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AICUZ PROGRAM MANAGEMENT

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This publication aligns with DAFI 32-1015, *Integrated Installation Planning*, (2025). This Handbook provides base and wing level command leadership, Air Installations Compatible Use Zones (AICUZ) Program Managers (PM) and Installation Mission Sustainment Team (IMST) members an overview of the Department of the Air Force's AICUZ Program and provides specific guidance concerning the organizational tasks and procedures necessary to implement the program. It is written in a "how to" format to guide the reader through the AICUZ Program and implementation process.

This publication applies to all civilian employees and uniformed members of the Regular Air Force, the United States Space Force, the Air Force Reserve, and the Air National Guard.

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SUMMARY OF CHANGES

Review this document fully as a substantial revision occurred. Major changes include consolidating the technical data from AFI 32-7063, *Air Installations Compatible Use Zones*, and AFI 32-7070, *Air Force Noise Program*, into DAFI 32-1015, *Integrated Installation Planning*,

resulting in numerous changes throughout the Handbook and added **Chapter 10**, “Acquisition of Real Property Interests.” This Handbook also benefits from the addition of **Attachment 5**, “The Department of the Air Force Noise Program;” **Attachment 6**, “Computer Modeling, Data, and Metrics;” **Attachment 7**, “The Role of Communication and Complaint Management;” and **Attachment 8**, “Geospatial Data.”

Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Forms 847 from the field through the appropriate functional chain of command.

Chapter 1—AICUZ PROGRAM OVERVIEW	6
1.1. Introduction.....	6
1.2. The History of AICUZ.....	6
1.3. Program Objectives.....	7
1.4. Governing Documents.	8
1.5. Using the AICUZ Program Management Guide.....	8
Chapter 2—THE AICUZ STUDY	9
2.1. Introduction.....	9
2.2. Technical Criteria for Compatibility Zones.	9
2.3. Accident Potential.....	9
Figure 2.1. Class “A” Runway CZs and APZs for Fixed-Wing Aircraft.	10
Figure 2.2. Class “B” Runway CZs and APZs for Fixed-Wing Aircraft.	11
Table 2.1. Runway Classification by Aircraft Type.	11
Table 2.2. Clear Zone and Accident Potential Zone Dimensions ¹	11
2.4. Modifications to Fixed-Wing APZs.....	12
2.5. Rotary-Wing Aircraft Clear Zones and Accident Potential Zones.	12
2.6. Explosives Safety.....	12
Figure 2.3. Typical Surface Danger Zone.	13
2.7. Noise.	14
2.8. The Department of the Air Force Operational Noise Program.	14
2.9. Aircraft Noise.	15
2.10. Ground Weapons Noise.	16
2.11. Planning Contours.....	17
2.12. Imaginary Surfaces.	18
2.13. Hazards to Aircraft Flight Zone.	18

Figure 2.4.	Imaginary Surfaces for Class B Runway.	19
2.14.	Areas of Critical Concern beyond the AICUZ Footprint.	20
2.15.	Land Use Compatibility Guidelines.	21
2.16.	Interpreting Land Use Compatibility Guidelines.	22
2.17.	Clear Zone Land Use Compatibility.	22
2.18.	Accident Potential Zone Land Use Compatibility.	22
Figure 2.5.	FAR Example.	23
Figure 2.6.	Calculating Floor Area Ratios.	24
2.19.	Land Use Compatibility for Aircraft Noise.	24
2.20.	Energy Related Land Use.	26
2.21.	Applicability of AICUZ to DAF Land and Facilities.	27
2.22.	Land Use in the Clear Zone.	27
2.23.	Conclusion.	27
Chapter 3—	WHEN TO UPDATE AN AICUZ STUDY	28
3.1.	Introduction.	28
3.2.	AICUZ Exemptions.	28
3.3.	When to update your AICUZ.	29
3.4.	Relationship with Environmental Impact Analysis Process.	29
3.5.	AICUZ Study Amendments.	30
Chapter 4—	PREPARING AN AICUZ STUDY	31
4.1.	Introduction.	31
Table 4.1.	Five Steps for Preparing an AICUZ Study.	31
4.2.	Step I: Study Kickoff.	31
4.3.	Step II: Data Collection.	32
4.4.	Step III: Operational Data Review and Validation.	33
4.5.	Step IV: AICUZ Study Preparation.	34
4.6.	Step V: AICUZ Study or Amendment Public Release.	36
4.7.	Preparing for an AICUZ public release.	37
Table 4.2.	Possible Invitees to AICUZ Public Release Meeting.	38
Figure 4.1.	Open House Format Meeting.	39
Chapter 5—	AICUZ PROGRAM IMPLEMENTATION	40
5.1.	Introduction.	40

5.2.	Terminology.....	40
5.3.	Strategy.....	41
Table 5.1.	Four Phases for AICUZ Implementation.....	42
Chapter 6—PHASE I: ORGANIZE		43
6.1.	General.....	43
6.2.	The AICUZ Program Manager.....	43
6.3.	The AICUZ Team.....	44
6.4.	Resources.....	44
Table 6.1.	Primers to assist in working with governmental agencies.....	44
Chapter 7—PHASE II: ASSESS		46
7.1.	Research.....	46
Table 7.1.	Potential Agencies and Organizations Interested in AICUZ Information.....	46
Chapter 8—PHASE III: ENGAGE		49
8.1.	Introduction.....	49
8.2.	Attitude.....	49
8.3.	Rules of Engagement.....	49
Table 8.1.	Engaging State and Local Governments: The Facts.....	49
8.4.	Understanding the Ground Rules.....	51
Table 8.2.	Rules of Engagement.....	51
8.5.	Proactive Engagement.....	52
8.6.	Internal Training and Education.....	52
8.7.	Boots on the Ground.....	52
8.8.	Networking.....	54
8.9.	Communication, Outreach and Engagement.....	54
8.10.	Special Stakeholders.....	55
8.11.	Working with Other Bases.....	57
Chapter 9—PHASE IV: MONITOR		58
9.1.	Monitoring.....	58
9.2.	Conclusion.....	59
Chapter 10—ACQUISITION OF REAL PROPERTY INTERESTS		60
10.1.	General.....	60
10.2.	Guidelines.....	60

10.3. Authorities and Methods.....	61
10.4. Real Estate Interests in the Clear Zones.....	62
10.5. Documentation of Real Property Interests Acquired in Support of the AICUZ Program.....	63
10.6. Monitoring Terms of Easements.....	64
Chapter 11—CONCLUSION	65
11.1. Conclusion.	65
Attachment 1—GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION	66
Attachment 2—LAND USE COMPATIBILITY TABLES FOR CZS AND APZS	82
Attachment 3—RECOMMENDED LAND USE COMPATIBILITY IN AIRCRAFT NOISE ZONES	83
Attachment 4—RECOMMENDED LAND USE COMPATIBILITY IN WEAPONS NOISE ZONES	84
Attachment 5—THE DEPARTMENT OF THE AIR FORCE NOISE PROGRAM	89
Attachment 6—COMPUTER MODELING, DATA, AND METRICS	95
Attachment 7—THE ROLE OF COMMUNICATION AND COMPLAINT MANAGEMENT	108
Attachment 8—GEOSPATIAL DATA	112

Chapter 1

AICUZ PROGRAM OVERVIEW

1.1. Introduction. “If you lived here, you’d be home by now.” We have all seen that sign outside military air installations. Military airfields attract development – people who work on base want to live nearby while others want to provide services to base employees and residents. When incompatible development occurs near an installation or training area, affected parties within the community may seek relief through political channels that could restrict, degrade or eliminate capabilities necessary to perform our mission. The Department of Defense (DoD) established the Air Installations Compatible Use Zones (AICUZ) Program in DoD Instruction (DoDI) 4165.57 to promote collaborative planning with our neighbors that will sustain the military mission and community goals.

1.2. The History of AICUZ.

1.2.1. Most DAF installations were built during or prior to the 1940s in relatively remote areas. This remoteness allowed flight training, air combat maneuvering and bombing practice all in the same county. In the years since, aircraft have steadily evolved from riveted aluminum-skinned airframes driven by pistons and propellers to exotic metal and composite platforms with jet engines that operate at significantly higher speeds and generate more noise. Today’s aircraft operate in all weather and take advantage of the night. These aircraft are net centric–communicating with each other to visualize the entire battlefield–and capable of striking targets over the horizon. Where before, their training footprint may have been located within a single county, today’s aircraft often train over multiple states.

