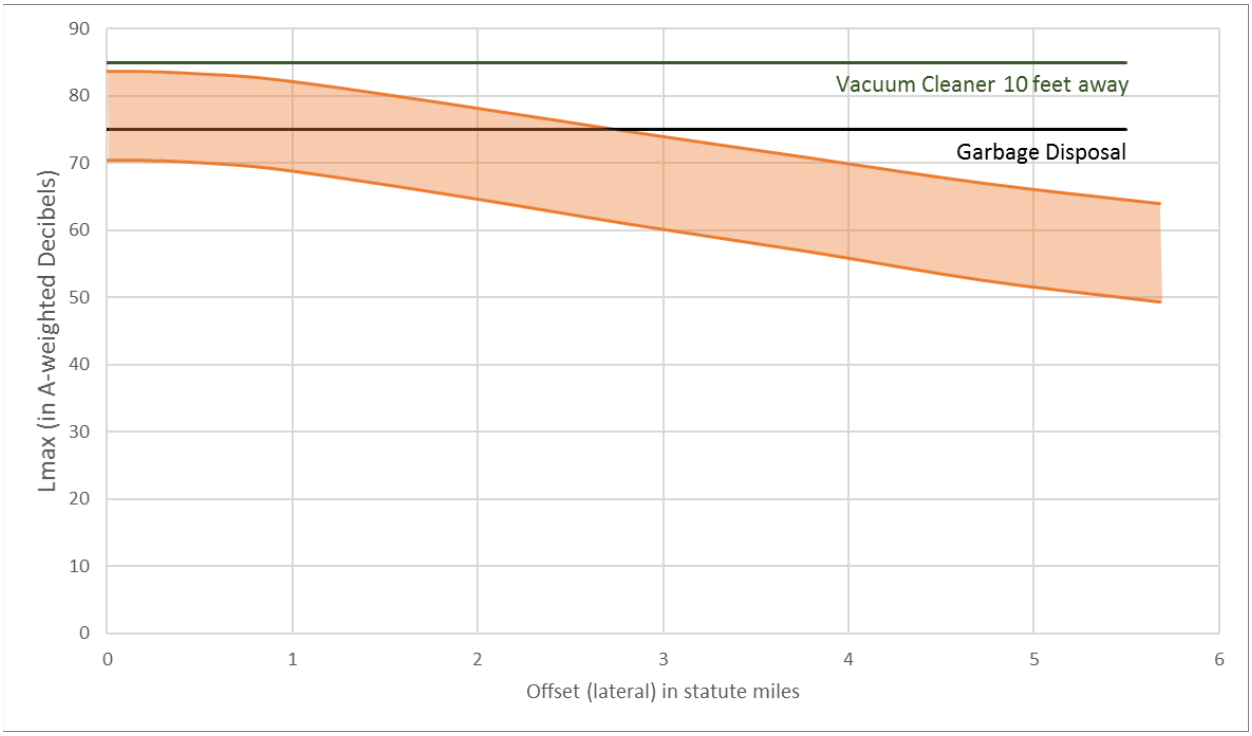


Figure 7.1-2. L_{max} for F-16 Overflight at 10,000 feet

8.0 REFERENCES

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APPENDIX G
AIR QUALITY SUPPORTING DOCUMENTS

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Background AQ Data

Baseline:			**Alt 1:**			**Alt 2:**			**Alt 3:**		
Airsapce	Sorties	Minutes	Airsapce	Sorties	Minutes	Airsapce	Sorties	Minutes	Airsapce	Sorties	Minutes
Talon Low	315	12,606				Talon Low	315	12,606			
			Talon Low A	2,571	102,840				Talon Low A	2,065	82,600
			Talon Low B	1,117	44,680				Talon Low B	516	20,640
						Smitty Low	2,867	86,005	Smitty Low	1,106	33,180
						Lobos Low	716	21,487			

	Sorties	Total Minutes	Total Hrs	GE-100/ PW-220	Sorties	Total Minut	Total Hrs	GE-100/ PW-220	Sorties	Total Minu	Total Hrs	GE-100/ PW-220	Sorties	Total Minute	Total Hrs	GE-100/ PW-220
F-16C	831	33,240	554	305	10,000	400,000	6,667	3,667	10,000	308,310	5,139	2,826	10,000	368,080	6,135	3,374
				249				3,000				2,312				2,761
F/A-18C	1,000	60,000	1,000		1,000	60,000	1,000		1,300	78,000	1,300		1,300	78,000	1,300	
			1,554				**7,667**				**6,439**				**7,435**	

Percent of time at power setting:

MAX	12%
MIL	74%
85%	14%

Engine model split for F016C

Aircraft:	56	55%
	45	45%

Block 40 with GE-100 Engine
Block 42 with PW-220 Engine

Below 3kft AGL (Minutes/year)	**3,513**	**42,280**	**32,588**	**38,906**
Baseline	**F-16** **GE-100**	**Alt 1**	**F-16** **GE-100**	**Alt 2**	**F-16** **GE-100**	**Alt 3**	**F-16** **GE-100**
	1,948 minutes below 3K		23,442 minutes below 3K		18,069 minutes below 3K		21,572 minutes below 3K
	228 minutes below 3K in A/B mode		**2,748 minutes below 3K in A/B mode**		**2,118 minutes below 3K in A/B mode**		**2,529 minutes below 3K in A/B mode**
	1,720 minutes below 3K in MIL		**20,694 minutes below 3K in MIL**		**15,951 minutes below 3K in MIL**		**19,043 minutes below 3K in MIL**
	F-16 **PW-220**		**F-16** **PW-220**		**F-16** **PW-220**		**F-16** **PW-220**
	1,565 minutes below 3K		18,838 minutes below 3K		14,520 minutes below 3K		17,334 minutes below 3K
	184 minutes below 3K in A/B mode		**2,208 minutes below 3K in A/B mode**		**1,702 minutes below 3K in A/B mode**		**2,032 minutes below 3K in A/B mode**
	1,382 minutes below 3K in MIL		**16,629 minutes below 3K in MIL**		**12,817 minutes below 3K in MIL**		**15,302 minutes below 3K in MIL**
	F-18C (transients)		**F-18C (transients)**		**F-18C (transients)**		**F-18C (transients)**
	1,333 minutes below 3K		1,333 minutes below 3K		1,000 minutes below 3K		1,233 minutes below 3K
	156 **minutes below 3K in A/B mode**		156 **minutes below 3K in A/B mode**		117 **minutes below 3K in A/B mode**		145 **minutes below 3K in A/B mode**
	1,177 **minutes below 3K in MIL**		1,177 **minutes below 3K in MIL**		883 **minutes below 3K in MIL**		1,088 **minutes below 3K in MIL**
Total Hours	**81**		**727**		**560**		**669**

Holloman AFB MOA Air Calculations

Table 1. Current Ops and Alternatives 1,2, and 3 - Flares

Type	Study Area Category	DODEC ID	# flares	VOC	CO	NO_x	Emission Factor (lb/item) SO_2	PM_{10}	$PM_{2.5}$	CO_2
Flare - baseline	CM flare	L410	5,000	0.0004	0.0013	0.00013	0.0000079	0.0062	0.0062	0.011
Alternative 1, 2 or 3	CM flare	L410	15,360	0.0004	0.0013	0.00013	0.0000079	0.0062	0.0062	0.011

	Total Tons Annually VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Flare - baseline	0.001	0.003	0.000	0.000	0.016	0.016	0.028
Alternative 1, 2 or 3	0.003	0.010	0.001	0.000	0.048	0.048	0.084
Net Change	0.002	0.007	0.001	0.000	0.032	0.032	0.057

Table 2. Baseline and Alternatives 1, 2 and 3 Total Emissions with Net Change

	Emissions T/Yr						
Type	VOC	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Current Operations	0.43	6.03	13.16	0.61	0.77	0.59	1,554
Alternative 1 Operations	4.23	47.22	112.61	5.00	4.77	3.96	12,650
Net Change	**3.81**	**41.19**	**99.45**	**4.40**	**4.00**	**3.37**	**11,096**
Alternative 2 Operations	3.26	36.35	86.71	3.85	3.68	3.05	9,740
Net Change	**2.84**	**30.32**	**73.55**	**3.25**	**2.91**	**2.47**	**8,186**
Alternative 3 Operations	3.90	43.48	103.64	4.61	4.39	3.65	11,644
Net Change	**3.47**	**37.45**	**90.48**	**4.00**	**3.63**	**3.06**	**10,090**

Table 3. Baseline and Alternatives 1, 2 and 3 Total GHG Emissions with Net Change

Type	Flight hrs	Fuel/ engine lb/hr	lb/1000 lb fuel CO_2	T/yr CO_2
Current Operations				
F100-PW-220				
A/B	30	41682	3214.59	2,002
MIL	219	9679	3214.59	3,409
F110-GE-100				
A/B	37	18,088	3214.59	1,064
MIL	268	11,358	3214.59	4,900
F404-GE-400				
A/B	120	15,851	3214.59	6,115

	MIL	880	7,739	3214.59	21,892
Current Operations Totals		**1,554**			**39,381**
Alternative 1 Operations					
F100-PW-220					
	A/B	360	41682	3214.59	24,118
	MIL	2640	9679	3214.59	41,071
F110-GE-100					
	A/B	440	18,088	3214.59	12,793
	MIL	3227	11,358	3214.59	58,910
F404-GE-400					
	A/B	120	15,851	3214.59	6,115
	MIL	880	7,739	3214.59	21,892
Alternative 1 Totals		**7,667**			**164,899**
Net Change		**6,113**			**125,518**
Alternative 2 Operations					
F100-PW-220					
	A/B	277	41682	3214.59	18,587
	MIL	2035	9679	3214.59	31,652
F110-GE-100					
	A/B	339	18,088	3214.59	9,859
	MIL	2487	11,358	3214.59	45,400
F404-GE-400					
	A/B	156	15,851	3214.59	7,949
	MIL	1144	7,739	3214.59	28,460
Alternative 2 Totals		**6,438**			**141,907**
Net Change		**4,884**			**102,525**
Alternative 3 Operations					
F100-PW-220					
	A/B	331	41682	3214.59	22,197
	MIL	2430	9679	3214.59	37,799
F110-GE-100					
	A/B	405	18,088	3214.59	11,771
	MIL	2969	11,358	3214.59	54,203
F404-GE-400					

A/B	156	15,851	3214.59	7,949
MIL	1144	7,739	3214.59	28,460
Alternative 3 Totals	**7,435**			**162,379**
Net Change	**5,881**			**122,997**

404 grams of CO2 per mile
0.89 lb of CO2 per mile

Table 4. Comparison of GHG Emissions to Additional Vehicles

	CO2e Tons/yr		
Alternative 1 Net Change	125,518	282,041,990	miles
		24,525	additional cars driving 11,500 miles per year
Alternative 2 Net Change	102,525	230,377,033	miles
		20,033	additional cars driving 11,500 miles per year
Alternative 3 Net Change	122,997	276,378,275	miles
		24,033	additional cars driving 11,500 miles per year

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Chaves; Eddy
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Special Use Airspace Optimization at Holloman Air Force Base

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2019

- Action Purpose and Need:

The action is the proposed optimization of special use Airspace (SUA) to support the training of F-16 pilots stationed at Holloman Air Force Base. The SUA in this region was created over 30 years ago and does not have the necessary volume or capabilities to support the training needs for pilots of modern aircraft.

- Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2 with the following differences. The proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

- Point of Contact

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
Phone Number:

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	F-16 (F100-PW-220) aircraft cruising below 3000 feet AGL in airspace
3.	Aircraft	F-16 (F110-GE-100) aircraft cruising below 3000 feet AGL in airspace
4.	Aircraft	F-18 (F404-GE-400) aircraft cruising below 3000 feet AGL in airspace

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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? Current Operations

- Activity Location
County: Otero; Chaves; Eddy
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-16 (F100-PW-220) aircraft cruising below 3000 feet AGL in Talon MOA airspace

- Activity Description:
F-16 (F100-PW-220) aircraft cruising below 3000 feet AGL in Talon MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.297317
CO	0.862174
PM 10	0.221754

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.200233
CO_2e	5,411

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.297317
CO	0.862174
PM 10	0.221754

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.200233
CO_2e	5,411

2.2 Aircraft & Engines

2.2.1 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1084.00	7.94	1.07	4.61	35.30	2.06	1.85	3234
Approach	3837.00	5.12	1.07	12.53	1.92	2.63	2.37	3234
Intermediate	5770.00	2.89	1.07	22.18	0.86	2.06	1.85	3234
Military	9679.00	1.79	1.07	29.32	0.86	1.33	1.20	3234
After Burn	41682.00	1.53	1.07	8.37	11.99	1.15	1.04	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 138.2
Takeoff [After Burn] (mins): 18.4
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Current Operations

- Activity Location
County: Catron; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-16 (F110-GE-100) aircraft cruising below 3000 feet AGL in Talon MOA airspace

- Activity Description:
F-16 (F110-GE-100) aircraft cruising below 3000 feet AGL in Talon MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.047539
CO	2.866950
PM 10	0.137725

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.102311
CO_2e	5,964

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.047539
CO	2.866950
PM 10	0.137725

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.102311
CO_2e	5,964

3.2 Aircraft & Engines

3.2.1 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:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	1.12	3234
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	0.91	3234
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.41	3234
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.00	3234
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	2.98	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 172

Takeoff [After Burn] (mins):	22.8
Climb Out [Intermediate] (mins):	0
Approach [Approach] (mins):	0
Taxi/Idle In [Idle] (mins):	0

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)

$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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? Current Operations

- Activity Location
County: Catron; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-18 (F404-GE-400) aircraft cruising below 3000 feet AGL in Talon MOA airspace

- Activity Description:
F-18 (F404-GE-400) aircraft cruising below 3000 feet AGL in Talon MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.079280
CO	2.298090
PM 10	0.392004

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.267200
CO_2e	28,007

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.079280
CO	2.298090
PM 10	0.392004

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.267200
CO_2e	28,007

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F/A-18C
Engine Model: F404-GE-400
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

4.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	685.00	3.39	1.07	1.70	110.18	4.47	3.10	3234
Approach	3111.00	0.04	1.07	7.86	2.02	1.46	0.87	3234
Intermediate	6464.00	0.07	1.07	17.03	1.54	1.57	0.90	3234
Military	7739.00	0.02	1.07	25.83	1.48	1.61	0.89	3234
After Burn	15851.00	1.85	1.07	5.43	50.31	3.57	3.21	3234

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 117.7
Takeoff [After Burn] (mins): 15.6
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test

Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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 of current operations.

a. Action Location:

Base: HOLLOMAN AFB
State: New Mexico
County(s): Otero; Chaves; Eddy
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Special Use Airspace Optimization at Holloman Air Force Base

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2019

e. Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2 with the following differences. The proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

f. Point of Contact:

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: HOLLOMAN AFB
State: New Mexico
County(s): Chaves; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Special Use Airspace Optimization at Holloman Air Force Base

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2022

- Action Purpose and Need:

The action is the proposed optimization of Special Use Airspace (SUA) to support the training of F-16 pilots stationed at Holloman Air Force Base. The SUA in this region was created over 30 years ago and does not have the necessary volume or capabilities to support the training needs for pilots of modern aircraft.

- Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

- Point of Contact

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
Phone Number:

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	Aircraft cruising below 3000 feet AGL in Talon MOA airspace
3.	Aircraft	Aircraft cruising below 3000 feet AGL in airspace
4.	Aircraft	Aircraft cruising below 3000 feet AGL in Talon MOA airspace

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Chaves; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Talon Low MOA airspace

- Activity Description:
F-16 (F100-PW-220) cruising below 3000 feet AGL in Talon Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	3.576765
CO	10.368002
PM 10	2.666530

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.407333
CO_2e	*65,189

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.576765
CO	10.368002
PM 10	2.666530

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.407333
CO_2e	*65,189

*includes entire flight duration

2.2 Aircraft & Engines

2.2.1 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Is Aircraft & Engine a Surrogate? No
Original Aircraft Name:
Original Engine Name:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1084.00	7.94	1.07	4.61	35.30	2.06	1.85	3234
Approach	3837.00	5.12	1.07	12.53	1.92	2.63	2.37	3234
Intermediate	5770.00	2.89	1.07	22.18	0.86	2.06	1.85	3234
Military	9679.00	1.79	1.07	29.32	0.86	1.33	1.20	3234
After Burn	41682.00	1.53	1.07	8.37	11.99	1.15	1.04	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 1662.9
Takeoff [After Burn] (mins): 220.8
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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

LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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
1	1	No	T-62T-40-8	

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
T-62T-40-8	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

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

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Chaves; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Talon Low MOA airspace

- Activity Description:
F-16 (F110-GE-100) cruising below 3000 feet AGL in Talon Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.572843
CO	34.542609
PM 10	1.659464

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.233119
CO_2e	*71,703

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.572843
CO	34.542609
PM 10	1.659464

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.233119
CO_2e	*71,703

*includes entire flight duration

3.2 Aircraft & Engines

3.2.1 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:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	1.12	3234
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	0.91	3234
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.41	3234
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.00	3234
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	2.98	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	0
Takeoff [Military] (mins):	2069.4
Takeoff [After Burn] (mins):	274.8
Climb Out [Intermediate] (mins):	0
Approach [Approach] (mins):	0
Taxi/Idle In [Idle] (mins):	0

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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? Add

- Activity Location
County: Chaves; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Talon Low MOA airspace

- Activity Description:
F-18 (F404-GE-400) cruising below 3000 feet AGL in Talon Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.079280
CO	2.298090
PM 10	0.392004

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.267200
CO_2e	*28,007

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.079280
CO	2.298090
PM 10	0.392004

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.267200
CO_2e	*28,007

*includes entire flight duration

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F/A-18C
Engine Model: F404-GE-400
Primary Function: Combat

Aircraft has After burn: Yes
Number of Engines: 2

- 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 Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	685.00	3.39	1.07	1.70	110.18	4.47	3.10	3234
Approach	3111.00	0.04	1.07	7.86	2.02	1.46	0.87	3234
Intermediate	6464.00	0.07	1.07	17.03	1.54	1.57	0.90	3234
Military	7739.00	0.02	1.07	25.83	1.48	1.61	0.89	3234
After Burn	15851.00	1.85	1.07	5.43	50.31	3.57	3.21	3234

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 117.7
Takeoff [After Burn] (mins): 15.6
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

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

Total combined direct and indirect emissions associated with the current operations were estimated through ACAM on a calendar-year basis.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)
NOT IN A REGULATORY AREA	
VOC	0.424
NOx	13.160
CO	6.027
SOx	0.605
PM 10	0.751
PM 2.5	0.570
Pb	0.000
NH3	0.000
CO2e	*39,381

*entire flight duration

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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:

Base: HOLLOMAN AFB
State: New Mexico
County(s): Chaves; Eddy; Otero
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Special Use Airspace Optimization at Holloman Air Force Base

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2022

e. Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

f. Point of Contact:

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
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

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

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.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA PSD thresholds that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

An Air Quality Indicator value of 250 tons/yr is used based on EPA's PSD threshold. Therefore, the worst-case year emissions were compared against the Air Quality Indicator and are summarized below.

Analysis Summary:

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.229	250	No
NOx	112.605	250	No
CO	47.209	250	No
SOx	5.003	250	No
PM 10	4.718	250	No
PM 2.5	3.908	250	No
CO2e	*164,899	NA	NA

*entire flight duration

None of estimated emissions associated with this action are above the air quality indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Lesley Hamilton

Lesley Hamilton, Sr Associate

8/20/19

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: HOLLOMAN AFB
State: New Mexico and Arizona
County(s): Catron; Hidalgo; Otero; Sierra; Socorro, NM and Graham, AZ
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Special Use Airspace Optimization at Holloman Air Force Base

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2022

- Action Purpose and Need:

The action is the proposed optimization of Special Use Airspace (SUA) to support the training of F-16 pilots stationed at Holloman Air Force Base. The SUA in this region was created over 30 years ago and does not have the necessary volume or capabilities to support the training needs for pilots of modern aircraft.

- Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

- Point of Contact

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
Phone Number:

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	Aircraft cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace
3.	Aircraft	Aircraft cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace
4.	Aircraft	Aircraft cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Catron; Hidalgo; Otero; Sierra; Socorro, NM and Graham, AZ
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

- Activity Description:
F-16 (F100-PW-220) cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	2.757483
CO	7.996226
PM 10	2.055472

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.855580
CO_2e	*50,239

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	2.757483
CO	7.996226
PM 10	2.055472

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.855580
CO_2e	*50,239

*includes entire flight duration

2.2 Aircraft & Engines

2.2.1 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

- 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 Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1084.00	7.94	1.07	4.61	35.30	2.06	1.85	3234
Approach	3837.00	5.12	1.07	12.53	1.92	2.63	2.37	3234
Intermediate	5770.00	2.89	1.07	22.18	0.86	2.06	1.85	3234
Military	9679.00	1.79	1.07	29.32	0.86	1.33	1.20	3234
After Burn	41682.00	1.53	1.07	8.37	11.99	1.15	1.04	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 1281.7
Takeoff [After Burn] (mins): 170.2
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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

LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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
1	1	No	T-62T-40-8	

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
T-62T-40-8	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

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

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Catron; Hidalgo; Otero; Sierra; Socorro, NM and Graham, AZ
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

- Activity Description:
F-16 (F110-GE-100) cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.441519
CO	26.623854
PM 10	1.279036

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.950417
CO_2e	*55,259

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.441519
CO	26.623854
PM 10	1.279036

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.950417
CO_2e	*55,259

*includes entire flight duration

3.2 Aircraft & Engines

3.2.1 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:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	1.12	3234
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	0.91	3234
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.41	3234
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.00	3234
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	2.98	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	0
Takeoff [Military] (mins):	1595.1
Takeoff [After Burn] (mins):	211.8
Climb Out [Intermediate] (mins):	0
Approach [Approach] (mins):	0
Taxi/Idle In [Idle] (mins):	0

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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? Add

- Activity Location
County: Catron; Hidalgo; Otero; Sierra; Socorro, NM and Graham, AZ
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

- Activity Description:
F-18 (F404-GE-400) cruising below 3000 feet AGL in Smitty Low and Lobos Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.059460
CO	1.723615
PM 10	0.294055

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.200429
CO_2e	*36,409

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.059460
CO	1.723615
PM 10	0.294055

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.200429
CO_2e	*36,409

*includes entire flight duration

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F/A-18C
Engine Model: F404-GE-400
Primary Function: Combat
Aircraft has After burn: Yes

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Number of Engines: 2

- 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 Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	685.00	3.39	1.07	1.70	110.18	4.47	3.10	3234
Approach	3111.00	0.04	1.07	7.86	2.02	1.46	0.87	3234
Intermediate	6464.00	0.07	1.07	17.03	1.54	1.57	0.90	3234
Military	7739.00	0.02	1.07	25.83	1.48	1.61	0.89	3234
After Burn	15851.00	1.85	1.07	5.43	50.31	3.57	3.21	3234

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 88.3
Takeoff [After Burn] (mins): 11.7
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: HOLLOMAN AFB
State: New Mexico and Arizona
County(s): Grant County, NM and Greenlee County, AZ
Regulatory Area(s): Grant Co, NM and Greenlee Co, AZ

- Action Title: Special Use Airspace Optimization at Holloman Air Force Base

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2022

- Action Purpose and Need:

The action is the proposed optimization of Special Use Airspace (SUA) to support the training of F-16 pilots stationed at Holloman Air Force Base. The SUA in this region was created over 30 years ago and does not have the necessary volume or capabilities to support the training needs for pilots of modern aircraft.

- Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

- Point of Contact

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
Phone Number:

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	Aircraft cruising below 3000 feet AGL in Lobos Low MOA airspace
3.	Aircraft	Aircraft cruising below 3000 feet AGL in Lobos Low MOA airspace
4.	Aircraft	Aircraft cruising below 3000 feet AGL in Lobos Low MOA airspace

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Grant County, NM and Greenlee County, AZ
Regulatory Area(s): Grant Co, NM and Greenlee Co, AZ

- Activity Title: Aircraft cruising below 3000 feet AGL in Lobos Low MOA airspace

- Activity Description:
F-16 (F100-PW-220) cruising below 3000 feet AGL in Lobos Low MOA

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	2.757483
CO	7.996226
PM 10	2.055472

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.855580
CO_2e	*50,239

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	2.757483
CO	7.996226
PM 10	2.055472

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.855580
CO_2e	*50,239

*includes entire flight duration

2.2 Aircraft & Engines

2.2.1 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:

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1084.00	7.94	1.07	4.61	35.30	2.06	1.85	3234
Approach	3837.00	5.12	1.07	12.53	1.92	2.63	2.37	3234
Intermediate	5770.00	2.89	1.07	22.18	0.86	2.06	1.85	3234
Military	9679.00	1.79	1.07	29.32	0.86	1.33	1.20	3234
After Burn	41682.00	1.53	1.07	8.37	11.99	1.15	1.04	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 1281.7
Takeoff [After Burn] (mins): 170.2
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Grant County, NM and Greenlee County, AZ
Regulatory Area(s): Grant Co, NM and Greenlee Co, AZ

- Activity Title: Aircraft cruising below 3000 feet AGL in airspace

- Activity Description:
F-16 (F110-GE-100) cruising below 3000 feet AGL in Lobos Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A

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End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.441519
CO	26.623854
PM 10	1.279036

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.950417
CO_2e	*55,259

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.441519
CO	26.623854
PM 10	1.279036

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.950417
CO_2e	*55,259

*includes entire flight duration

3.2 Aircraft & Engines

3.2.1 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:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	1.12	3234
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	0.91	3234
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.41	3234
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.00	3234
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	2.98	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	0
Takeoff [Military] (mins):	1595.1
Takeoff [After Burn] (mins):	211.8
Climb Out [Intermediate] (mins):	0
Approach [Approach] (mins):	0
Taxi/Idle In [Idle] (mins):	0

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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? Add

- Activity Location
County: Grant County, NM and Greenlee County, AZ
Regulatory Area(s): Grant Co, NM and Greenlee Co, AZ

- Activity Title: Aircraft cruising below 3000 feet AGL in Lobos Low MOA airspace

- Activity Description:
F-18 (F404-GE-400) cruising below 3000 feet AGL in Lobos Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.059460
CO	1.723615
PM 10	0.294055

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.200429
CO_2e	*36,409

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.059460
CO	1.723615
PM 10	0.294055

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.200429
CO_2e	*36,409

*includes entire flight duration

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F/A-18C
Engine Model: F404-GE-400
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 2

- 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 Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	685.00	3.39	1.07	1.70	110.18	4.47	3.10	3234
Approach	3111.00	0.04	1.07	7.86	2.02	1.46	0.87	3234
Intermediate	6464.00	0.07	1.07	17.03	1.54	1.57	0.90	3234
Military	7739.00	0.02	1.07	25.83	1.48	1.61	0.89	3234
After Burn	15851.00	1.85	1.07	5.43	50.31	3.57	3.21	3234

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 88.3
Takeoff [After Burn] (mins): 11.7
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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:

Base: HOLLOMAN AFB
State: New Mexico, Arizona
County(s): Grant, NM and Greenlee, AZ
Regulatory Area(s): Grant Co, NM and Greenlee Co, AZ

b. Action Title: Special Use Airspace Optimization at Holloman Air Force Base

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2022

e. Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

f. Point of Contact:

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
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:

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY		Air Quality Indicator	
		Threshold (ton/yr)	Exceedance (Yes or No)	Threshold (ton/yr)	Exceedance (Yes or No)
Grant Co, NM and Greenlee, AZ					
VOC	3.258			250	No
NOx	86.711			250	No
CO	36.344			250	No
SOx	3.852	100	No	NA	NA
PM 10	3.629			250	No
PM 2.5	3.006			250	No
CO2e	*141,907			NA	NA

*entire flight duration

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

Lesley Hamilton, Sr Associate

8/19/19

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: HOLLOMAN AFB
State: New Mexico
County(s): Catron; Chaves; Eddy; Otero; Sierra; Socorro
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Special Use Airspace Optimization at Holloman Air Force Base

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2022

- Action Purpose and Need:

The action is the proposed optimization of Special Use Airspace (SUA) to support the training of F-16 pilots stationed at Holloman Air Force Base. The SUA in this region was created over 30 years ago and does not have the necessary volume or capabilities to support the training needs for pilots of modern aircraft.

- Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

- Point of Contact

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
Phone Number:

- Activity List:

	Activity Type	Activity Title
2.	Aircraft	Aircraft cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace
3.	Aircraft	Aircraft cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace
4.	Aircraft	Aircraft cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

2. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Catron; Chaves; Eddy; Otero; Sierra; Socorro
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

- Activity Description:
F-16 (F100-PW-220) cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	3.291640
CO	9.542961
PM 10	2.453871

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.215314
CO_2e	*59,995

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	3.291640
CO	9.542961
PM 10	2.453871

Pollutant	Emissions Per Year (TONs)
PM 2.5	2.215314
CO_2e	*59,995

*includes entire flight duration

2.2 Aircraft & Engines

2.2.1 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

- 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 Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1084.00	7.94	1.07	4.61	35.30	2.06	1.85	3234
Approach	3837.00	5.12	1.07	12.53	1.92	2.63	2.37	3234
Intermediate	5770.00	2.89	1.07	22.18	0.86	2.06	1.85	3234
Military	9679.00	1.79	1.07	29.32	0.86	1.33	1.20	3234
After Burn	41682.00	1.53	1.07	8.37	11.99	1.15	1.04	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 1530.2
Takeoff [After Burn] (mins): 203.2
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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

LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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
1	1	No	T-62T-40-8	

2.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
T-62T-40-8	272.6	0.493	0.289	1.216	3.759	0.131	0.037	910.8

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

3. Aircraft

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Catron; Chaves; Eddy; Otero; Sierra; Socorro
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

- Activity Description:
F-16 (F110-GE-100) cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity End Date

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

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.527185
CO	31.789182
PM 10	1.527191

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.134846
CO_2e	*65,974

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.527185
CO	31.789182
PM 10	1.527191

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.134846
CO_2e	*65,974

*includes entire flight duration

3.2 Aircraft & Engines

3.2.1 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:

3.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1111.00	0.22	1.07	3.77	24.11	2.60	1.12	3234
Approach	5080.00	0.03	1.07	9.78	5.77	1.37	0.91	3234
Intermediate	7332.00	0.05	1.07	16.92	3.47	0.58	0.41	3234
Military	11358.00	0.04	1.07	29.00	3.38	0.14	0.00	3234
After Burn	18088.00	1.21	1.07	14.26	67.41	3.35	2.98	3234

3.3 Flight Operations

3.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi/Idle Out [Idle] (mins):	0
Takeoff [Military] (mins):	1904.3
Takeoff [After Burn] (mins):	252.9
Climb Out [Intermediate] (mins):	0
Approach [Approach] (mins):	0
Taxi/Idle In [Idle] (mins):	0

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

3.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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? Add

- Activity Location
County: Catron; Chaves; Eddy; Otero; Sierra; Socorro
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Aircraft cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

- Activity Description:
F-18 (F404-GE-400) cruising below 3000 feet AGL in Talon Low and Smitty Low MOA airspace

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.073674
CO	2.134898
PM 10	0.363113

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.247670
CO_2e	*36,409

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.073674
CO	2.134898
PM 10	0.363113

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.247670
CO_2e	*36,409

*includes entire flight duration

4.2 Aircraft & Engines

4.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F/A-18C
Engine Model: F404-GE-400
Primary Function: Combat
Aircraft has After burn: Yes

Number of Engines: 2

- 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 Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	685.00	3.39	1.07	1.70	110.18	4.47	3.10	3234
Approach	3111.00	0.04	1.07	7.86	2.02	1.46	0.87	3234
Intermediate	6464.00	0.07	1.07	17.03	1.54	1.57	0.90	3234
Military	7739.00	0.02	1.07	25.83	1.48	1.61	0.89	3234
After Burn	15851.00	1.85	1.07	5.43	50.31	3.57	3.21	3234

4.3 Flight Operations

4.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 1
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 10
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 0
Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 0
Takeoff [Military] (mins): 108.8
Takeoff [After Burn] (mins): 14.5
Climb Out [Intermediate] (mins): 0
Approach [Approach] (mins): 0
Taxi/Idle In [Idle] (mins): 0

- Trim Test
Idle (mins): 0
Approach (mins): 0
Intermediate (mins): 0
Military (mins): 0
AfterBurn (mins): 0

4.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year

$AE_{LTO} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & 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
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year

$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year

$AEPS_{POL} = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000$

$AEPS_{POL}$: Aircraft Emissions per Pollutant & 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) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	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

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 Instruction 32-7040, Air Quality Compliance And Resource Management; 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:

Base: HOLLOMAN AFB
State: New Mexico
County(s): Catron; Chaves; Eddy; Otero; Sierra; Socorro
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Special Use Airspace Optimization at Holloman Air Force Base

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2022

e. Action Description:

Under the Proposed Action, the Air Force would modify the dimensions and altitudes of training airspace in the vicinity of Holloman AFB. The proposed airspace modifications would result in appropriately sized and configured training airspace needed to conduct IQT activities. The modified airspace would improve airspace availability and scheduling flexibility for training activities.

Under Alternative 1, the Talon MOA would be reconfigured and expanded. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Under Alternative 2, the Cato and Smitty MOAs would be reconfigured and expanded, and Lobos MOA would be established. Training operations, to include the use of defensive countermeasures, would occur throughout the proposed airspace.

Alternative 3 would be a combination of Alternatives 1 and 2, the proposed Talon MOA/ATCAA would be slightly smaller than what is proposed under Alternative 1 and the proposed Lobos MOA would have a floor of 13,500 feet MSL as opposed to the 500 feet AGL proposed under Alternative 2. SUA no longer needed by the Air Force would be returned to the National Airspace System including the lower portion of the existing Talon Low MOA (300 to 500 feet AGL), the northern portion of the existing Cato and Smitty MOAs, Valentine MOA, Bronco 1 MOA, and Bronco 2 MOA.

f. Point of Contact:

Name: Lesley Hamilton
Title: Sr Associate
Organization: Cardno
Email:
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

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

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.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA PSD thresholds that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

An Air Quality Indicator value of 250 tons/yr is used based on EPA's PSD threshold. Therefore, the worst-case year emissions were compared against the Air Quality Indicator and are summarized below.

Analysis Summary:

2022 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	3.892	250	No
NOx	103.640	250	No
CO	43.467	250	No
SOx	4.605	250	No
PM 10	4.344	250	No
PM 2.5	3.598	250	No
CO2e	*162,379	NA	NA

*entire flight duration

None of estimated emissions associated with this action are above the air quality indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Lesley Hamilton

Lesley Hamilton, Sr Associate

8/21/19

DATE

APPENDIX H
USFWS CONSULTATION CORRESPONDENCE

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

United States Fish and Wildlife Service
Attn: Dr. George Dennis
New Mexico Ecological Services Field Office
2105 Osuna Road NE
Albuquerque NM 87113

Dear Dr Dennis

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with the proposed optimization of the special use airspace available for current and anticipated future pilot training at Holloman Air Force Base (AFB), New Mexico. Under the Proposed Action, existing special use airspace would be reconfigured and expanded or new special use airspace would be established to ensure the availability of training airspace today and into the future. The training airspace used by aircraft assigned to Holloman AFB today was developed for legacy aircraft. This airspace does not have the optimum volume, proximity, availability or attributes needed to support the Holloman AFB training mission. The purpose of the Proposed Action is to ensure consistent availability of adequately sized and configured training airspace needed to conduct multiple, simultaneous training missions. The Proposed Action would increase training efficiencies and provide more scheduling flexibility.

The proposed airspace modifications would include reconfiguring and expanding existing airspace or creating new airspace within parts of the following counties: Graham and Greenlee, Arizona; and Chaves, Catron, Eddy, Grant, Hidalgo, Otero, Sierra, and Socorro, New Mexico (see attachment). The Proposed Action would include aircraft operations from 500 feet above ground level (AGL) up to Flight Level (FL) 500 (50,000 feet above mean sea level [MSL]). The Proposed Action includes supersonic flight above FL300 (30,000 feet above MSL) as well as the use of chaff throughout the designated airspace and flares above 2,000 feet AGL.

The environmental analysis for the Proposed Action is being conducted by the Air Force Civil Engineer Center in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act (NEPA) of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs* and Section 7 of the Endangered Species Act; we solicit your comments concerning the Proposed Action. The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on August 24, 2017, initiating the public involvement process.

Open-house style public meetings will be held at the locations, dates, and times listed below. The purpose of the meetings is to provide information about the proposal and solicit comments on the scope of environmental issues to be addressed in the EIS. No formal presentation will be given. Please attend at your convenience.

Tuesday September 12, 2017	Wednesday, September 13, 2017	Thursday, September 14, 2017
6:00 PM to 8:00 PM	6:00 PM to 8:00 PM	6:00 PM to 8:00 PM
Carlsbad Public Library	Truth or Consequences Civic Center	Hilton Garden Inn
101 S. Halagueno Street	Ralph Edwards Auditorium	2550 S. Don Roser Dr.
Carlsbad, NM 88220	400 W. 4th Avenue	Las Cruces, NM 88001
	Truth or Consequences, NM 87901	

We request your participation and solicit your comments on the Proposed Action. Though comments will be accepted throughout the EIS process, please provide your comments no later than September 25, 2017 to ensure consideration in the Draft EIS. Comments may be submitted at any of the public meetings; on the project website, www.HollomanAFBAirspaceEIS.com; or in writing to: Holloman AFB Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666.

My points of contact for this project are Mr. Ramon Acevedo-Cruz, (575) 572-6670, ramon.acevedocruz.3@us.af.mil and Ms. Dana Banwart, (757) 594-1465, dana.banwart@cardno-gs.com. Please feel free to contact either of them directly for additional information or with any questions you may have. Thank you for your assistance in this matter.

HOUSTON R. CANTWELL
Colonel, USAF
Commander, 49th Wing

1 Attachment
Project Area Map

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
Phone: (602) 242-0210 Fax: (602) 242-2513
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies_Main.html

In Reply Refer To: October 01, 2018
Consultation Code: 02EAAZ00-2019-SLI-0001
Event Code: 02EAAZ00-2019-E-00002
Project Name: Special Use Airspace Optimization EIS for Holloman AFB

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that may occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. In some cases, a species does not currently occur within a quadrangle but occurs nearby and could be affected by a project. Please refer to the species information links found at:
http://www.fws.gov/southwest/es/arizona/Docs_Species.htm
http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf .

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to consult with us if their projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, we recommend preparing a biological evaluation similar to a Biological Assessment to determine whether the project may

affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat may be affected by a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. You should request consultation with us even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint." For example, projects that involve streams and river systems should consider downstream effects. If the Federal action agency determines that the action may jeopardize a proposed species or adversely modify proposed critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.
Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend considering them in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at:
http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

We also advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668 et seq.). The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when authorized by the Service. The Eagle Act prohibits anyone, without a permit, from taking (including disturbing) eagles, and their parts, nests, or eggs. Currently 1026 species of birds are protected by the MBTA, including species such as the western burrowing owl (Athene cunicularia hypugea). Protected western burrowing owls are often found in urban areas and may use their nest/burrows year-round; destruction of the burrow may result in the unpermitted take of the owl or their eggs.

If a bald eagle (or golden eagle) nest occurs in or near the proposed project area, you should evaluate your project to determine whether it is likely to disturb or harm eagles. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles:
https://www.fws.gov/migratorybirds/pdf/management/
nationalbaldeaglenanagementguidelines.pdf
https://www.fws.gov/birds/management/managed-species/eagle-management.php.

The Division of Migratory Birds (505/248-7882) administers and issues permits under the MBTA and Eagle Act, while our office can provide guidance and Technical Assistance. For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following: https://www.fws.gov/birds/policies-and-regulations/incidental-take.php. Guidance for minimizing impacts to migratory birds for communication tower projects (e.g. cellular, digital

television, radio, and emergency broadcast) can be found at: https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php.

Activities that involve streams (including intermittent streams) and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.
If your action is on tribal land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7 consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated.

We also recommend you seek additional information and coordinate your project with the Arizona Game and Fish Department. Information on known species detections, special status species, and Arizona species of greatest conservation need, such as the western burrowing owl and the Sonoran desert tortoise (Gopherus morafkai) can be found by using their Online Environmental Review Tool, administered through the Heritage Data Management System and Project Evaluation Program https://www.azgfd.com/Wildlife/HeritageFund/.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact our following offices for projects in these areas:

Northern Arizona: Flagstaff Office 928/556-2001
Central Arizona: Phoenix office 602/242-0210
Southern Arizona: Tucson Office 520/670-6144

Sincerely,
/s/ Steven L. Spangle Field Supervisor

Attachment

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
(602) 242-0210

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

New Mexico Ecological Services Field Office
2105 Osuna Road Ne
Albuquerque, NM 87113-1001
(505) 346-2525

Project Summary

Consultation Code: 02EAAZ00-2019-SLI-0001

Event Code: 02EAAZ00-2019-E-00002

Project Name: Special Use Airspace Optimization EIS for Holloman AFB

Project Type: MILITARY OPERATIONS / MANEUVERS

Project Description: Proposed Action includes expanding existing special use airspace and creating new airspace to support military jet training activities out of Holloman AFB. There are 3 alternatives being considered:
Alternative 1 includes expanding the existing Talon Military Operations Area (MOA) (on the eastern side of NM). The expanded MOA would have a floor of 500 feet AGL and a ceiling of 18,000 feet MSL. The MOA would support the use of chaff and flares and supersonic flights. Approximately 10,000 sorties are proposed in the expanded MOA.
Alternative 2 includes expanding the existing Cato/Smitty MOA and creating a new MOA (named Lobos) (on the western side of NM). These MOAs would have a floor of 500 feet AGL and a ceiling of 18,000 feet MSL. The MOAs would support the use of chaff and flares and supersonic flights. Approximately 10,000 sorties are proposed in the expanded MOAs.
Alternative 3 would be a combination of Alternatives 1 and 2. Under this alternative, the 10,000 proposed sorties would be split between the western airspace and the eastern airspace.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.603055499999655N104.49983880949674W



Counties: Graham, AZ | Greenlee, AZ | Catron, NM | Chaves, NM | Eddy, NM | Grant, NM | Hidalgo, NM | Lea, NM | Otero, NM | Sierra, NM | Socorro, NM

Endangered Species Act Species

There is a total of 8 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. 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.

Mammals

NAME	STATUS
Gray Wolf *Canis lupus* Population: Mexican gray wolf, EXPN population No critical habitat has been designated for this species.	Proposed Experimental Population, Non-Essential

Birds

NAME	STATUS
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Northern Mexican Gartersnake *Thamnophis eques megalops* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7655	Threatened

Fishes

NAME	STATUS
Loach Minnow *Tiaroga cobitis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6922	Endangered
Razorback Sucker *Xyrauchen texanus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/530	Endangered
Spikedace *Meda fulgida* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6493	Endangered
Woundfin *Plagopterus argentissimus* Population: Gila R. drainage, AZ, NM No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/49	Experimental Population, Non-Essential

Critical habitats

There are 4 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Narrow-headed Gartersnake *Thamnophis rufipunctatus* https://ecos.fws.gov/ecp/species/2204#crithab	Proposed
Northern Mexican Gartersnake *Thamnophis eques megalops* https://ecos.fws.gov/ecp/species/7655#crithab	Proposed
Razorback Sucker *Xyrauchen texanus* https://ecos.fws.gov/ecp/species/530#crithab	Final
Southwestern Willow Flycatcher *Empidonax traillii extimus* https://ecos.fws.gov/ecp/species/6749#crithab	Final

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna Road Ne
Albuquerque, NM 87113-1001
Phone: (505) 346-2525 Fax: (505) 346-2542
http://www.fws.gov/southwest/es/NewMexico/
http://www.fws.gov/southwest/es/ES_Lists_Main2.html

In Reply Refer To: October 01, 2018
Consultation Code: 02ENNM00-2019-SLI-0001
Event Code: 02ENNM00-2019-E-00002
Project Name: Special Use Airspace Optimization EIS for Holloman AFB

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

Thank you for your recent request for information on federally listed species and important wildlife habitats that may occur in your project area. The U.S. Fish and Wildlife Service (Service) has responsibility for certain species of New Mexico wildlife under the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et seq.), the Migratory Bird Treaty Act (MBTA) as amended (16 USC 701-715), and the Bald and Golden Eagle Protection Act (BGEPA) as amended (16 USC 668-668c). We are providing the following guidance to assist you in determining which federally imperiled species may or may not occur within your project area and to recommend some conservation measures that can be included in your project design.

FEDERALLY-LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

Attached is a list of endangered, threatened, and proposed species that may occur in your project area. Your project area may not necessarily include all or any of these species. Under the ESA, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service, to make "no effect" determinations. If you determine that your proposed action will have "no effect" on threatened or endangered species or their respective critical habitat, you do not need to seek concurrence with the Service. Nevertheless, it is a violation of Federal law to harm or harass any federally-listed threatened or endangered fish or wildlife species without the appropriate permit.