1.2.2. While DAF aircraft and missions have evolved, the surrounding communities have not stood still. Following the end of World War II, the United States population surged, riding the baby boom wave of the late ‘40s to the early ‘60s. The population of the United States grew from 144 million in 1947–when the United States government formally established the Air Force – to 331 million in 2010. The population rapidly spread out from urban centers, aided by the National Interstate and Defense Highways Act of 1956. Veterans who had trained throughout the southwest during WWII, returned to the scorched regions tamed by the advent of air conditioning, establishing thriving communities outside once remote military installations.

1.2.3. The origins of the AICUZ Program go back to the early 1950s when a series of civilian aircraft accidents prompted President Truman to appoint General James Doolittle (USAF Ret.) to establish a commission to review these accidents and develop flight safety recommendations. This report, “The Airport and Its Neighbors,” included a comprehensive analysis of airport land use planning and safety considerations, including effective zoning regulations to control land use near airports. The report noted similarities between civilian and military airports and their effects on surrounding communities.

1.2.4. As early as 1957, the Air Force established procedures for estimating noise exposure and gauging community reaction to aircraft operations. By 1964, the Air Force was working on the relationship between land use planning and aircraft noise. Even then, we recognized the need to address noise from a land use planning perspective.

1.2.5. The late 1960s and early 1970s saw the beginning of the environmental movement. Emphasis on incorporating environmental concerns into the planning process was a major push. Notable events included Air Force research on sonic boom exposure in the 1960s, passage of the National Environmental Policy Act (NEPA) of 1969, and the Noise Control Act of 1972. These developments increased DoD awareness of noise exposure issues, adopting these concepts into its programs.

1.2.6. In 1971, the Air Force introduced the “Greenbelt” concept to address the growing problem of incompatible development around airfields. The idea behind greenbelts was to establish buffer zones around installations through the purchase of real property. The Air Force dropped the concept when it proved too costly.

1.2.7. The Noise Control Act of 1972 initiated a federal program to regulate noise pollution with the intent of protecting human health and minimizing annoyance of noise to the public. While this was a significant step forward in reducing the public’s exposure to aircraft noise, the Act did not apply to military weapons or equipment, effectively exempting the DoD from noise regulation.

1.2.8. In 1973, DoD established the AICUZ Program to protect its flying mission from incompatible development. The Air Force and Navy released their first AICUZ studies in the mid-1970s, followed by individual service instructions.

1.2.9. The next significant event in the development of the military noise program was the 1974 U.S. Environmental Protection Agency (EPA) designation of the noise descriptor Day-Night Average Sound Level or “DNL.” DNL does not reflect the actual sound level experienced at any point in time. It refers to the average sound level exposure, measured in decibels (dB) on the A-weighted scale, over a 24-hour period, with a 10-dB adjustment for operations occurring from 2200 to 0700. This adjustment accounts for the increased annoyance created by noise events occurring late at night when the ambient level is low. In 1974, the Administrator of the EPA, under authority in the Noise Control Act of 1972, recommended all federal agencies adopt the DNL noise descriptor. The Department of Defense, Air Force, and EPA agreed that all AICUZ studies would be prepared in DNL.

1.2.10. The development of DNL was an important milestone in the AICUZ Program. It provided a single descriptor for the noise level that provides noise contours for land use planning. This reduced confusion, increased credibility, and allowed for comparative research efforts on the effects of noise in different places.

1.2.11. Through the AICUZ Program, the DAF successfully promoted state legislation for compatible development around military airfields in Arizona, Texas, Florida, and Alabama. Other states, such as California, have adopted legislation after recognizing the need to protect all airfields from encroachment. The DAF encourages the adoption of enabling legislation for this purpose and cooperates with the appropriate state and local authorities regarding its implementation.

1.3. Program Objectives. The objectives of the AICUZ Program are simple – to protect the health, safety, and welfare of our neighbors from the effects of aircraft operations while ensuring the continued viability of the defense missions. AICUZ promotes collaborative planning with our neighbors to achieve these objectives through development compatible with aircraft operations.

1.3.1. An AICUZ Study must be consistent with current land use planning principles and procedures as well as current techniques in noise assessment methodology. The Study must also describe current or projected air operations, provide recommendations for compatible land development, and support local long-range land use planning efforts in accordance with nationally recognized standards. The AICUZ Study should complement state laws, enabling legislation, and local economic and political conditions. It brings an awareness of airfield safety and sounds to the development goals of local leaders. The AICUZ Study is not an end but rather one of many tools used by planners (on base and off) and decision makers to inform reasonable land use decisions.

1.4. Governing Documents. Three documents provide the regulatory basis for the AICUZ Program:

1.4.1. General Services Administration (GSA) Federal Management Circular (FMC) 75-2, *Compatible Land Uses at Federal Airfields*, requires federal agencies that operate airfields to develop an “airfield land use plan” which “...shall contain an analysis of land use compatibility problems and potential solutions.” Federal agencies must also work with local, regional, state, and other federal officials on compatible land use planning. Finally, “all federal agencies (in addition to those operating the airfields) having programs which affect or may affect the use of land near Federal [sic] airfields shall ensure their programs serve to foster compatible land use in accordance with the plans developed by the operating agencies.” Agencies such as Housing and Urban Development (HUD), Veterans Affairs (VA), Federal Housing Administration (FHA), and other federal agencies achieve this through their loan programs checking to see if homes they are financing are within the APZs or noise zones.

1.4.2. DoDI 4165.57, *Air Installations Compatible Use Zones*, establishes policy, assigns responsibilities, and prescribes procedures for the DoD AICUZ Program across all military Services. The DoDI sets policy and assigns responsibility for educating military personnel and engaging local communities on issues related to noise, safety, and compatible land use in and around air installations.

1.4.3. DAFI 32-1015, *Integrated Installation Planning*, discusses and sets forth the policy, responsibilities, and requirements of the Department of the Air Force Noise Program. AICUZ-related topics covered include program objectives, roles and responsibilities, technical criteria, acquisition of real estate interests, land use compatibility guidelines, and applicability.

1.5. Using the AICUZ Program Management Guide. This Handbook provides all the technical and practical information needed to manage an installation’s AICUZ and Operational Noise programs. It complements DAFI 32-1015. The reader can find all the resources cited in this Handbook under the AICUZ Program Toolbox or Noise Program Toolbox tabs at the AFCEC/CIP Regional Development SharePoint® site: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

1.5.1. As always, you may obtain reach back support through the AICUZ and Operational Noise Program managers at AFCEC/CIP at AFCEC.CP.AICUZNOISE@us.af.mil.

Chapter 2

THE AICUZ STUDY

2.1. Introduction. At the heart of the AICUZ Program is the AICUZ Study. The Department of the Air Force prepares AICUZ studies to assist local communities with planning near military installations through implementation of land use controls. The Study describes military operations and depicts zones of greatest accident potential and high noise. The Study also identifies other land use-related concerns and contains recommendations for development compatible with military operations. The recommendations within the studies are non-binding – local communities have responsibility for land use development. Since AICUZ recommendations are only advisory, it is important that the installation take an active role with the community in AICUZ Program implementation (discussed in the [Chapter 5](#)).

2.1.1. You can find details on the AICUZ Study content, including a study template, on the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox Tab: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

2.2. Technical Criteria for Compatibility Zones. The majority of the compatibility zones are for air installations. However, DAF-supported Joint Bases with an Army component may have ground training activities. For these joint installations, we have added additional compatibility zones centered on ground training noise. This chapter describes the technical criteria used to define both the physical extent of the zones as well as any associated land use compatibility guidelines.

2.2.1. The compatibility zones at DAF bases consist of:

2.2.1.1. Areas within Clear Zones and Accident Potential Zones (APZs) of a DAF base with active runways.

2.2.1.2. Areas exposed to high levels of aircraft noise defined as being within the A-weighted 65 decibel (dB Day-Night Average Sound Level (DNL) (or 60 dB Community Noise Equivalent Level (CNEL) in California) or higher noise zones.

2.2.1.3. At DAF-led Joint Bases with a contiguous Army component, there may be additional major noise sources such as small arms ranges and artillery/explosives training. The noise zones for small arms noise are defined as the area within 87 dB Peak contour and higher. The noise zones for artillery/explosives training noise are the areas within the C-weighted 62 dB DNL (CDNL) and higher. The effect of the 62 dB CDNL blast noise is essentially equivalent to 62 dB CNEL, the California metric.

2.2.1.4. Land areas surrounding the airfield on which certain uses may obstruct the airspace or pose hazards to flight safety.

2.2.1.5. Line of sight/radar look angles, if appropriate.

2.3. Accident Potential. On 3 April 2006, a C-5B Galaxy crashed short of the runway while attempting a heavyweight emergency landing at Dover Air Force Base, Delaware. The aircraft had taken off from Dover 21 minutes earlier and reported an in-flight emergency 10 minutes later. Upon impact, the aircraft broke apart into three major pieces on a grassy area just beyond the base's fenced perimeter. All 17 people aboard survived while two received serious injuries. No one on the ground had been injured because the land had been left undeveloped as part of the AICUZ Program.

2.3.1. While the chances of a mishap are remote, they can occur and compatible land use planning can reduce risk to persons on the ground. Recognizing the need to identify areas of accident potential, the Department of Defense conducted studies of historic accidents throughout the military. An analysis of aircraft accidents within 10 nautical miles of an airfield for the period of 1968-1972 led to defining areas of high accident potential known as the Clear Zone (CZ), Accident Potential Zone I (APZ I), and Accident Potential Zone II (APZ II). CZs and APZs are areas where accidents are most likely to occur if they occur—they are not predictors of accidents. DoD Instruction 4165.57 is the basis for runway Clear Zones and APZs for fixed-wing aircraft.

2.3.2. The CZ begins at the end of the runway and is the area of highest accident potential; it has few land uses that are compatible. The DAF concluded that the CZs warranted special attention due to the high incidence of mishaps. Acceptable land uses are severely limited and, consequently, the DAF has spent tens of millions of dollars to acquire real property interests within the CZ.

2.3.3. The percentages of accidents within the two APZs are such that, while purchase is not necessary, some type of land use control is essential. APZ I lies beyond the CZ and is of lower, but still considerable, accident potential. APZ II is beyond APZ I. APZ II possesses less accident potential but still warrants land use restriction recommendations. The DAF recommends limiting the number of people within APZs through focused land use planning.

2.3.4. **Figure 2.1** and **Figure 2.2** shows CZ and APZ dimensions for Class “A” and Class “B” runways. **Table 2.1** shows runway classification by aircraft type. **Table 2.2** gives the dimensions for CZs and APZs including variations by Service. Class B runways are used by large aircraft such as refueling and airlift aircraft as well as high-speed tactical aircraft. The Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*, defines the dimensions for Clear Zones and APZs for C-130 and C-17 landing zones. Class A runways are for smaller and lighter aircraft. Examples include propeller driven aircraft, some of the smaller jet trainers, gliders, and some remotely piloted aircraft. The airfield CZ begins at the end of the runway for airfields operated by the DAF and are rectangles that run along the extended centerline of the runway. Installations previously granted permission for reduced size CZs for their Class B runways now reflect the standard 3,000 foot x 3,000 foot CZs in AICUZ studies. The Navy’s trapezoidal CZ is 2000’ wide at the end of the runway and flares out 2784’ on approach or adjacent to APZ I.

Figure 2.1. Class “A” Runway CZs and APZs for Fixed-Wing Aircraft.

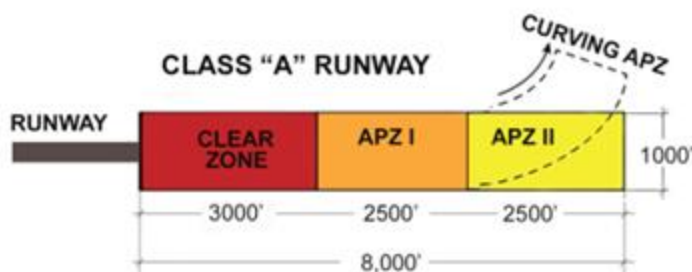


Figure 2.2. Class “B” Runway CZs and APZs for Fixed-Wing Aircraft.

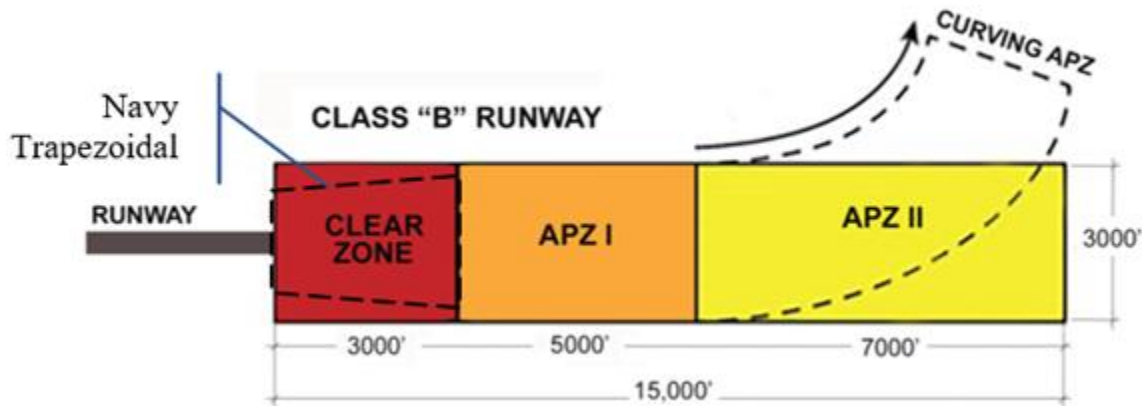


Table 2.1. Runway Classification by Aircraft Type.

Class A Runways		Class B Runways		
C-1	OV-10	A-4	E-3	R/F-4
C-2	T-3	A-6	E-4	RQ-4
C-12	T-6 (Navy)	EA-6B	E-6	RQ-9
C-20	T-28	A-10	E-8	S-3
C-21	T-34	AV-8	EA-18	T-1
C-22	T-41	B-1	F-5	T-2
C-23	T-44	B-2	F-15	T-6 (DAF)
C-26	U-21	B-52	F-16	T-38
C-37	UC-35	C-5	E/F/A-18	T-43
C-38	UV-18	C-9	F-22	T-45
E-1	V-22	C-17	F-35	TR-1
E-2	DASH-7	C-27J	KC-10	U-2
MQ-1	DASH-8	C-32	KC-46	VC-25
		C-40	KC-135	
		C-130	MQ-4	
		C-135	P-3	
		C-137	P-8	

NOTES:

- Only symbols for basic mission aircraft or basic mission aircraft plus type are used. Designations represent the entire series. Runway classes in this table are not related to aircraft approach categories, aircraft weight, aircraft wingspan, or to pavement design classes or types.
- These are examples of aircraft that fall into these classifications and may not be all-inclusive.
- Rotary-wing aircraft are not addressed in this table.
- For F-35B aircraft operating as STOVL, see UFC 3-260-01, Chapter 8.
- For US Army rotary-wing aircraft, see UFC 3-260-01, Chapter 4.

Table 2.2. Clear Zone and Accident Potential Zone Dimensions¹.

	Clear Zone	APZ 1	APZ 2
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	Length	Width	Length	Width	Length	Width
AF Class A	3,000 ft	1,000 ft	2,500 ft	1,000 ft	2,500 ft	1,000 ft
AF Class B	3,000 ft	3,000 ft	5,000 ft	3,000 ft	7,000 ft	3,000 ft
Navy Class A	3,000 ft	1,000 ft	2,500 ft	1,000 ft	2,500 ft	1,000 ft
Navy Class B	3,000 ft	2,000/2,784 ft ²	5,000 ft	3,000 ft	7,000 ft	3,000 ft
Army Class A	3,000 ft	1,000 ft	2,500 ft	1,000 ft	2,500 ft	1,000 ft
¹ See DAFI 32-1015, <i>Integrated Installation Planning</i> , for DAF policy on Clear Zones and APZs						
² Navy trapezoid CZ-width at beginning (runway)/width at end (adjacent to APZ I)						

2.4. Modifications to Fixed-Wing APZs. Installations proposing modifications to their APZs should be aware that the DAF conducted its accident analysis independent of flight tracks. The analysis only supports straight APZs bounding the runway centerline. However, bases may consider modifications to APZs based on the conditions listed below:

2.4.1. Local accident history indicates consideration of a different area.

2.4.2. All active runways will retain the traditional APZs aligned with the runway centerline. However, if more than 80% of the total runway departures or arrivals are on a single flight track that turns before the end of APZ II, the installation may propose adding a new set of APZs that follow the curved line of flight.