If you determine that your proposed action may affect federally-listed species, consultation with the Service will be necessary. Through the consultation process, we will analyze information contained in a biological assessment that you provide. If your proposed action is associated with Federal funding or permitting, consultation will occur with the Federal agency under section 7(a)(2) of the ESA. Otherwise, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA (also known as a habitat conservation plan) is necessary to harm or harass federally listed threatened or endangered fish or wildlife species. In either case, there is no mechanism for authorizing incidental take "after-the-fact." For more information regarding formal consultation and HCPs, please see the Service's Consultation Handbook and Habitat Conservation Plans at www.fws.gov/endangered/esa-library/index.html#consultations.

The scope of federally listed species compliance not only includes direct effects, but also any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects that may occur in the action area. The action area includes all areas to be affected, not merely the immediate area involved in the action. Large projects may have effects outside the immediate area to species not listed here that should be addressed. If your action area has suitable habitat for any of the attached species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts.

Candidate Species and Other Sensitive Species

A list of candidate and other sensitive species in your area is also attached. Candidate species and other sensitive species are species that have no legal protection under the ESA, although we recommend that candidate and other sensitive species be included in your surveys and considered for planning purposes. The Service monitors the status of these species. If significant declines occur, these species could potentially be listed. Therefore, actions that may contribute to their decline should be avoided.

Lists of sensitive species including State-listed endangered and threatened species are compiled by New Mexico state agencies. These lists, along with species information, can be found at the following websites:

Biota Information System of New Mexico (BISON-M): www.bison-m.org

New Mexico State Forestry. The New Mexico Endangered Plant Program: www.emnrd.state.nm.us/SFD/ForestMgt/Endangered.html

New Mexico Rare Plant Technical Council, New Mexico Rare Plants: nmrareplants.unm.edu

Natural Heritage New Mexico, online species database: nhnm.unm.edu

WETLANDS AND FLOODPLAINS

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. These habitats should be conserved through avoidance, or mitigated to ensure that there would be no net loss of wetlands function and value.

We encourage you to use the National Wetland Inventory (NWI) maps in conjunction with ground-truthing to identify wetlands occurring in your project area. The Service's NWI program website, www.fws.gov/wetlands/Data/Mapper.html integrates digital map data with other resource information. We also recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands.

MIGRATORY BIRDS

The MBTA prohibits the taking of migratory birds, nests, and eggs, except as permitted by the Service's Migratory Bird Office. To minimize the likelihood of adverse impacts to migratory birds, we recommend construction activities occur outside the general bird nesting season from March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until the young have fledged.

We recommend review of Birds of Conservation Concern at website www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html to fully evaluate the effects to the birds at your site. This list identifies birds that are potentially threatened by disturbance and construction.

BALD AND GOLDEN EAGLES

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the ESA on August 9, 2007. Both the bald eagle and golden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For information on bald and golden eagle management guidelines, we recommend you review information provided at www.fws.gov/midwest/eagle/guidelines/bgepa.html.

On our web site www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm, we have included conservation measures that can minimize impacts to federally listed and other sensitive species. These include measures for communication towers, power line safety for raptors, road and highway improvements, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.

We also suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding State fish, wildlife, and plants.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. For further consultation on your proposed activity, please call 505-346-2525 or email nmesfo@fws.gov and reference your Service Consultation Tracking Number.

Attachment(s):

- Official Species List
- Migratory Birds

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New Mexico Ecological Services Field Office
2105 Osuna Road Ne
Albuquerque, NM 87113-1001
(505) 346-2525

This project's location is within the jurisdiction of multiple offices. Expect additional species list documents from the following office, and expect that the species and critical habitats in each document reflect only those that fall in the office's jurisdiction:

Arizona Ecological Services Field Office
9828 North 31st Ave
#c3
Phoenix, AZ 85051-2517
(602) 242-0210

Project Summary

Consultation Code: 02ENNM00-2019-SLI-0001

Event Code: 02ENNM00-2019-E-00002

Project Name: Special Use Airspace Optimization EIS for Holloman AFB

Project Type: MILITARY OPERATIONS / MANEUVERS

Project Description: Proposed Action includes expanding existing special use airspace and creating new airspace to support military jet training activities out of Holloman AFB. There are 3 alternatives being considered:
Alternative 1 includes expanding the existing Talon Military Operations Area (MOA) (on the eastern side of NM). The expanded MOA would have a floor of 500 feet AGL and a ceiling of 18,000 feet MSL. The MOA would support the use of chaff and flares and supersonic flights. Approximately 10,000 sorties are proposed in the expanded MOA.
Alternative 2 includes expanding the existing Cato/Smitty MOA and creating a new MOA (named Lobos) (on the western side of NM). These MOAs would have a floor of 500 feet AGL and a ceiling of 18,000 feet MSL. The MOAs would support the use of chaff and flares and supersonic flights. Approximately 10,000 sorties are proposed in the expanded MOAs.
Alternative 3 would be a combination of Alternatives 1 and 2. Under this alternative, the 10,000 proposed sorties would be split between the western airspace and the eastern airspace.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.603055499999655N104.49983880949674W



Counties: Graham, AZ | Greenlee, AZ | Catron, NM | Chaves, NM | Eddy, NM | Grant, NM | Hidalgo, NM | Lea, NM | Otero, NM | Sierra, NM | Socorro, NM

Endangered Species Act Species

There is a total of 44 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. 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.

Mammals

NAME	STATUS
Jaguar *Panthera onca* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3944	Endangered
Mexican Long-nosed Bat *Leptonycteris nivalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8203	Endangered
Mexican Wolf *Canis lupus baileyi* Population: U.S.A. (portions of AZ and NM)see 17.84(k) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3916	Experimental Population, Non-Essential
New Mexico Meadow Jumping Mouse *Zapus hudsonius luteus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7965	Endangered
Penasco Least Chipmunk *Tamias minimus atristriatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5126	Candidate

Birds

NAME	STATUS
Least Tern *Sterna antillarum* Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	Endangered
Mexican Spotted Owl *Strix occidentalis lucida* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8196	Threatened
Northern Aplomado Falcon *Falco femoralis septentrionalis* Population: U.S.A (AZ, NM) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1923	Experimental Population, Non-Essential
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Southwestern Willow Flycatcher *Empidonax traillii extimus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6749	Endangered
Yellow-billed Cuckoo *Coccyzus americanus* Population: Western U.S. DPS There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Narrow-headed Gartersnake *Thamnophis rufipunctatus* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2204	Threatened
New Mexican Ridge-nosed Rattlesnake *Crotalus willardi obscurus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3657	Threatened
Northern Mexican Gartersnake *Thamnophis eques megalops* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7655	Threatened

Amphibians

NAME	STATUS
Chiricahua Leopard Frog *Rana chiricahuensis*	Threatened

There is **final** critical habitat for this species. Your location overlaps the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/1516

Fishes

NAME	STATUS
Beautiful Shiner *Cyprinella formosa* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7874	Threatened
Chihuahua Chub *Gila nigrescens* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7156	Threatened
Gila Chub *Gila intermedia* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/51	Endangered
Gila Topminnow (incl. Yaqui) *Poeciliopsis occidentalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1116	Endangered
Gila Trout *Oncorhynchus gilae* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/781	Threatened
Loach Minnow *Tiaroga cobitis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6922	Endangered
Pecos Bluntnose Shiner *Notropis simus pecosensis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4362	Threatened
Pecos Gambusia *Gambusia nobilis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/460	Endangered
Rio Grande Silvery Minnow *Hybognathus amarus* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1391	Endangered
Spikedace *Meda fulgida* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6493	Endangered

Clams

NAME	STATUS
Texas Hornshell *Popenaias popeii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/919	Endangered

Snails

NAME	STATUS
Alamosa Springsnail *Tryonia alamosae* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4371	Endangered
Chupadera Springsnail *Pyrgulopsis chupaderae* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6644	Endangered
Koster's Springsnail *Juturnia kosteri* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3126	Endangered
Pecos Assiminea Snail *Assiminea pecos* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/4519	Endangered
Roswell Springsnail *Pyrgulopsis roswellensis* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/923	Endangered
Socorro Springsnail *Pyrgulopsis neomexicana* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2806	Endangered

Crustaceans

NAME	STATUS
Noel's Amphipod *Gammarus desperatus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8042	Endangered
Socorro Isopod *Thermosphaeroma thermophilus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2470	Endangered

Flowering Plants

NAME	STATUS
Gypsum Wild-buckwheat *Eriogonum gypsophilum* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7770	Threatened
Kuenzler Hedgehog Cactus *Echinocereus fendleri var. kuenzleri* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2859	Threatened
Lee Pincushion Cactus *Coryphantha sneedii var. leei* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2504	Threatened
Pecos (=puzzle, =paradox) Sunflower *Helianthus paradoxus* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7211	Threatened
Sacramento Mountains Thistle *Cirsium vinaceum* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7486	Threatened
Sacramento Prickly Poppy *Argemone pleiacantha ssp. pinnatisecta* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3332	Endangered
Sneed Pincushion Cactus *Coryphantha sneedii var. sneedii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4706	Endangered
Todsen's Pennyroyal *Hedeoma todsenii* There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1081	Endangered
Wright's Marsh Thistle *Cirsium wrightii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8963	Candidate
Zuni Fleabane *Erigeron rhizomatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5700	Threatened

Critical habitats

There are 11 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Chiricahua Leopard Frog *Rana chiricahuensis* https://ecos.fws.gov/ecp/species/1516#crithab	Final
Gila Chub *Gila intermedia* https://ecos.fws.gov/ecp/species/51#crithab	Final
Gypsum Wild-buckwheat *Eriogonum gypsophilum* https://ecos.fws.gov/ecp/species/7770#crithab	Final
Loach Minnow *Tiaroga cobitis* https://ecos.fws.gov/ecp/species/6922#crithab	Final
Mexican Spotted Owl *Strix occidentalis lucida* https://ecos.fws.gov/ecp/species/8196#crithab	Final
Narrow-headed Gartersnake *Thamnophis rufipunctatus* https://ecos.fws.gov/ecp/species/2204#crithab	Proposed
Northern Mexican Gartersnake *Thamnophis eques megalops* https://ecos.fws.gov/ecp/species/7655#crithab	Proposed
Pecos Bluntnose Shiner *Notropis simus pecosensis* https://ecos.fws.gov/ecp/species/4362#crithab	Final
Southwestern Willow Flycatcher *Empidonax traillii extimus* https://ecos.fws.gov/ecp/species/6749#crithab	Final
Spikedace *Meda fulgida* https://ecos.fws.gov/ecp/species/6493#crithab	Final
Yellow-billed Cuckoo *Coccyzus americanus* https://ecos.fws.gov/ecp/species/3911#crithab	Proposed

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 should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

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, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list 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* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5113	Breeds elsewhere

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. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Bendire's Thrasher *Toxostoma bendirei* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9435	Breeds Mar 15 to Jul 31
Black Throated Sparrow *Amphispiza bilineata* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 15 to Sep 5
Black-chinned Sparrow *Spizella atrogularis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9447	Breeds Apr 15 to Jul 31
Black-throated Gray Warbler *Dendroica nigrescens* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 1 to Jul 20
Blue-throated Hummingbird *Lampornis clemenciae* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Feb 15 to Oct 10
Brewer's Sparrow *Spizella breweri* 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/9291	Breeds May 15 to Aug 10
Burrowing Owl *Athene cunicularia* 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/9737	Breeds Mar 15 to Aug 31
Cassin's Sparrow *Aimophila cassinii* 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	Breeds Aug 1 to Oct 10
Chestnut-collared Longspur *Calcarius ornatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 10

NAME	BREEDING SEASON
Clark's Grebe *Aechmophorus clarkii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jan 1 to Dec 31
Common Black-hawk *Buteogallus anthracinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 1 to Sep 20
Elf Owl *Micrathene whitneyi* 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/9085	Breeds May 1 to Jul 15
Golden Eagle *Aquila chrysaetos* 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/1680	Breeds Jan 1 to Aug 31
Grace's Warbler *Dendroica graciae* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 20 to Jul 20
Grasshopper Sparrow *Ammodramus savannarum ammolegus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Jun 1 to Aug 20
Gray Vireo *Vireo vicinior* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8680	Breeds May 10 to Aug 20
Hudsonian Godwit *Limosa haemastica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Lark Bunting *Calamospiza melanocorys* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 10 to Aug 15
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

NAME	BREEDING SEASON
Lewis's Woodpecker *Melanerpes lewis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9408	Breeds Apr 20 to Sep 30
Long-billed Curlew *Numenius americanus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/5511	Breeds Apr 1 to Jul 31
Long-eared Owl *asio otus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Marbled Godwit *Limosa fedoa* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9481	Breeds elsewhere
Mccown's Longspur *Calcarius mccownii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9292	Breeds May 1 to Aug 15
Mexican Whip-poor-will *Antrostomus arizonae* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Olive-sided Flycatcher *Contopus cooperi* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Phainopepla *phainopepla nitens* 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/1372	Breeds Mar 1 to Aug 20
Pinyon Jay *Gymnorhinus cyanocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15
Red-faced Warbler *Cardellina rubrifrons* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 10 to Jul 15

NAME	BREEDING SEASON
Rufous Hummingbird *selasphorus rufus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds elsewhere
Rufous-winged Sparrow *Aimophila carpalis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 15 to Sep 30
Semipalmated Sandpiper *Calidris pusilla* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Sprague's Pipit *Anthus spragueii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8964	Breeds elsewhere
Varied Bunting *Passerina versicolor* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 25 to Sep 30
Virginia's Warbler *Vermivora virginiae* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9441	Breeds May 1 to Jul 31
Whimbrel *Numenius phaeopus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9483	Breeds elsewhere
Willet *Tringa semipalmata* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5
Willow Flycatcher *Empidonax traillii* 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/3482	Breeds May 20 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 and understand the

FAQ “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.

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 (|)

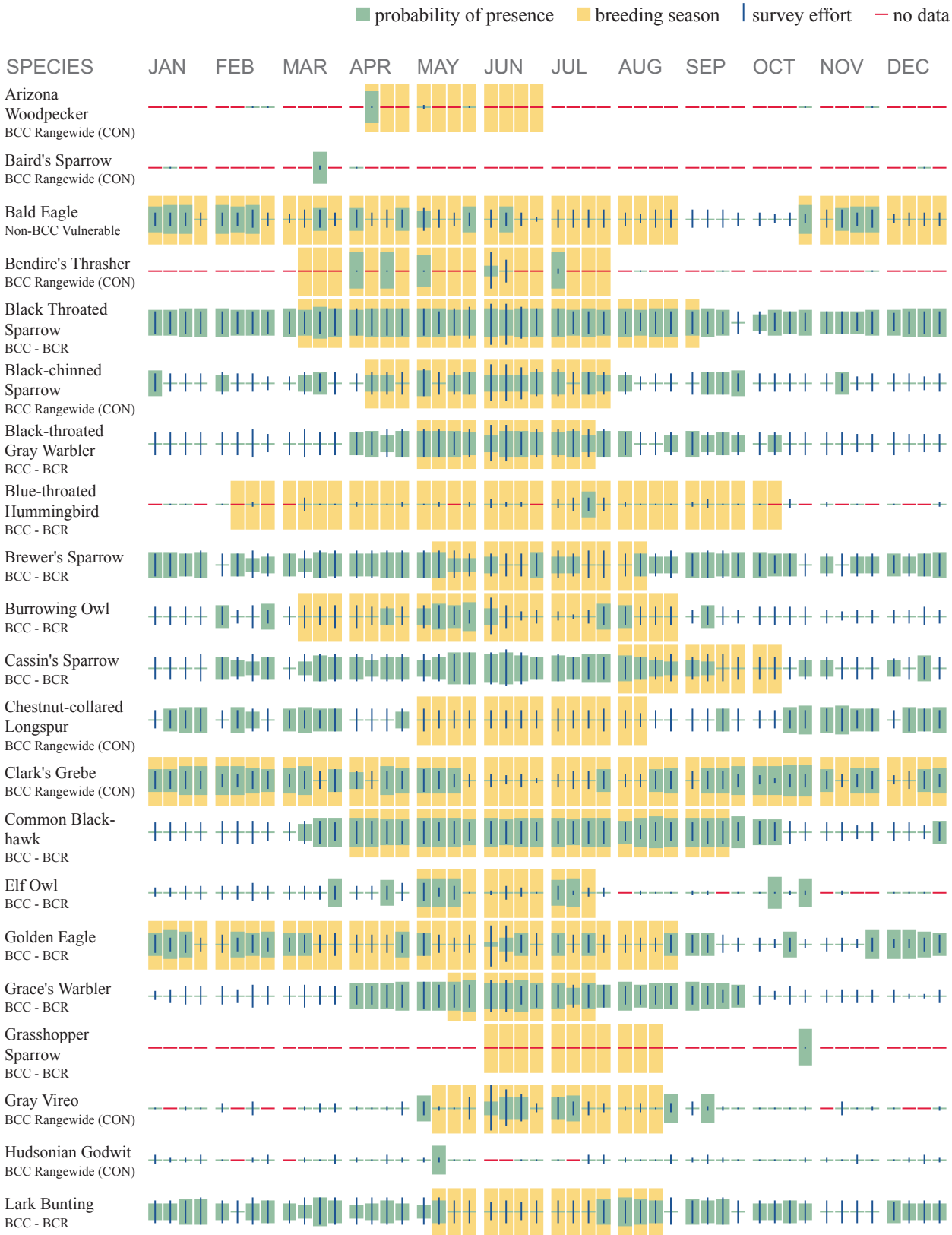
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

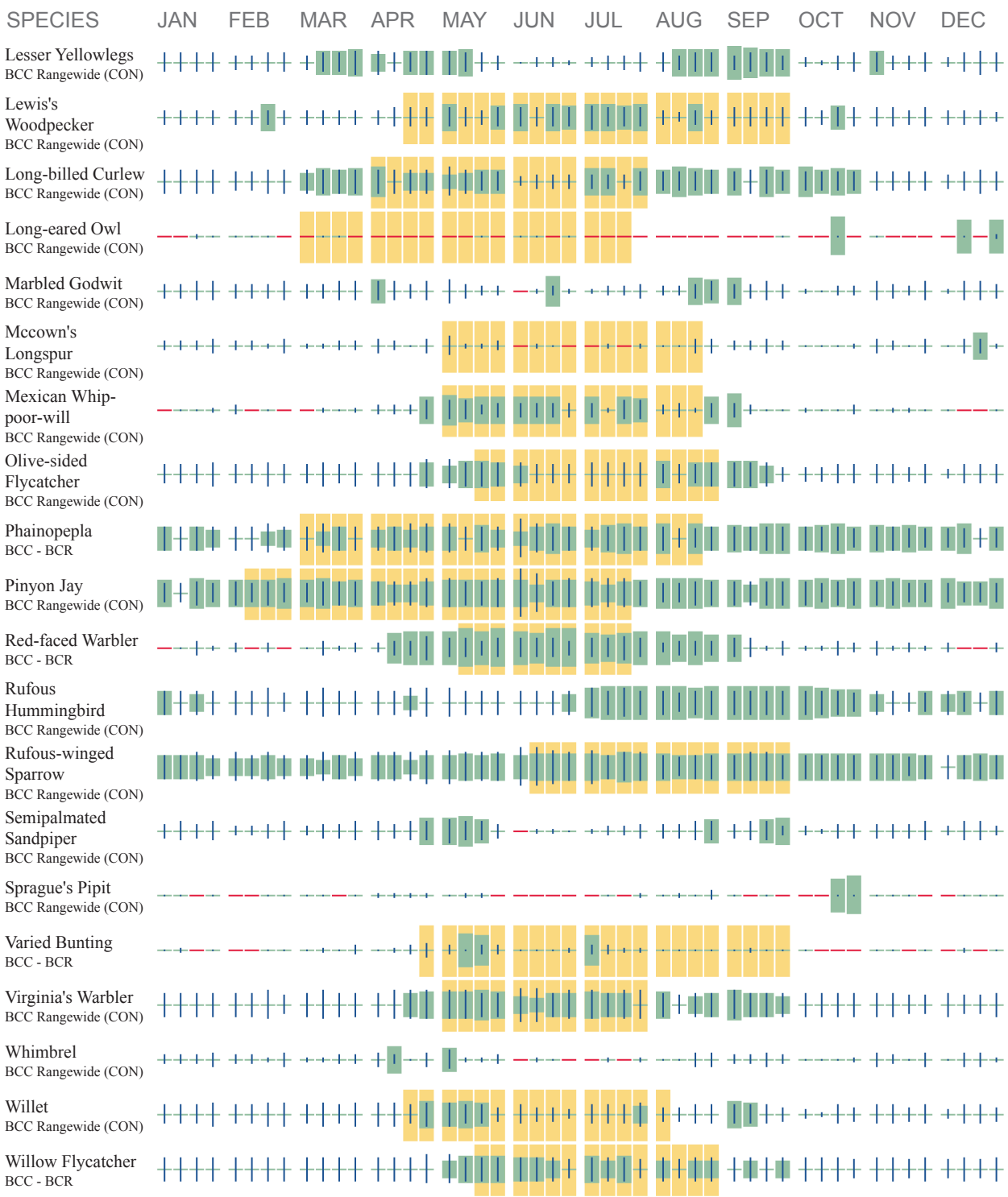
No Data (–)

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
SPECIES
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Arizona Woodpecker
BCC Rangewide (CON)
Baird's Sparrow
BCC Rangewide (CON)
Bald Eagle
Non-BCC Vulnerable
Bendire's Thrasher
BCC Rangewide (CON)
Black Throated Sparrow
BCC - BCR
Black-chinned Sparrow
BCC Rangewide (CON)
Black-throated Gray Warbler
BCC - BCR
Blue-throated Hummingbird
BCC - BCR
Brewer's Sparrow
BCC - BCR
Burrowing Owl
BCC - BCR
Cassin's Sparrow
BCC - BCR
Chestnut-collared Longspur
BCC Rangewide (CON)
Clark's Grebe
BCC Rangewide (CON)
Common Black-hawk
BCC - BCR
Elf Owl
BCC - BCR
Golden Eagle
BCC - BCR
Grace's Warbler
BCC - BCR
Grasshopper Sparrow
BCC - BCR
Gray Vireo
BCC Rangewide (CON)
Hudsonian Godwit
BCC Rangewide (CON)
Lark Bunting
BCC - BCR



Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php

- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

Migratory Birds FAQ

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 and/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 migratory birds potentially occurring 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 E-bird Explore Data 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, migrating or present year-round in my project 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 refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. 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.

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APPENDIX I
AIR OBSTRUCTION ANALYSIS

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Appendix I – Airspace Obstruction Analysis

1.0 Introduction – Objects Affecting Navigable Airspace

As set forth in Title 49 of the U.S. Code of Federal Regulations, §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 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 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.

Structure proponents or their representatives may file online at the FAA's OE/AAA website, http://oeaaa.faa.gov.

The FAA conducts an initial aeronautical study to determine whether the proposal would exceed obstruction standards under the provision of the FAR Part 77.23. An object constitutes an obstruction to air navigation if any of the following obstruction standards are exceeded:

- §77.23(a)(1) – A height more than 500 feet AGL at the object site.

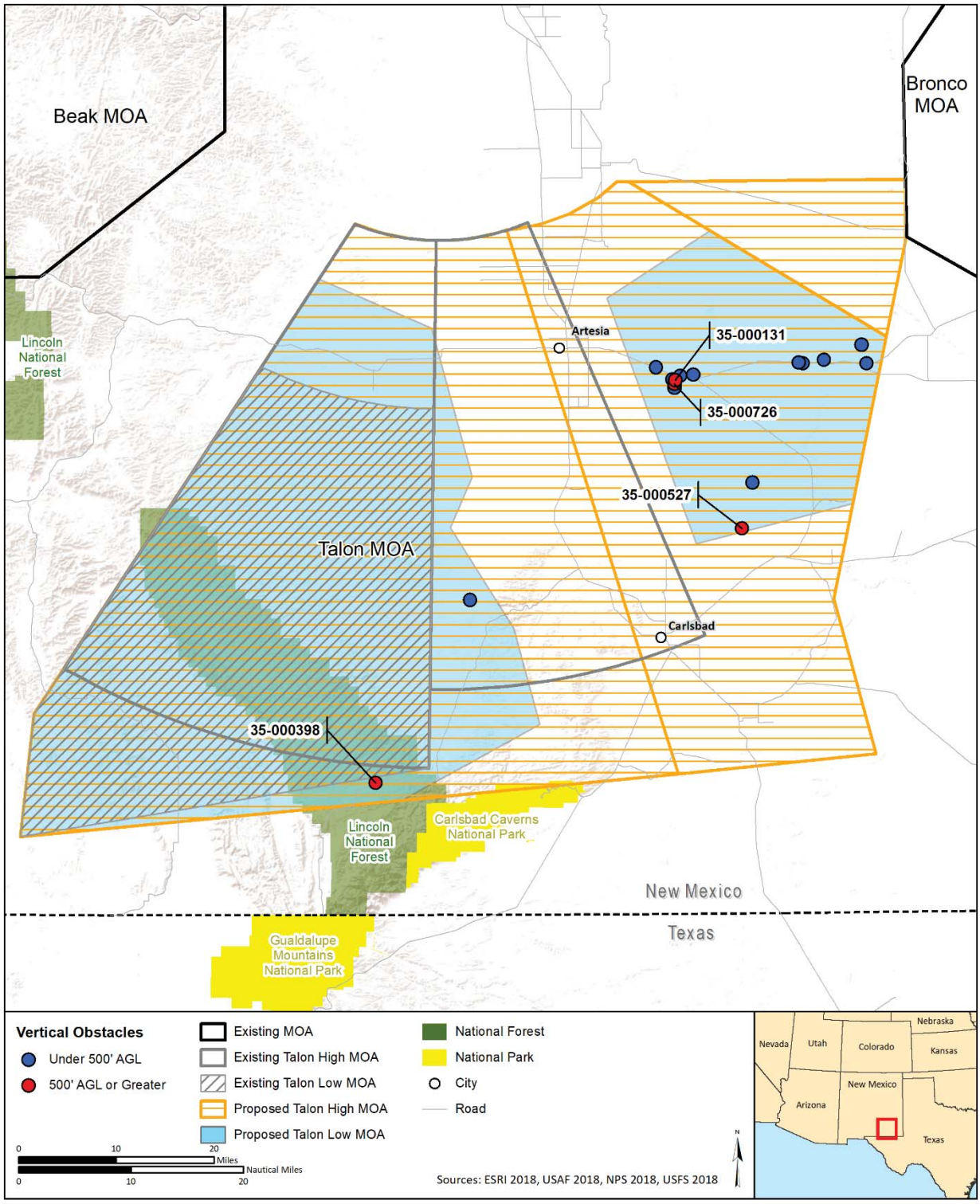
- §77.23(a)(2) – A height AGL or above the airport elevation, whichever is greater, exceeding 200 feet within 3 nautical miles (NM) of the airport, and that height increases at a rate of 100 feet per NM up to 500 feet within 6 miles.
- §77.23(a)(3) – A height that increases a minimum instrument flight altitude within a terminal area. This standard references instrument procedure criteria such as TERPS.
- §77.23(a)(4) – A height that increases a minimum obstruction clearance (MOCA) under enroute criteria.
- §77.23(a)(5) – The surface of a take-off and landing area of an airport or any imaginary surface defined in later sections: §77.25 for civil airports, §77.28 for military airports, and §77.29 for heliports.

2.0 Airspace Obstructions Beneath Proposed Airspace

Obstructions within each of the proposed low MOAs are shown below. Highlighted obstacles exceed the proposed 500 feet AGL floor of the low MOAs. As shown, only four obstacles are 500 ft AGL or greater. All are located in the proposed Talon Low A and B MOAs, as shown in **Figure 2-1**.

MOA Name	Obstacle ID	Height AGL (feet)	Obstacle Type	Lighting Type	Latitude	Longitude
LOBOS	35-001370	260	TOWER	D	32.7632	-108.1387
LOBOS	35-000038	206	TOWER	R	32.7814	-108.2703
LOBOS	35-022240	199	TOWER	N	32.5982	-108.9707
LOBOS	35-000155	199	TOWER	N	32.7808	-108.2000
LOBOS	35-031929	180	TOWER	N	32.9154	-107.9987
LOBOS	35-000847	124	TOWER	N	32.5823	-108.4252
LOBOS	35-022955	100	TOWER	N	32.7852	-108.2444
LOBOS	35-000275	70	TOWER	N	32.9244	-108.1797
LOBOS	35-031210	66	TOWER	N	32.5824	-108.4254
SMITTY	35-000741	364	TOWER	N	34.1545	-106.9303
SMITTY	35-000183	335	TOWER	D	34.0380	-107.4464
SMITTY	35-000793	303	TOWER	D	33.4651	-107.2428
SMITTY	35-000373	153	TOWER	R	34.1428	-107.2183
TALON	35-000131	1,054	TOWER	R	32.7939	-104.2083
TALON	35-000527	715	TOWER	R	32.5728	-104.0928
TALON	35-000398	513	TOWER	R	32.1972	-104.7370
TALON	35-000726	500	TOWER	D	32.7881	-104.2097
TALON	35-020008	486	TOWER	D	32.7950	-104.2133
TALON	35-000752	460	TOWER	R	32.8004	-104.1994
TALON	35-001292	349	TOWER	D	32.8171	-103.9833
TALON	35-000082	320	TOWER	R	32.8022	-104.1769
TALON	35-020036	306	TOWER	D	32.8164	-103.8710
TALON	35-022594	259	TOWER	D	32.6410	-104.0740
TALON	35-000057	230	TOWER	U	32.8222	-103.9464
TALON	35-000873	220	TOWER	D	32.8132	-104.2417
TALON	35-031620	195	TOWER	N	32.8183	-103.9911
TALON	35-031169	190	ANTENNA	N	32.7824	-104.2096
TALON	35-000361	170	TOWER	U	32.4692	-104.5706
TALON	35-006013	150	TOWER	U	32.8444	-103.8797