2.4.3. If the installation wishes to pursue a modification of the APZs, the AICUZ PM should submit the request to the IMST for review and coordination. If the base does not have an active IMST, then MAJCOM Mission Sustainment Team (MST) concurrence is required. With installation or MAJCOM MST concurrence, the AICUZ PM should then send proposals for new APZs to AFCEC/CIP who will coordinate with AF/JAOE-FSC and send to A4CP or equivalent for approval. If A4CP approves the request, the new APZ will be included in the next AICUZ update or in an AICUZ amendment. AICUZ Updates and Amendments are discussed in Section 4.6.

2.5. Rotary-Wing Aircraft Clear Zones and Accident Potential Zones. Clear Zones for rotary-wing runways and helipads for visual flight rules (VFR) and standard instrument flight rules (IFR) operations are 400 feet long with varying widths. The Clear Zone length for Army and DAF IFR same direction ingress and egress is 825 ft. The single APZ length for a rotary-wing runway and helipad is 800 feet long. You can find detailed discussion on rotary-wing APZs and Clear Zones in UFC 3-260-01.

2.6. Explosives Safety.

2.6.1. Surface Danger Zones. DAF-supported Joint Bases may have units conducting ground training activities. There are potential safety hazards related to those activities at the ground-to-ground range areas. Range planners define the impact and blast area of these safety hazards for ground-to-ground weapons delivery as a Surface Danger Zone (SDZ). SDZs depict the space necessary for containment of projectiles, fragments, and debris from the firing of a ground weapons system or Explosive Ordnance Disposal (EOD) activity. SDZs represent a mathematically predicted, three-dimensional area of ground and airspace that projectiles or fragments could travel through and impact the earth, either by direct fire or ricochet from ground-based live-fire operations. SDZ designs are based on the worst-case scenario for how and where a given munition type could travel. Range planners design SDZs to make the

probability of a hazardous fragment escaping from range boundaries unlikely and minimize the danger to the public, range personnel, facilities/equipment, and property.

2.6.2. SDZ sizes and shapes are dependent on the characteristics of the weapon system, ammunition, training requirements, geographical location, and environmental conditions.

Figure 2.3 depicts notional parameters of a basic cone SDZ and its components, as defined below:

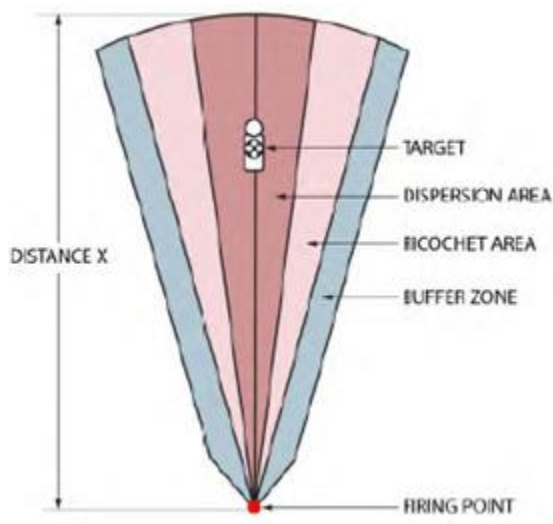
2.6.2.1. The “distance X” of an SDZ is the maximum distance a projectile will travel when fired from a weapon system.

2.6.2.2. The “dispersion area” is the area directly outside the gun target line that accounts for human error, weapon error, or propellant malfunction.

2.6.2.3. The “ricochet area” is located outside the Dispersion Area and contains any projectiles after they make contact with the target.

2.6.2.4. The “buffer zone” is the secondary danger area that laterally parallels the ricochet area and contains fragments, debris, and components from frangible or explosive projectiles and warheads functioning on the outside edge of the Ricochet Area.

Figure 2.3. Typical Surface Danger Zone.



2.6.3. Quantity Distance Arcs. The cardinal principle of explosives safety is to expose the minimum number of people to the minimum amount of ammunition and explosives for the minimum amount of time. That is accomplished through safe and efficient handling of explosive material with a deep understanding of the potential harm a mishap could cause. The potential for accidents is small but real.

2.6.4. Ammunition and explosives (AE) are preferably stored in Earth Covered Magazines. These “igloos” are specially designed to contain an explosion to the greatest extent possible. AE may also be located in other types of structures or open storage areas separated into modules by barricades. Regardless of the style of construction, these facilities are sited, in part, on the quantity and type of explosive they contain. A quantity of material of a certain type would produce a calculable blast radius in a mishap, and that radius and its corresponding

arc defines the Quantity Distance Arc and the land use recommendations intended to protect the public.

2.6.5. The Air Force Manual (AFMAN), *Defense Explosives Safety Regulation 6055.09_AFMAN 91-201, Explosives Safety Standards*, implements the DAF Weapons Safety Program.

2.7. Noise. Sound is caused by vibrations in the air. A multitude of sources can generate these vibrations, including roadway traffic, barking dogs, radios – or military operations. These vibrations push and pull the air into “compression waves.” Just like a pebble dropped into a pond creates ripples, the compression waves – formed of air molecules pressed together – radiate out, decreasing with distance. If these vibrations reach your eardrum at a certain rate and intensity, you perceive them as sound. When the sound is unwanted, we refer to it as “noise.” Generally, sound becomes noise to a listener when it interferes with normal activities.

2.7.1. We train the way we fight. When the sounds of military training interfere with our neighbors near the base, the affected parties may soon try to seek relief through political channels. How an installation manages noise complaints plays a key role in shaping not only base development but also the installation’s relationship with neighboring communities. Ideally, operational noise and its management should be key factors in on-base and local land use planning.

2.8. The Department of the Air Force Operational Noise Program. Community opposition to aviation noise began with the installation of jet engines. As far back as 1957 the AF began establishing procedures for estimating exposure and gaging community reaction to aircraft operation. Those procedures were published in the “Noise Guide for Base Commanders.” Now, DAFI 32-1015 establishes roles and responsibilities and provides guidance for the DAF Operational Noise Program. The goals of the program are to:

2.8.1. Ensure the availability of computer models to display the current and future operational noise environment, investigate specific noise concerns in support of DAF planning and mission sustainment programs, and answer Congressional inquiries and questions from senior leadership.

2.8.2. Ensure appropriate management of aircraft/weapon system noise data, computer model operational data input files, and model output files to ensure they are available when needed and reflect current operations.

2.8.3. Establish the primary and supplemental metrics used to support the AICUZ Program for analysis of noise impacts.

2.8.4. Standardize the methodology for identifying, analyzing, and describing impacts from military test and training noise and mitigation options.

2.8.5. Enhance installation personnel’s and DAF leadership’s understanding of the impacts associated with noise and vibration from military operations in order to better mitigate noise and facilitate public outreach and engagement. This directly supports the DoD Community Noise Mitigation Program. Authorized under the Consolidated Appropriations Act, 2022 (Pub. L. 117-35) Section 8120, the program provided limited funding for addressing noise mitigation in non-DoD covered structures. Requests for funds can include meeting the Federal match

requirements under the Federal Aviation Administration [Part 150](#), Airport Improvement Program as needed.

2.8.6. Develop a comprehensive noise complaint/inquiry management methodology as a means to improve communication and relationships with the surrounding communities, and identify trends and issues with the potential to impact future beddowns and/or realignments.

2.8.7. Identify and advocate for noise-related research/studies to support environmental analysis of noise impacts in compliance with the National Environmental Policy Act (42 USC §4321 et seq.), consultations under Section 7 of the Endangered Species Act (16 USC §§ 1531 et seq) and determinations under Section 106 of the National Historic Preservation Act (36 CFR Part 800).

2.8.8. [Attachment 5](#) discusses this Program in detail. The Operational Noise Program Manager at AFCEC/CIP is available for technical and reach-back support.