Source: FAA 2018
Notes: AGL = Above Ground Level; D = Medium Density White Strobe & Red; R = Red; N = None; U = Unknown

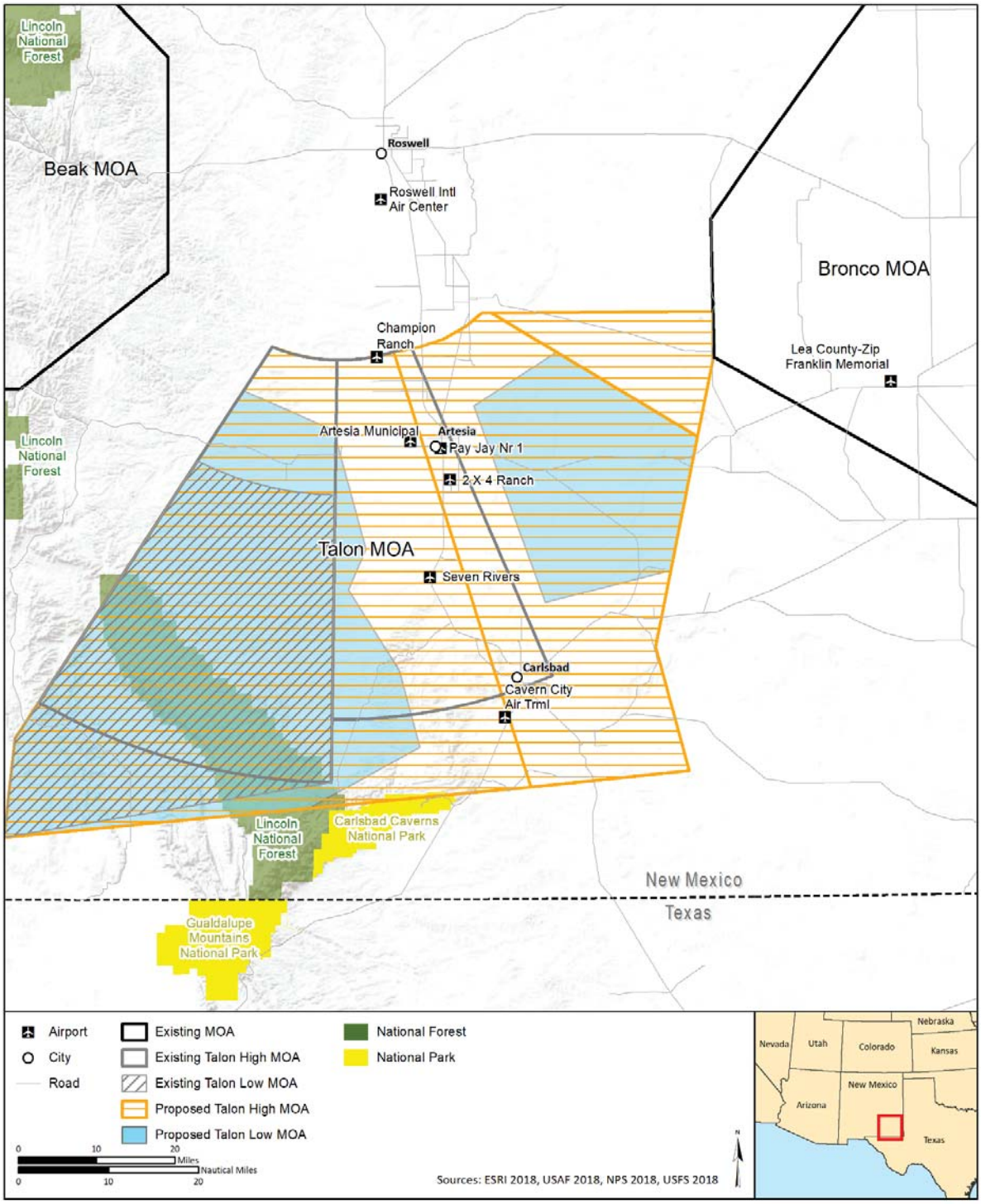


Legend: MOA-Military Operations Area; AGL-Above Ground Level

Figure 2.1 Obstructions under Talon Low A and Low B MOA Airspace

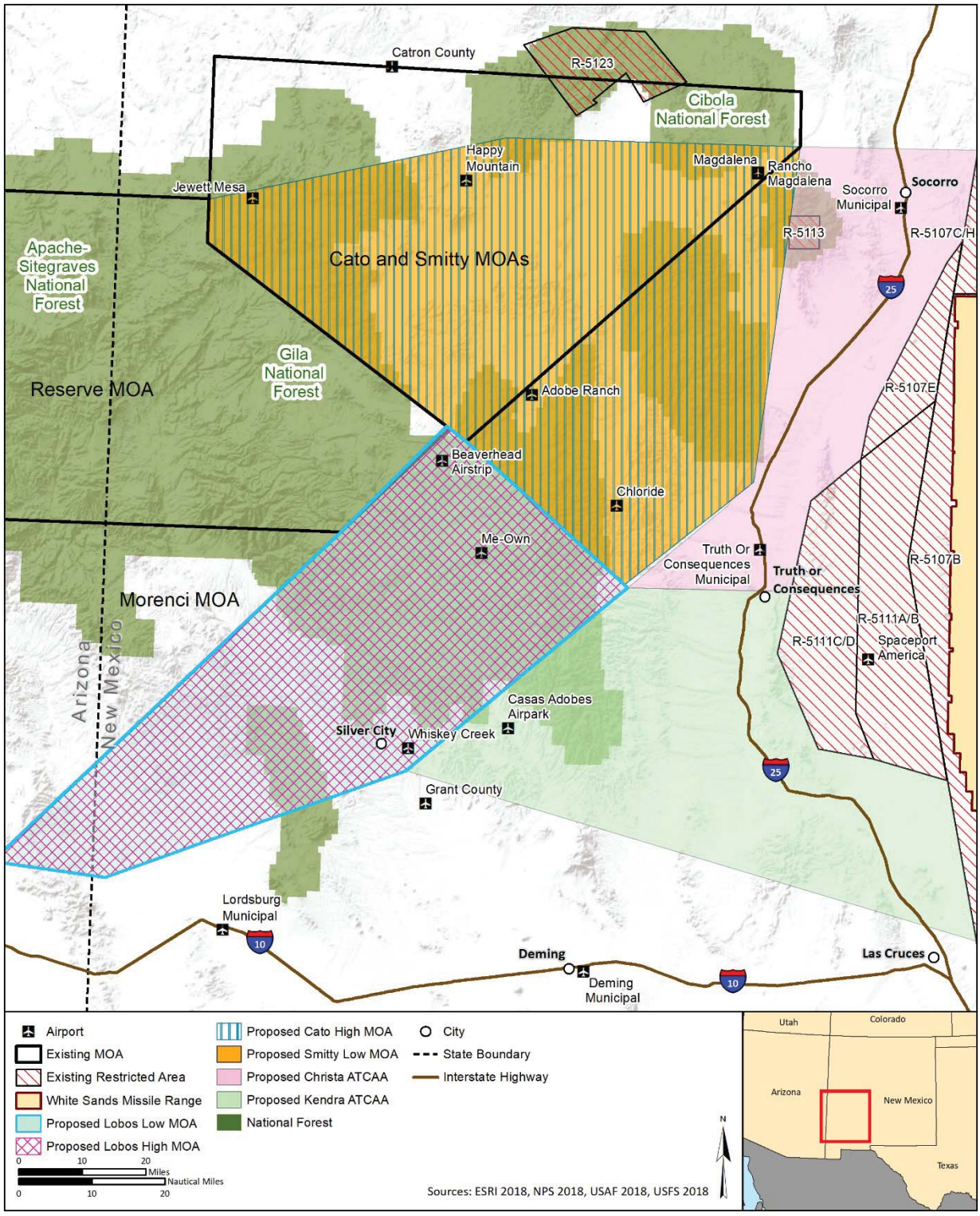
3.0 Airfields Beneath Proposed Airspace

Currently, 24 airfields exist within the project airspace. These can be seen in **Figures 3-1 and 3-2**.



Legend: MOA-Military Operations Area.

Figure 3-1. Airfields within Existing and Proposed Talon MOA

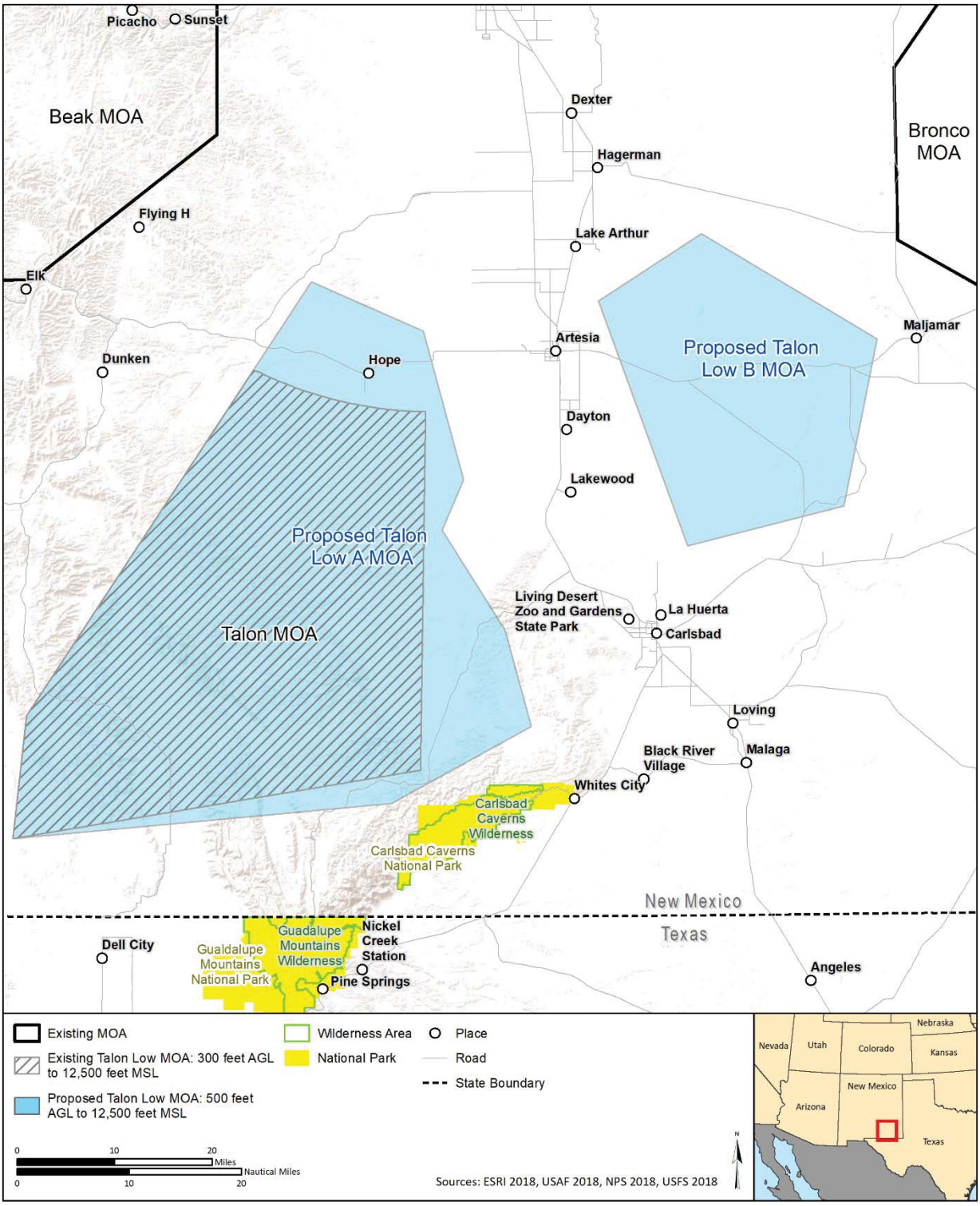


Legend: MOA-Military Operations Area.

Figure 3-2. Airfields within the Existing and Proposed Smitty and Lobos MOAs

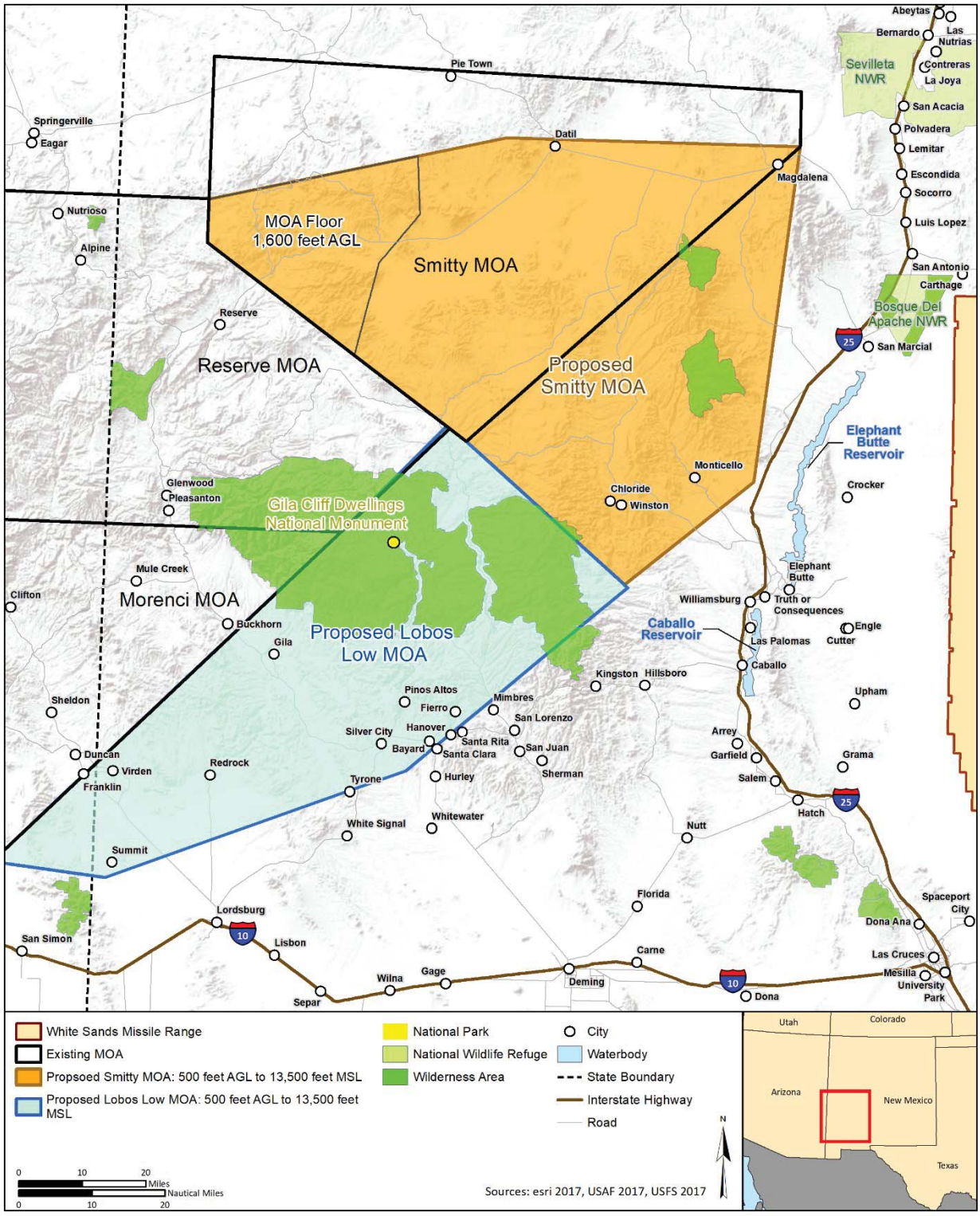
4.0 Areas with Overflight Restrictions within Proposed Airspace

Within the existing Smitty MOA, the western portion that partially overlies Gila National Forrest is currently charted with a minimum altitude of 1,600 feet AGL. This would continue to occur within the proposed Smitty MOA. Additionally, in accordance with the Aeronautical Information Manual (paragraph 7-4-6), pilots are requested to maintain a minimum altitude of 2,000 feet above the surface of the following: National Parks, Monuments, Seashores, Lakeshores, Recreation Areas and Scenic Riverways administered by the National Park Service; National Wildlife Refuges, Big Game Refuges, Game Ranges and Wildlife Ranges administered by the U.S. Fish and Wildlife Service; and Wilderness and Primitive areas administered by the U.S. Forest Service. In accordance with FAA minimum safe altitudes (14 CFR 91.119), aircraft must 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. Outside congested areas, aircraft must avoid persons, vessels, vehicles, or structures by 500 feet. **Figures 4-1 and 4-2** show the areas that qualify for these restrictions. These restrictions only apply to the proposed low MOAs since the floor of the proposed high MOAs would be well above the 2,000 feet AGL restriction.



Legend: MOA-Military Operations Area.

Figure 4-1.Areas under Proposed Talon Low MOAs Subject to Avoidance



Legend: MOA-Military Operations Area.

Figure 4-2. Areas under Proposed Smitty and Lobos Low MOAs Subject to Avoidance

APPENDIX J
NHPA AND NAGPRA CONSULTATION CORRESPONDENCE

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Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

New Mexico Historic Preservation Division
Attn: Jeff Pappas, PhD
State Historic Preservation Officer
Bataan Memorial Building
407 Galisteo Street, Suite 236
Sante Fe NM 87501

Dear Dr. Pappas

The United States Air Force is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with the proposed optimization of the special use airspace available for current and anticipated future pilot training at Holloman Air Force Base (AFB), New Mexico. Under the Proposed Action, existing special use airspace would be reconfigured and expanded or new special use airspace would be established to ensure the availability of training airspace today and into the future. The training airspace used by aircraft assigned to Holloman AFB today was developed for legacy aircraft. This airspace does not have the optimum volume, proximity, availability or attributes needed to support the Holloman AFB training mission. The purpose of the Proposed Action is to ensure consistent availability of adequately sized and configured training airspace needed to conduct multiple, simultaneous training missions. The Proposed Action would increase training efficiencies and provide more scheduling flexibility.

The proposed airspace modifications would include reconfiguring and expanding existing airspace or creating new airspace within parts of the following counties: Graham and Greenlee, Arizona; and Chaves, Catron, Eddy, Grant, Hidalgo, Otero, Sierra, and Socorro, New Mexico (see attachment). The Proposed Action would include aircraft operations from 500 feet above ground level (AGL) up to Flight Level (FL) 500 (50,000 feet above mean sea level [MSL]). The Proposed Action includes supersonic flight above FL300 (30,000 feet above MSL) as well as the use of chaff throughout the designated airspace and flares above 2,000 feet AGL.

The environmental analysis for the Proposed Action is being conducted by the Air Force Civil Engineer Center in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs* and 36 Code of Federal Regulations Part 800 of the National Historic Preservation Act, this letter initiates consultation with your office regarding the Proposed Action. Additional information on determining the Area of Potential Effects, Identifying Historic Properties, determining effects will be forthcoming as the analyses are completed.

The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on August 24, 2017, initiating the public involvement process. Open-house style public meetings will be held at the locations, dates, and times listed below. The purpose of the meetings is to provide information

about the proposal and solicit comments on the scope of environmental issues to be addressed in the EIS. No formal presentation will be given. Please attend at your convenience.

Tuesday September 12, 2017 6:00 PM to 8:00 PM Carlsbad Public Library 101 S. Halagueno Street Carlsbad, NM 88220	Wednesday, September 13, 2017 6:00 PM to 8:00 PM Truth or Consequences Civic Center Ralph Edwards Auditorium 400 W. 4th Avenue Truth or Consequences, NM 87901	Thursday, September 14, 2017 6:00 PM to 8:00 PM Hilton Garden Inn 2550 S. Don Roser Dr. Las Cruces, NM 88001

We request your participation and solicit your comments on the Proposed Action. Though comments will be accepted throughout the EIS process, please provide your comments no later than September 25, 2017 to ensure consideration in the Draft EIS. Comments may be submitted at any of the public meetings; on the project website, www.HollomanAFBAirspaceEIS.com; or in writing to: Holloman AFB Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666.

My point of contact and Cultural Resources Manager for this project is Mr. Andrew Gomolak. He may be reached at (575) 572-6647, andrew.gomolak@us.af.mil. Please feel free to contact him directly for additional information or with any questions may have. Thank you for your assistance in this matter.

HOUSTON R. CANTWELL, Colonel, USAF
Commander

Attachment
1. Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Arizona State Parks
State Historic Perservation Office
Attn: Kathryn Leonard
State Historic Preservation Officer
1100 W. Washington Street, Suite 190
Phoenix AZ 85085

Dear Ms. Leonard

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with the proposed optimization of the special use airspace available for current and anticipated future pilot training at Holloman Air Force Base (AFB), New Mexico. Under the Proposed Action, existing special use airspace would be reconfigured and expanded or new special use airspace would be established to ensure the availability of training airspace today and into the future. The training airspace used by aircraft assigned to Holloman AFB today was developed for legacy aircraft. This airspace does not have the optimum volume, proximity, availability or attributes needed to support the Holloman AFB training mission. The purpose of the Proposed Action is to ensure consistent availability of adequately sized and configured training airspace needed to conduct multiple, simultaneous training missions. The Proposed Action would increase training efficiencies and provide more scheduling flexibility.

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

SHPO - 2017 - 1201 (138898) lgc
ARIZONA STATE HISTORIC PRESERVATION OFFICE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

RECEIVED
AUG 31 2017
ARIZONA STATE HISTORIC PRESERVATION OFFICE

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Arizona State Parks
State Historic Perservation Office
Attn: Kathryn Leonard
State Historic Preservation Officer
1100 W. Washington Street, Suite 190
Phoenix AZ 85085

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HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

Lois Powell 9-14-17
AZ STATE HISTORIC PRESERVATION OFFICE
Thank you for the information. We have no comments at this time.

S.H.P.O.
State Historic Preservation Office
1100 West Washington Street
Phoenix, AZ 85007-2935

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Holloman AFB Airspace EIS
c/o Cardno
501 Butler Farms Rd, Ste H
Hampton, VA 23666

HMW-EMB 23666

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Charles Riley
U.S. Department of the Interior Indian Affairs
Mescalero Agency
P.O. Box 189
Mescalero, NM 88340

Dear Mr. Riley

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and may not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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1. Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

William Walker
U.S. Department of the Interior Indian Affairs
Southwest Regional Office
1001 Indian School Road, NW
Albuquerque, NM 87104

Dear Mr. Walker

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We request your participation and solicit your comments on the Proposed Action. Though comments will be accepted throughout the EIS process, please provide your comments no later than September 25, 2017 to ensure consideration in the Draft EIS. Comments may be submitted at any of the public meetings; on the project website, www.HollomanAFBAirspaceEIS.com; or in writing to: Holloman AFB Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666.

My point of contact and Cultural Resources Manager for this project is Mr. Andrew Gomolak. He may be reached at (575) 572-6647, andrew.gomolak@us.af.mil. Please feel free to contact him directly for additional information or with any questions may have. Thank you for your assistance in this matter.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1. Project Area Map

United States Department of the Interior
Bureau of Indian Affairs
Southwest Region
1001 Indian School Road N.W.
Albuquerque, New Mexico 87104-2303

TAKE PRIDE IN AMERICA

In Reply Refer To:
620-Division of Environmental, Safety,
and Cultural Resources Management

OCT 04 2017

Holloman Air Force Base Airspace EIS
c/o Cardno
501 Butler Farm Rd., Suite H
Hampton, Virginia 23666

To Whom It May Concern:

The Bureau of Indian Affairs (BIA), Division of Environmental, Safety, and Cultural Resources Management has received your request for comments regarding the Draft Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with the proposed optimization of the special use airspace available for current and anticipated future pilot training at Holloman Air Force Base, New Mexico. We recommend that the Department of Defense contact tribes and pueblos on a government-to-government basis regarding environmental issues and impacts to resources, specifically cultural resources in relation to the proposed action.

As is, the proposed action does not impact any trust resources under the jurisdiction of the BIA. Therefore, our office does not have any comments; however we may choose to participate in subsequent stages of the EIS process.

Thank you for the opportunity to participate and comment on the proposed action. If you have any questions or concerns, please contact Mrs. Priscilla J. Avila at (505) 563-3417.

Sincerely,

Regional Director

U.S. Department of the Interior
Bureau of Indian Affairs-Southwest Region
1001 Indian School Rd., NW
Albuquerque, New Mexico 87104

ALBUQUERQUE
NM 870
17 OCT '17
PM 2 L





Holloman Air Force Base Airspace EIS
c/o Cardno
501 Butler Farm Rd., Suite H
Hampton, Virginia 23666

23666-177780



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

New Mexico Indian Affairs Department
David Mann
Wendell Chino Building, 2nd Floor
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Mann

The United States Air Force is preparing an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts associated with the proposed optimization of the special use airspace available for current and anticipated future pilot training at Holloman Air Force Base (AFB), New Mexico. Under the Proposed Action, existing special use airspace would be reconfigured and expanded or new special use airspace would be established to ensure the availability of training airspace today and into the future. The training airspace used by aircraft assigned to Holloman AFB today was developed for legacy aircraft. This airspace does not have the optimum volume, proximity, availability or attributes needed to support the Holloman AFB training mission. The purpose of the Proposed Action is to ensure consistent availability of adequately sized and configured training airspace needed to conduct multiple, simultaneous training missions. The Proposed Action would increase training efficiencies and provide more scheduling flexibility.

The proposed airspace modifications would include reconfiguring and expanding existing airspace or creating new airspace within parts of the following counties: Graham and Greenlee, Arizona; and Chaves, Catron, Eddy, Grant, Hidalgo, Otero, Sierra, and Socorro, New Mexico (see attachment). The Proposed Action would include aircraft operations from 500 feet above ground level (AGL) up to Flight Level (FL) 500 (50,000 feet above mean sea level [MSL]). The Proposed Action includes supersonic flight above FL300 (30,000 feet above MSL) as well as the use of chaff throughout the designated airspace and flares above 2,000 feet AGL.

The Air Force published a Notice of Intent in the *Federal Register* on August 24, 2017 to prepare an EIS, initiating the public involvement process. Open-house style public scoping meetings will be held at the locations, dates, and times listed below. No formal presentation will be given, please attend at your convenience.

Tuesday September 12, 2017 6:00 PM to 8:00 PM Carlsbad Public Library 101 S. Halagueno Street Carlsbad, NM 88220	Wednesday, September 13, 2017 6:00 PM to 8:00 PM Truth or Consequences Civic Center Ralph Edwards Auditorium 400 W. 4th Avenue Truth or Consequences, NM 87901	Thursday, September 14, 2017 6:00 PM to 8:00 PM Hilton Garden Inn 2550 S Don Roser Drive Las Cruces, NM 88011

We request your participation and solicit your comments on the Proposed Action. Though comments will be accepted throughout the EIS process, please provide your comments no later than September 25, 2017 to ensure consideration in the Draft EIS. Comments may be submitted at any of the public meetings; on the project website, www.HollomanAFBAirspaceEIS.com; or in writing to: Holloman AFB Airspace EIS, c/o Cardno, 501 Butler Farm Rd., Suite H, Hampton, VA 23666.

My point of contact and Cultural Resources Manager for this project is Mr. Andrew Gomolak. He may be reached at (575) 572-6647, andrew.gomolak@us.af.mil. Please feel free to contact him directly for additional information or with any questions may have. Thank you for your assistance in this matter.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment: Project Area Map

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Heritage and Historic Preservation Department
The Navajo Nation
Mr. Richard Begay
PO BOX 4950
Window Rock, AZ 86515

Dear Mr. Begay:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

As a part of the NEPA process, government-to-government consultation with Federally recognized Native American Tribes is required per Executive Order 13175: Memorandum on Government-to-Government Relations with Native American Tribal Governments; Department of Defense (DoD) Instruction 4710.02: DoD Interactions with Federally-Recognized Tribes; and Air Force Instruction (AFI) 90-2002: Air Force Interactions with Federally-Recognized Tribes. In addition, consultations are being conducted in accordance with the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800.

The Air Force would like to initiate consultations on this proposal on a government-to-government basis. As the 49th Wing Commander, I am offering to discuss our proposal in detail with you, and would like to hear from you regarding any comments, concerns, and suggestions you may have. In addition, open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given, but we invite you to attend at your convenience.

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If you wish to meet with me to discuss the proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (575) 572-5571 to arrange a meeting.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1.Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Historic Preservation and Arch Department
San Carlos Apache Tribe
Ms. Vernelda Grant
PO BOX 0
San Carlos, AZ 85550

Dear Ms. Grant:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

As a part of the NEPA process, government-to-government consultation with Federally recognized Native American Tribes is required per Executive Order 13175: Memorandum on Government-to-Government Relations with Native American Tribal Governments; Department of Defense (DoD) Instruction 4710.02: DoD Interactions with Federally-Recognized Tribes; and Air Force Instruction (AFI) 90-2002: Air Force Interactions with Federally-Recognized Tribes. In addition, consultations are being conducted in accordance with the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800.