2.9. Aircraft Noise. Although there are a number of sound sources on an installation, AICUZ studies generally do not include noise from military or civilian ground vehicles, generators, or Aerospace Ground Equipment (AGE). Aircraft noise often dominates the noise environment. Joint Bases are likely to have military sound sources other than aircraft that may need to be included (i.e., , small arms firing and artillery ranges, demolitions, etc.) in their AICUZ Study. Discussions on incorporating ground weapons noise into an AICUZ Study are included later in this chapter.

2.9.1. Soon after the DoD implemented the AICUZ Program, the Services adopted the NOISEMAP computer program to describe noise impacts created by aircraft operations. NOISEMAP is one of two Environmental Protection Agency (EPA) approved programs initially adopted for calculating noise in the airfield environment. The other is the Integrated Noise Model (INM) that the FAA used for civil airports. FAA replaced INM with the Aviation Environmental Design Tool (AEDT). However, military aircraft operations at joint use airports are modeled separately using NOISEMAP. You merge the outputs from NOISEMAP with the outputs of AEDT to produce the final aircraft noise contours for the airport.

2.9.2. While some civil airports deploy microphones and recording equipment for live noise monitoring along with noise modeling, the DAF policy is to use modeled contours. Noise modeling allows for anticipated changes in aircraft and operational tempo. This is important for beddown studies prepared under NEPA and allows bases to project a planning contour several years into the future, which provides communities with stability for their long-term planning (see below, in this chapter). Modeling also allows for the comparison of a basing action at multiple installations and adds the ability to reduce impacts by testing different operational scenarios. Those types of impact avoidance and minimization are not possible with monitoring.

2.9.3. The United States uses Day Night Average Sound Level, with the exception of California which uses a similar metric called Community Noise Equivalent Level (CNEL). CNEL adds an additional 5 dB weighting for aircraft operations during the evening hours of 1900 to 2200. In general, CNEL contours average a little larger than DNL contours. When State law requires the use of a different descriptor, such as CNEL in California, you should also use it for on-base contours. Noise contours for the off-base operational noise environment at overseas bases are prepared only in consultation with the overseas Major Commands.

2.9.4. The AICUZ Study noise contour map displays aircraft noise using contour lines. Just as topographic map's contours connect points of equal elevation, the AICUZ map's contours connect points of equal noise value. All AICUZ maps using DNL will display noise contours of 65, 70, 75, 80, and 85 dB DNL to analyze land use compatibility. State law requires airport noise contour maps in California to display a 60 dB CNEL noise contour in addition to the typical range. Outside California, the DoD does not require contours less than 65 dB DNL. However, we can provide them if local conditions merit lower noise levels, such as in rural and desert areas, or where bases have received significant complaints outside the 65 dB DNL contour. AFCEC/CIP is available to assist installations in determining whether they should display any noise contours lower than 65 dB DNL.

2.9.5. DNL/CNEL noise contours reflecting the current or proposed (planning) mission operations are developed by using an installation's aircraft operation and maintenance data. Those data are input to the latest DoD approved version of the NOISEMAP suite of noise modeling software.

2.9.6. The DoD is currently refining part of the NOISEMAP suite known as the Advanced Acoustic Model (AAM), for an eventual replacement of NOISEMAP. The DAF will use AAM alone or in combination with NOISEMAP (as appropriate) to generate airfield noise contours. AAM is currently used in the NOISEMAP suite for rotary-wing noise modeling and fixed-wing aircraft with measured noise data.

2.9.7. The DoD based the land use compatibility tables in DoDI 4165.57 on DNL/CNEL noise contours using the Average Annual Day (averaging all operations over 365 days). Consequently, so does the DAF in its AICUZ studies.

2.9.8. AFCEC/CIP archives copies of noise model input and output files for all AICUZ studies.

2.9.9. Military and civilian noise planning efforts have benefited from mutual interest. One area is research and development. Developing quieter engines for the KC-135, for example, came about through commercial efforts to reduce fuel costs and noise impacts of the Boeing 707. Other efforts have gone into developing hush houses, where in-frame engines can run at full power with dramatically reduced noise effects to the surrounding environment. Noise abatement procedures can be, and often are, integrated into flight scheduling and aircraft operating procedures. Modifications to flight tracks, imposition of quiet hours and use of preferential runways are all techniques used by both the military and civilian airfields to reduce noise. Most installations used noise reduction techniques to their maximum degree, and compatible land use planning and controls are the answer for further protection of the community.

2.10. Ground Weapons Noise. With the inception of joint basing within DoD, we see more bases where both aircraft operations and ground weapons training activities (small arms, large caliber weapons or explosives) occur, adding another dimension to military noise that should be disclosed to the public. For the most part, the different noise sources use separate delimiters, metrics, and land use compatibility guidelines. Consequently, you cannot merge the contours into a single set of master contours for all noise sources, and the DAF plots each one separately. NOTE: Ground ranges are defined using metric units.

2.10.1. Many bases have small arms ranges, and/or Explosive Ordnance Disposal (EOD) proficiency training ranges. Small arms ranges may employ a variety of weapons under .50 caliber. EOD proficiency ranges may include areas for training with small amounts of explosives (up to five pounds net explosive weight) and for demolition of old munitions in an emergency. Because range planners base the noise zones for these ranges on the loudest weapon (or the largest allowed munition charge) and not the number of annual operations conducted at the range, we use peak noise contours to reflect the loudest level that occurs at each receiver location.

2.10.2. Since the sound of small arms is relatively localized when compared to other weapon systems, noise is typically only a concern up to 1000 meters behind the firing point. However, since the direction of fire may not always be directly away from the boundary, installations should model the noise when the range footprint is within 3000 meters of the boundary. For small arms ranges, we plot two noise zones, 87-104 dB Peak, and >104 dB Peak, for analyzing land use compatibility.

2.10.3. For ground training ranges involving the live fire of large caliber (greater than 20 mm) munitions and detonation of explosive, use C-weighted Day-Night Average Noise Level (CDNL) noise descriptor to describe the noise environment. Range planners average contours developed using the Blast Noise Model, (BNOISEx), over 250 days for Joint Bases with ground training activities. CDNL noise contours of 57 dB, 62 dB, and 70 dB, are plotted for purposes of land use compatibility. These CDNL levels roughly equal their DNL counterparts 65 dB, 70 dB, and 75 dB.

2.10.4. Noise from small arms ranges, demolition, or EOD proficiency ranges may be included in an AICUZ Study as a way to provide information to local communities about this noise source. Unless the training tempo has the possibility of increasing in the future, installations that use these ranges infrequently should consider whether asking local communities to incorporate land use controls for these noise sources are warranted.

2.11. Planning Contours. Long-range planning by local land use authorities involves long-range strategies to influence present and future land uses. Frequent AICUZ updates and changes to land use recommendations by the DAF can undermine a community's willingness to adopt AICUZ land use recommendations into their comprehensive plan or enact land use controls over the AICUZ footprint. Updates of local government comprehensive plans are dependent on many factors from development pressure and rate of change to staff capacity and funding. Planning guidance advocates for updates of comprehensive plans every 5 years, but 10-year cycles are common due in part to the expense of updating plans. The jurisdiction determines when they will refresh their plans. The AICUZ PM must be ready to provide the latest data to the update.

2.11.1. A planning contour is a long-range projection of the future flying mission's sound at the installation. Long range planning requires local land use authorities to project, as far into the future as is practicable changes that would influence the development for their community. If the military only provides a noise contour reflecting the present mission, it leaves the community in a quandary. Should they adopt land use controls for a contour that may change with the next mission, or plan more conservatively for future, undefined impacts? The planning contour alleviates uncertainty. By projecting possible mission changes as far into the future as practicable, the DAF can help add stability to the community planning process.

2.11.2. Planning contours are the best available, realistic, long-range projections of unclassified estimates of future mission requirements. They start with the low hanging fruit – are there any decisions on an aircraft beddown or realignment that have been made but the action has not started or is only partially completed? Another consideration might be to include newly proposed beddowns, mission change actions, or the retirement of legacy aircraft that could affect the noise contours. You must base planning contours on reasonable conclusions of how the flying mission will evolve. You cannot base planning contours on classified information. Planning contours are not commitments of future operations, nor should the AICUZ Study portray them that way (e.g., the Study should not state that the DAF will base a new aircraft at an installation unless the Service has already reached that decision through the Environmental Impact Analysis Process (EIAP)). EIAP is the DAF approach to National Environmental Policy Act compliance.