The Air Force would like to initiate consultations on this proposal on a government-to-government basis. As the 49th Wing Commander, I am offering to discuss our proposal in detail with you, and would like to hear from you regarding any comments, concerns, and suggestions you may have. In addition, open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given, but we invite you to attend at your convenience.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Mescalero Apache Tribe
Ms. Holly Houghten
PO Box 227
Mescalero, NM 88340

Dear Ms. Houghten:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

As a part of the NEPA process, government-to-government consultation with Federally recognized Native American Tribes is required per Executive Order 13175: Memorandum on Government-to-Government Relations with Native American Tribal Governments; Department of Defense (DoD) Instruction 4710.02: DoD Interactions with Federally-Recognized Tribes; and Air Force Instruction (AFI) 90-2002: Air Force Interactions with Federally-Recognized Tribes. In addition, consultations are being conducted in accordance with the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Zuni Heritage & Historic Preservation
Mr. Kurt Dongoske
PO BOX 1149
San Carlos, AZ 87327

Dear Mr. Dongoske:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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If you wish to meet with me to discuss the proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (575) 572-5571 to arrange a meeting.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Acoma
Governor Kurt Riley
PO BOX 309
Acoma, NM 87034

Dear Governor Riley:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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1.Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Cochiti
Governor Eugene Herrera
PO BOX 70
Cochiti Pueblo, NM 87072

Dear Governor Herrera:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Isleta
Governor Jose R. Benavides
PO BOX 1270
Isleta Pueblo, NM 87022

Dear Governor Benavides:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Jemez
Governor Joseph Toya
PO BOX 100
Jemez Pueblo, NM 87024

Dear Governor Toya:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1.Project Area Map

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Laguna
Governor Virgil Siow
PO BOX 194
Laguna Pueblo, NM 87026

Dear Governor Siow:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Nambe
Governor Phillip A. Perez
Route 1, Box 117-BB
Santa Fe, NM 87506

Dear Governor Perez:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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If you wish to meet with me to discuss the proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (575) 572-5571 to arrange a meeting.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1.Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Ohkay Owingeh
Governor Peter Garcia, Jr.
PO BOX 1099
San Juan Pueblo, NM 87566

Dear Governor Garcia, Jr.:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Picuris
Governor Craig Quanchello
PO BOX 127
Penasco, NM 87553

Dear Governor Quanchello:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Pojoaque
Governor Joseph M. Talachy
78 Cities of Gold Road
Santa Fe, NM 87506

Dear Governor Talachy:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of San Felipe
Governor Anthony Ortiz
PO BOX 4339
San Felipe Pueblo, NM 87001

Dear Governor Ortiz:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of San Ildefonso
Governor James R. Mountain
02 Tunyo Po
Santa Fe, NM 87506

Dear Governor Mountain:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Sandia
Governor MalColonelm Montoya
481 Sandia Loop
Bernalillo, NM 87004

Dear Governor Montoya:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Santa Ana
Governor Lawrence Montoya
2 Dove Road
Santa Ana Pueblo, NM 87004

Dear Governor Montoya:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Santa Clara
Governor J. Michael Chavarria
PO BOX 580
Espanola, NM 87532

Dear Governor Chavarria:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Santo Domingo
Governor Brian Coriz
PO BOX 99
Santo Domingo Pueblo, NM 87052

Dear Governor Coriz:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Taos
Governor Ruben Romero
PO BOX 1846
Taos, NM 87571

Dear Governor Romero:

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HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Tesuque
Governor Mark Mitchell
Route 42, Box 360-T
Santa Fe, NM 87506

Dear Governor Mitchell:

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The Air Force would like to initiate consultations on this proposal on a government-to-government basis. As the 49th Wing Commander, I am offering to discuss our proposal in detail with you, and would like to hear from you regarding any comments, concerns, and suggestions you may have. In addition, open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given, but we invite you to attend at your convenience.

Tuesday September 12, 2017	Wednesday, September 13, 2017	Thursday, September 14, 2017
6:00 PM to 8:00 PM	6:00 PM to 8:00 PM	6:00 PM to 8:00 PM
Carlsbad Public Library	Truth or Consequences Civic Center	Hilton Garden Inn
101 S. Halagueno Street	Ralph Edwards Auditorium	2550 S Don Roser Drive
Carlsbad, NM 88220	400 W. 4th Avenue	Las Cruces, NM 88011
	Truth or Consequences, NM 87901	

If you wish to meet with me to discuss the proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (575) 572-5571 to arrange a meeting.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1.Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Zia
Governor Carl B. Schildt
135 Capitol Square Dr.
Zia Pueblo, NM 87053

Dear Governor Schildt:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

As a part of the NEPA process, government-to-government consultation with Federally recognized Native American Tribes is required per Executive Order 13175: Memorandum on Government-to-Government Relations with Native American Tribal Governments; Department of Defense (DoD) Instruction 4710.02: DoD Interactions with Federally-Recognized Tribes; and Air Force Instruction (AFI) 90-2002: Air Force Interactions with Federally-Recognized Tribes. In addition, consultations are being conducted in accordance with the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800.

The Air Force would like to initiate consultations on this proposal on a government-to-government basis. As the 49th Wing Commander, I am offering to discuss our proposal in detail with you, and would like to hear from you regarding any comments, concerns, and suggestions you may have. In addition, open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given, but we invite you to attend at your convenience.

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If you wish to meet with me to discuss the proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (575) 572-5571 to arrange a meeting.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1.Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (ACC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

Colonel Houston R. Cantwell
Commander, 49th Wing
490 First Street
Holloman AFB NM 88330-8277

Pueblo of Zuni
Governor Val Panteah, Sr.
PO BOX 339
Zuni, NM 87327

Dear Governor Panteah, Sr.:

Pursuant to the National Environmental Policy Act of 1969, as amended, and its implementing regulations, The United States Air Force (Air Force) is preparing an EIS to evaluate the potential environmental impacts of optimizing the special use airspace available for pilot training at Holloman AFB. Some of the training airspaces used by aircraft assigned to Holloman AFB were developed for legacy aircraft more than 30 years ago and do not have the optimum volume, proximity, times or attributes to support pilot training missions at Holloman AFB. The Proposed Action would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see attachment). The Air Force published a Notice of Intent in the Federal Register on August 24, 2017 to prepare an EIS.

As a part of the NEPA process, government-to-government consultation with Federally recognized Native American Tribes is required per Executive Order 13175: Memorandum on Government-to-Government Relations with Native American Tribal Governments; Department of Defense (DoD) Instruction 4710.02: DoD Interactions with Federally-Recognized Tribes; and Air Force Instruction (AFI) 90-2002: Air Force Interactions with Federally-Recognized Tribes. In addition, consultations are being conducted in accordance with the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800.

The Air Force would like to initiate consultations on this proposal on a government-to-government basis. As the 49th Wing Commander, I am offering to discuss our proposal in detail with you, and would like to hear from you regarding any comments, concerns, and suggestions you may have. In addition, open-house style public meetings will be held at the locations, dates, and times listed below. No formal presentation will be given, but we invite you to attend at your convenience.

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If you wish to meet with me to discuss the proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (575) 572-5571 to arrange a meeting.

Sincerely,

HOUSTON R. CANTWELL, Colonel, USAF
Commander

1 Attachment
1.Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman Bobby Komardley
Apache Tribe of Oklahoma
PO Box 1220
Anadarko OK 73005

Dear Chairman Komardley

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the Apache Tribe of Oklahoma. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman William Nelson
Comanche Nation of Oklahoma
PO Box 908
Lawton OK 73502

Dear Chairman Nelson

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the Comanche Nation of Oklahoma. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman Jeff Hazous
Fort Sill Apache Tribe of Oklahoma
Rt. 2, Box 121
Apache OK 73006

Dear Chairman Hazous

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the Fort Sill Apache Tribe of Oklahoma. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman Matthew Komalty
Kiowa Tribe of Oklahoma
PO Box 369
Carnegie OK 73015

Dear Chairman Komalty

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the Kiowa Tribe of Oklahoma. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Ms. Kelly J. Poolaw, Acting THPO
Kiowa Tribe of Oklahoma

P.O. Box 50 I Carnegie, OK 73015 I 405.203.2874

January 10, 2019

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste. 1700
Holloman AFB, NM 88330-8277

RE: Section 106 Consultation and Review of Proposed Environmental Impact Statement (EIS), to evaluate potential impacts associated with optimizing the special use airspace available for pilot training at Holloman AFB, Otero County, NM

Dear Colonel Campo,

The Kiowa Tribe Office of Historic Preservation has received the information and materials requested for our Section 106 Review and Consultation. Section 106 of the National Historic Preservation Act of 1966 (NHPA), and 36 CFR Part 800 requires consultation with the Kiowa Tribe.

Given the information provided, you are hereby notified that the proposal project location should have minimal potential to adversely affect any known Archaeological, Historical, or Sacred Kiowa sites. Therefore, in accordance with 36 CFR 800.4(d) (1), you may proceed with your proposed project. However, please be advised undiscovered properties may be encountered and must be immediately reported to the Kiowa Tribe Office of Historic Preservation under both the NHPA and NAGPRA regulations.

This information is provided to assist you in complying with 36 CFR Part 800 for Section 106 Consultation procedures. Please retain this correspondence to show compliance. Should you have any questions, please do not hesitate to contact me at kellie@tribaladminservices.org. Thank you for your time and consideration.

Sincerely,

Kellie J. Lewis
Acting Tribal Historic Preservation Officer (THPO)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

President Arthur Blazer
Mescalero Apache Tribe
PO Box 227
Mescalero NM 88340

Dear President Blazer

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the Mescalero Apache Tribe. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Ms. Holly Houghton, THPO
Mescalero Apache Tribe

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Governor Kurt Riley
Pueblo of Acoma
PO Box 309
Acoma NM 87034

Dear Governor Riley

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from Pueblo of Acoma. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Mr. Damian Garcia, THPO
Acoma Historic Preservation Office, Pueblo of Acoma

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Governor J. Robert Benavides
Pueblo of Isleta
PO Box 1270
Isleta Pueblo NM 87034

Dear Governor Benavides

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from Pueblo of Isleta. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Dr. Henry Walt, THPO
Pueblo of Isleta

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Governor Virgil Siow
Pueblo of Laguna
PO Box 194
Laguna NM 87026

Dear Governor Siow

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from Pueblo of Laguna. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Mr. Adam Ringia, Acting THPO
Pueblo of Laguna

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Governor Frederick Vigil
Pueblo of Tesuque
Route 42, Box 360-T
Santa Fe NM 87506

Dear Governor Vigil

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August, 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from Pueblo of Tesuque. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Mr. Mark Mitchell, THPO
Pueblo of Tesuque

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman Terry Rambler
San Carlos Apache Tribe
PO Box 0
San Carlos AZ 85550

Dear Chairman Rambler

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the San Carlos Apache Tribe. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Ms. Vernelda Grant, THPO
Historic Preservation and Arch Department, San Carlos Apache Tribe

Received from Tribal Admin 02/04/19 VN

E-mailed 02/05/19 VN (initial & date)

Scanned 02/05/19 VN (initial & date)

SAN CARLOS APACHE TRIBE
Historic Preservation & Archaeology Department
P.O. Box 0
San Carlos Arizona 85550
Tel. (928) 475-5797, apachevern@yahoo.com

Tribal Consultation Response Letter

Date: January 15, 2019

Contact Name: Allison Harvey (575)572-3931/Allison.harvey.1.ctr@us.af.mil

Company: Department of the Air Force

Address: 49th Wing Commander 490 First Street, Ste 1700 Holloman AFB NM 88330-8277

Project Name/#: USAF is preparing an EIS under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training.

Dear Sir or Madam:

Under Section 106 and 110 of the National Historic Preservation Act, we are replying to the above referenced project. Please see the appropriate marked circle, including the signatures of Vernelda Grant, Tribal Historic Preservation Officer (THPO), and the concurrence of the Chairman of the San Carlos Apache Tribe:

- ○ **NO INTEREST/NO FURTHER CONSULTATION/NO FUTURE UPDATES**
  We defer to the Tribe located nearest to the project area.
- ⊗ **CONCURRENCE WITH REPORT FINDINGS & THANK YOU**
- ⊗ **REQUEST ADDITIONAL INFORMATION**
  I require additional information in order to provide a finding of effect for this proposed undertaking, i.e. Project description ___ Map ___ Photos X Other Please call us @ # listed above.
- ○ **NO EFFECT** We may have concerns about flights over Acorn Picking areas.
  I have determined that there are no properties of religious and cultural significance to the San Carlos Apache Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.
- ○ **NO ADVERSE EFFECT**
  Properties of cultural and religious significance within the area of effect have been identified that are eligible for listing in the National Register for which there would be no adverse effect as a result of the proposed project.
- ○ **ADVERSE EFFECT**
  I have identified properties of cultural and religious significance within the area of potential effect that are eligible for listing in the National Register. I believe the proposed project would cause an adverse effect on these properties. Please contact the THPO for further discussion.

We were taught traditionally not to disturb the natural world in a significant way, and that to do so may cause harm to oneself or one's family. Apache resources can be best protected by managing the land to be as natural as it was in pre-1870s settlement times. Please contact the THPO, if there is a change in any portion of the project, especially if Apache cultural resources are found at any phase of planning and construction. Thank you for contacting the San Carlos Apache Tribe, your time and effort is greatly appreciated.

DIRECTOR/THPO: Vernelda J. Grant 01/22/19
Vernelda J. Grant, Tribal Historic Preservation Officer — Date

CONCURRENCE: Terry Rambler 1/25/19
Terry Rambler, Tribal Chairman — Date

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman Timothy L. Nuvangyaoma
The Hopi Tribe
PO Box 123
Kykotsmovi AZ 86039

Dear Chairman Nuvangyaoma

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from The Hopi Tribe. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Mr. Stewart Koyiyumptewa, Acting THPO
Cultural Preservation Office Director, The Hopi Tribe

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

President Russell Begaye
The Navajo Nation
PO Box 7440
Widow Rock AZ 86515

Dear President Begaye

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from The Navajo Nation. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Mr. Richard Begay, THPO
Historic Preservation Department, The Navajo Nation

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Chairman Ronnie Lupe
White Mountain Apache Tribe
PO Box 700
Whiteriver AZ 85926

Dear Chairman Lupe

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the White Mountain Apache Tribe. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map

cc:
Mr. Mark Altaha, THPO
White Mountain Apache Tribe

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 49TH WING (AETC)
HOLLOMAN AIR FORCE BASE NEW MEXICO

DEC 14 2018

Colonel Joseph L. Campo
49th Wing Commander
490 First Street, Ste 1700
Holloman AFB NM 88330-8277

Governor Carlos Hisa
Ysleta del Sur Pueblo
P119 S. Old Pueblo Road
Ysleta del Sur Pueblo TX 79917

Dear Governor Hisa

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act to evaluate potential environmental impacts associated with optimizing the special use airspace available for pilot training at Holloman Air Force Base (AFB), New Mexico. Per Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations in 36 CFR Part 800, the USAF is accounting for various environmental concerns and engaging early with tribal governments as it formulates the proposed undertaking.

The proposed undertaking addressed in the Special Use Airspace Optimization EIS would increase training efficiencies and provide more scheduling flexibility by reconfiguring and expanding existing airspace or creating new airspace (see Attachment). The Air Force published a Notice of Intent to prepare an EIS in the Federal Register on 24 August 2017. Although the conceptual proposal distributed September 2017 is still under development with the Federal Aviation Administrative (FAA), the USAF welcomes additional input on this proposal from the Ysleta del Sur Pueblo. Therefore, we would like to initiate government-to-government consultation at this time to afford you the opportunity to identify any issues or areas of concern you feel should be included in the environmental analysis, and any properties of religious and cultural significance that may be affected. Your input will help us develop the Description of the Proposed Action and Alternatives (DOPAA) that will be presented in the Draft EIS.

In order to arrange initiation of our consultations, or if you have any questions, please contact Ms. Allison Harvey, Acting Cultural Resources Manager, at (575) 572-3931 or allison.harvey.1.ctr@us.af.mil. I look forward to our consultations concerning this matter.

Sincerely

JOSEPH L. CAMPO, Colonel, USAF
Commander

Attachment:
Project Area Map