2.11.3. In situations where reasonable estimates of projected aircraft operations are not available, the local land use authorities are not open to long-range projections, or where the base expects little or no change to aircraft operations in the next 5 to 10 years; you may use current instead of planning contours.

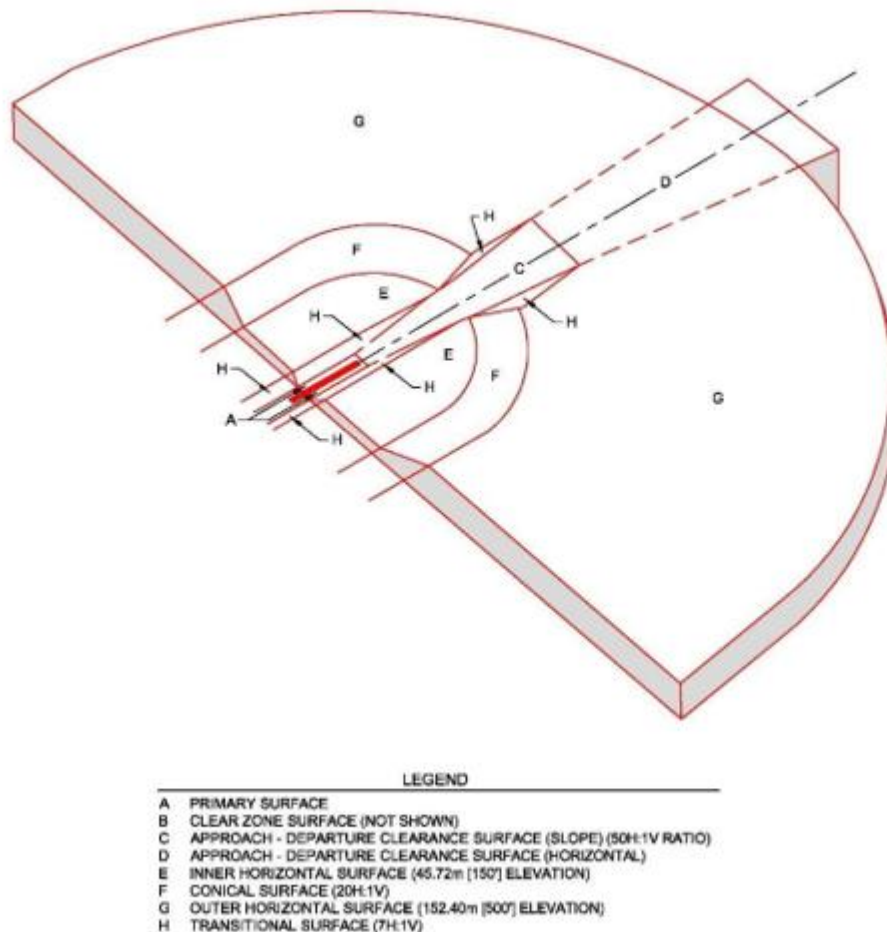
2.11.4. If the operations at a base using planning contours change in a way that was not part of the assumptions, or the base modifies current operations, the AICUZ Study may need updating. You can accomplish this through an amendment or a new AICUZ study.

2.11.5. Since planning contours are a projection of possible future operations, you should never use them as a representation of the affected environment in EIAP analysis.

2.12. Imaginary Surfaces. Certain land uses and activities can pose potential hazards to flight. Imaginary surfaces are described in the UFC 3-260-01, and in Title 14 Code of Federal Regulations (CFR), Part 77.9. **Figure 2.4** shows the 3-dimensional surfaces. Tall objects can pose significant hazards to flight operations or interfere with navigational equipment and radar systems. An impact can be catastrophic. This concern can be further complicated where there are major changes in terrain elevation close to the military airfield. Buildings and other objects can block radar, but so can transmission lines, cell towers, and even trees. They can create a flight hazard by penetrating navigable airspace. City/County agencies involved with construction permit approvals should require developers to submit calculations, which show that projects meet the height restriction criteria of Title 14 CFR, Part 77.9, for the specific airfield described in the AICUZ Study.

2.13. Hazards to Aircraft Flight Zone. The Department of the Air Force defines the Hazards to Aircraft Flight Zone (HAFZ) as the area under the imaginary surfaces. The HAFZ has no defined land use recommendations. While we've already discussed the danger from tall objects, you should examine proposed uses in this area for compatibility:

2.13.1. Smoke, Dust, or Steam – activities that result in smoke, dust, or steam or may cause interference with flight activities are generally not compatible with air operations. Smoke or steam generated by nearby businesses, industry, or field-burning operations can create severe visual interference during air operations. Dust and smoke can be created by fire (controlled burns, agricultural burning), ground disturbance (agricultural operations, grading), industrial activities, or similar processes. While these uses may be initially incompatible, mitigation may reduce the severity of the impact. For instance, watering before plowing will reduce dust.

Figure 2.4. Imaginary Surfaces for Class B Runway.

Note: The edge of the Outer Horizontal Surface (G) extends 44,500 feet from the runway centerline.

2.13.2. Light – bright lights, either direct or reflected, in the airfield vicinity can impair a pilot’s vision, especially at night. A sudden flash from a bright light causes a spot or “halo” to remain at the center of the visual field for a few seconds or more, rendering a person virtually blind to all other visual input. This is particularly dangerous at night when the flash can diminish the eye’s adaptation to darkness. The eye usually achieves partial recovery in minutes, but full adaptation typically requires 40 to 45 minutes. Sources of direct or indirect (reflected) light emissions are a land use compatibility issue when aircrew, maintainers, air traffic controllers or airfield operations personnel are unable to obtain necessary distance of view, distinguish airfield surfaces, markings or lighting, cannot see other air traffic or obstructions; or cannot properly train due to artificial light sources affecting nighttime training activities. Specific examples of light emissions that can interfere with the safety of nearby aviation operations include:

2.13.2.1. Light sources can include spotlights, streetlights, fireworks, buildings with reflective glass surfaces, and some solar energy technologies:

2.13.2.1.1. Lasers that emit in the visible spectrum, which can be potentially harmful to a pilot’s vision during both day and night.

2.13.2.1.2. The increasing use of energy-efficient Light Emitting Diode (LED) lighting, which poses potential conflicts in areas where pilots use night vision goggles (NVGs). NVGs can exaggerate the brightness of these lights, interfering with pilot vision.

2.13.2.1.3. The use of red LED lights to mark obstructions, which can produce an unintended safety consequence because red LED lights are not visible on most NVG models, rendering them invisible to NVG users in the area.

2.13.2.1.4. Birds and Wildlife – birds and aircraft don't mix. Assess the development of potential bird attractants, such as storm water management ponds, landfills, waste transfer stations, wildlife refuges, and agricultural uses against Bird/wildlife Aircraft Strike Hazard (BASH) criteria. The AICUZ PM needs to be familiar with the installation's BASH plan. The installation's BASH program manager and the Natural Resource Manager need to be members of the Installation Mission Sustainment Team. See the DAF Safety Center website for further information on BASH at <https://www.safety.af.mil/Divisions/Aviation-Safety-Division/BASH/> and the DAF portal at <https://www.my.af.mil/gcss-af/USAF/ep/globalTab.do?channelPageId=s6925EC1334F60FB5E044080020E329A9>

2.13.2.1.5. Electromagnetic Interference. New generations of military aircraft and their associated weapons systems are highly dependent on complex electronic systems for navigation and other critical flight and mission-related functions. Consequently, use caution in siting any activities that create Electromagnetic Interference (EMI). EMI can be induced intentionally, as in forms of electronic warfare, or unintentionally as a result of spurious emissions such as high-tension line leakage. Impacts from EMI also include the masking of radar targets and interference in communications. As the civil sector's need for bandwidth increases, EMI will become an increasingly important concern. It is important the installation frequency manager be involved in the review of all projects that have the potential for EMI.

2.13.2.1.6. Drones. The use of drones near military airfields poses a serious flight safety hazard due to the potential for a mid-air collision between military aircraft and small- to medium-sized drones. The FAA maintains specific guidance about where the public may fly drones (also known as Unmanned Aircraft Systems or UAS). Currently, the FAA does not permit non-DoD drone operations within certain zones surrounding military bases; depiction of the airspace restrictions are available at <https://udds-faa.opendata.arcgis.com/>. Additional restrictions are in place around airports, sports stadiums, and security sensitive areas. For more information on drone use in and around DoD airfields, visit the FAA's website at: www.faa.gov/uas.

2.14. Areas of Critical Concern beyond the AICUZ Footprint. The DAF Mission Sustainment Program (MSP) has identified areas of additional compatibility concerns beyond the traditional AICUZ footprint pursuant to the sustainment hazards defined in AFI 90-2001, *Mission Sustainment*. This instruction also identifies the possibility of needing to define Line of Sight/Look Angle Zones to protect the viability of radar/radio relay sites, telemetry equipment, radio antennas, etc. This facilitates identification of other areas of concern, especially as a consultation zone. If an installation feels they have a critical mission compatibility concern that requires a separate

compatibility zone, contact the AFCEC AICUZ Program Manager who will elevate the issue with the appropriate MAJCOM Mission Sustainment Team (MMST) and the AF/A4CP Noise Program Manager.

2.14.1. Although beyond the scope of this Handbook, be aware that aircraft sound is measured differently in Special Activity Airspace and ranges. The typical DNL metric is modified to include a “startle effect.” The sound ahead of an aircraft is often lower than the sound beyond the engine exhaust. It is possible for pedestrians to be surprised by an overflight, and the Onset Rate-Adjusted Monthly Day-Night Average Sound Level, or simply “Onset Rate,” (Ldnmr) is a supplemental sound metric that tries to describe that experience.

2.15. Land Use Compatibility Guidelines. The AICUZ composite footprint for an air installation – the combination of noise contours, Clear Zones, APZs and the HAFZ – defines the minimum acceptable area in which land use control measures are recommended to protect the public’s health, safety, and welfare and sustain the DAF flying mission. Local governments ultimately decide controls over land use and development in areas abutting air installations. Accordingly through the AICUZ Program, local governments are encouraged to plan for and promote compatible development.

2.15.1. The Federal Interagency Committee on Urban Noise (FICUN) brought the expertise and policy interests of five Executive Departments to bear on the effect of environmental noise on the successful use of land. In 1980, FICUN published *Guidelines for Considering Noise in Land Use Planning and Control*. The Department of Defense was a member and signatory. The guidelines remain the most comprehensive assessment of noise and land use and inform the policies of all federal agencies. The guidelines encourage the best land use, consistent with community planning objectives, by defining the maximum noise level each activity can tolerate without impairment. The guidelines note, as appropriate, the sound insulation necessary to successfully conduct the activity in spite of higher levels of noise. This gives local planners the maximum flexibility to site land use zones. The guidelines have evolved for military airfields through the DoDI 4165.57, *Air Installations Compatible Use Zones*, and further adjusted through the individual Services. You may find land use compatibility guidelines for Clear Zones, APZs, and aircraft noise zones in DoDI 4165.57.

2.15.2. The DAF uses land use recommendations tables based on the Federal Highway Administration’s *Standard Land Use Coding Manual* (SLUCM). The SLUCM provides planners with detailed information describing specific land use categories. The SLUCM standards only group similar types of land use and do not reflect noise sensitivity or population density in APZs that may influence whether a particular land use is compatible or incompatible. The Department of Defense has integrated additional land uses that did not exist in the original SLUCM categories into the land use compatibility tables. These additions clarify the categorization of certain land uses for the purposes of the AICUZ Study.

2.15.3. To ensure accurate review of land use plans, zoning ordinances, or development proposals; it is critical that the AICUZ PM is aware of which land use classification/coding system a local government uses – SLUCM or the Land Based Classification Standards (LBCS). The LBCS was designed for georeferencing parcels and offers a more detailed breakdown of land uses. Today, many communities rely on the LBCS, so the AICUZ PM may need to crosswalk local land use classifications with the SLUCM codes to identify potentially incompatible land uses. Drilling down in the SLUCM code has limited value as it categorizes

by similar types of land uses, not by noise sensitive or people intensive uses. FICUN's *Guidelines for Considering Noise in Land Use Planning and Control* references the SLUCM code.

2.15.4. You can find a copy of the SLUCM at the AFCEC SharePoint® site under the AICUZ Program Toolbox tab: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

2.16. Interpreting Land Use Compatibility Guidelines. The compatibility guidelines represent the minimum compatibility recommendations for military airfield operations. The guidelines provide a direct 'Yes' or 'No' answer to whether a listed land use is or is not compatible. Whether reviewing the compatibility tables in DoDI 4165.57 or local land use regulations, check the footnotes to see if there are any conditions or exceptions to compatibility. Ancillary uses to a designated compatible land use may not necessarily be compatible. For instance, rapid rail is compatible within the APZs but above ground rail stations, an ancillary use, are incompatible. Cemeteries are also compatible, but cemetery chapels are not. Planners should compare the intent of the recommended restriction with the activity proposed. The intent of an APZ is to protect people from harm in aircraft mishaps. If the proposed activity involves clustering groups of people in an APZ, then the activity would not be compatible in that location. No list can be all-inclusive of the latest evolution of land uses. Interpretation and judgement are important determining compatibility.

2.17. Clear Zone Land Use Compatibility. The Clear Zone is the area that has the greatest risk of accidents after the runway itself based on analysis of historic aircraft accident locations near military airfields. Because of this high risk, the Clear Zone warrants special attention. The potential for accidents is so high that land use restrictions necessary to ensure compatibility can prohibit an otherwise reasonable economic use of the land. Therefore, it is DoD and AF policy to own the land within the Clear Zone or control the land through restrictive use easements.

2.18. Accident Potential Zone Land Use Compatibility. The goal of land use compatibility within accident potential zones is to minimize population density. The percentage of accidents that have occurred within APZ's I and II is such that the purchase of the property within the APZs by the DAF is not necessary; however, some type of land use control is essential. The DoD and DAF recommend limiting the number of people living or working in APZs through proper land use planning. The DoD founded land use guidelines for APZs on the concepts of population density and building size. In addition to limiting density and building footprints, the DoD considers certain types of land use (such as residential, educational facilities, and medical facilities) incompatible because of the number of people clustered together in normal use and strongly discourages them in APZs.

2.18.1. The accident potential in APZ I is less than the Clear Zone but APZ I still poses an important risk factor. This area has land use compatibility guidelines that are sufficiently flexible to allow reasonable economic use of the land, such as industrial/manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture. However, uses that generate high concentrations of people in small areas are not appropriate.

2.18.2. The accident potential in APZ II is less than APZ I but APZ II still possesses a potential for accidents. Within APZ II, acceptable uses include those compatible within APZ I, as well as low-density single family residential, personal and business services, and commercial/retail

trade uses of low intensity or low scale of operation. High-density functions such as multi-story buildings, places of assembly (theaters, churches, schools, restaurants, etc.), and high-density office uses are not considered compatible. To assist local governments in implementing land use controls in APZs, DoD provides recommended Floor Area Ratios (FARs) for select commercial uses as a way to limit people density.

2.18.2.1. FAR is simply the ratio of open space to enclosed space on a parcel. The DAF uses FAR as a guide to density in some land use classifications within the APZs. Many communities use FAR to limit the intensity or scale of a use, particularly non-residential uses with the potential to conflict with surrounding residential or less intense uses already in existence. Early DoD policy recommended that density for non-residential land uses in APZ I be based on not more than 25 persons per acre and in APZ II not more than 50 persons per acre. However, land development can occur on multiple properties and in phases over time, making efforts to control development solely based on density hard to enforce. Consequently, DoD conducted studies using required parking spaces to determine appropriate FARs to achieve the not more than 25 and 50 persons per acre in APZs I and II, respectively.

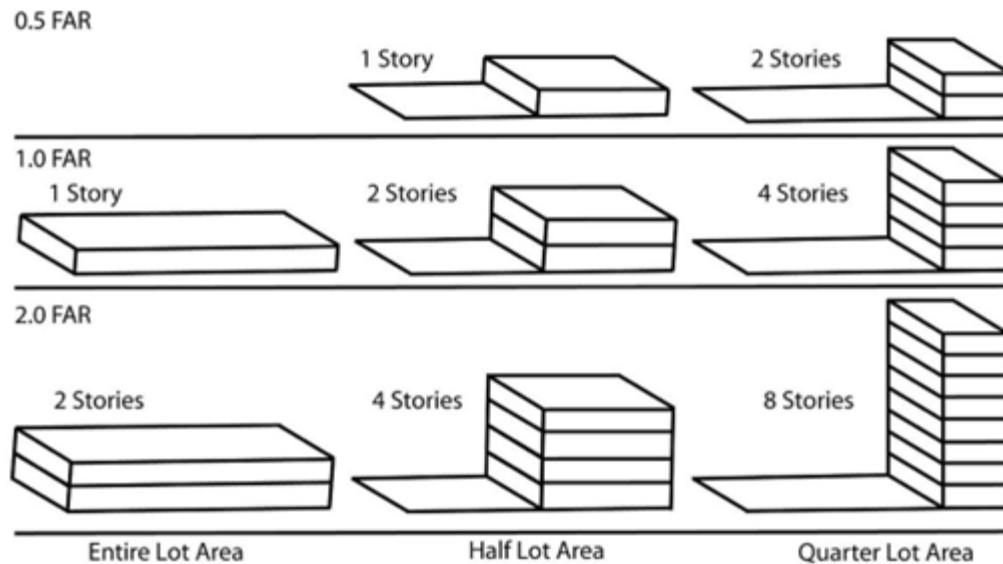
2.18.2.1.1. We base parking requirements on number of employees, building floor area, type of use or other factors. We base FARs on standard parking generation rates for various land uses, vehicle occupancy rates, and desired people intensity in the APZs I and II. For APZ I, the formula is $\text{FAR} = 25 \text{ people an acre} / (\text{Average Vehicle Occupancy} \times \text{Average Parking Rate} \times (43560/1000))$. The formula for APZ II is $\text{FAR} = 50 \text{ people an acre} / (\text{Average Vehicle Occupancy} \times \text{Average Parking Rate} \times (43560/1000))$, resulting in FARs ranging from 0.11 to 0.56, depending on the APZ and the land use.

2.18.2.1.2. See [Figure 2.6](#) for an example of how FARs work. FAR equals the total floor area of a building in square feet divided by the total lot size in square feet. For example, a two-story building has 5,000 square feet of floor on each level, totaling 10,000 square feet (ft²) of floor. The lot is 20,000 square feet. Thus,

Figure 2.5. FAR Example.

$$\frac{10,000 \text{ ft}^2}{20,000 \text{ ft}^2} = 0.5 \text{ FAR}$$

If the building had only one story with 5,000 ft² and the lot was 20,000 ft², the FAR would be 0.25.

Figure 2.6. Calculating Floor Area Ratios.

2.19. Land Use Compatibility for Aircraft Noise. Long-term land use compatibility with noise resulting from the operation of military aircraft should minimize the effects on people, animals (domestic and wild), and structures on or in proximity to the installation. Nearly all studies on residential/aircraft noise compatibility recommend no residential uses in noise zones above 75 dB DNL. Generally, the federal government considers most land uses to be unaffected when exposed to noise levels below 65 dB DNL. The area above the 65 dB DNL noise contours may not qualify for Federal mortgage insurance in residential categories according to HUD Regulation 24 CFR Part 51, "Environmental Criteria and Standards, Part B Noise Abatement and Control." In many cases, HUD approval requires noise attenuation measures, the Regional Administrator's concurrence, and (for exposure above 75 dB) an Environmental Impact Statement. The Department of Veterans Affairs also has airfield noise and accident APZ restrictions that apply to its home loan guarantee program. Whenever possible, residential land use should be located below 65 dB DNL. Many communities near military air installations are aware of federal programs that have restrict financing for homes in high noise areas and advise local citizens developing property.

2.19.1. The land use compatibility table shows all residential units above 65 dB DNL as incompatible. The DAF discourages residential use in the 65-70 dB DNL noise zone and strongly discourages housing in the 70-75 dB DNL noise zone. Local planning bodies should examine other development options prior to local approvals indicating that proposed residential meets a demonstrated community need that they would not meet if they prohibited development in these zones. If the community decides to develop new homes within these zones, the DAF strongly recommends that local land use agencies require that developers build appropriate noise level reduction (sound insulation) into the structures. Developers should be made aware during the planning process that effective sound mitigation may be prohibitively expensive for affordable housing goals. Yet knowingly building noise-sensitive uses in high noise areas without such protection will make builders vulnerable to criticism and perhaps litigation.

2.19.2. The numbers 25, 30, or 35 in the compatibility guidelines refer to noise level reduction (NLR) levels. NLR (outdoor to indoor) is achieved through the incorporation of noise attenuation into the design and construction of a structure. Noise level reduction is in addition to the protection inherently offered by typical construction. The goal is an interior sound level of 45 dB DNL. Many land uses and related structures may be compatible in certain noise zones above 65 dB DNL/CNEL; however, developers must incorporate NLR measures of 25, 30, or 35 (depending on the noise zone) into the design and construction of structures. Speech interference and sleep disruption are two major impacts of noise exposure that are mitigated with sound insulation. Measures to achieve an overall noise reduction do not necessarily solve noise concerns outside the structure and may warrant additional evaluation.

2.19.2.1. Guidelines for NLR are included in *Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations* (U.S. Navy, 2005) and *ACRP Report 89—Guidelines for Airport Sound Insulation* (Transportation Research Board, 2013). Both documents are available on the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox tab: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

2.19.3. Most industrial/manufacturing land uses are compatible in the airfield environs. Exceptions are used such as research or scientific activities that require lower noise levels and/or uses sensitive to vibration. The DAF recommends the addition of noise attenuation measures to those areas of buildings devoted to office use, receiving the public, or those areas where the normal background noise level is low.

2.19.4. The transportation, communications, and utilities categories have a high noise level compatibility because they generally are not people-intensive, and the presence of people associated with these land use categories is usually of short duration. Additional evaluation is warranted, however, when buildings are required for these uses.

2.19.5. The commercial/retail trade and personal and business services categories are compatible without restriction up to 70 dB DNL; however, they are incompatible above 80 dB DNL. Between 70-80 dB DNL, noise level reduction measures should be included in the design and construction of buildings.

2.19.6. Verbal communication is critical to most uses in the public and quasi-public services category requiring a quiet environment. Planning authorities should attempt to locate these uses below 65 dB DNL or at least provide adequate noise level reduction. Where the requirement to hear is a function of the use (i.e., music shell, etc.), compatibility may be limited to less than 60 dB DNL.

2.19.7. Although the land use tables often recommend recreational use as compatible with high noise levels, even in areas above 75 dB DNL, noise becomes a factor that limits the ability to enjoy such uses. Buildings associated with golf courses and similar uses should be noise attenuated. People who are outdoors in areas above 80 dB DNL should consider wearing hearing protection when aircraft noise is present. In extreme occupational instances like factory or steel mill workers, unprotected exposure to noise levels of 80 dB DNL for 8-hour days over the course of a 40-year career can lead to hearing impairment.

2.19.8. Except for livestock farming, most uses in the resource production and extraction land use category are compatible with some restrictions. However, land uses that require residences or offices may require targeted noise level reduction for compatibility.

2.20. Energy Related Land Use. Because of the changing needs of military test and training, the broad array of energy related land uses, and the continual emergence of new energy technologies, there are no pre-defined or generic “energy development zones” for airfields nor is there a definitive yes/no answer when it comes to energy compatibility. Typically, land use plans and zoning maps do not identify energy-related land, so AICUZ PMs and others involved in Mission Sustainment need to be actively watching for these kinds of development proposals.

2.20.1. Land uses related to energy development, including support infrastructure, fall under a range of SLUCM codes.

2.20.2. Typically, planners may not have identified utility related land uses on local land use maps; AICUZ PMs must learn about local incentives to attract renewable energy development to the area or local or state permits for energy development. Like any other type of land development proposal, evaluate proposed energy projects for mission compatibility. There are no specific land use compatibility criteria for energy related land uses outside the APZs; however, energy projects proposed within the HAFZ can be evaluated using the potential effects identified later in this Handbook.

2.20.3. Consider the following three factors when evaluating the compatibility or potential for mission impacts of proposed energy development or transmission line projects: The technology (solar, wind, geo-thermal, and biomass), the location of the proposed development, and the mission requirements. The mission compatibility concerns for various types of energy projects are:

2.20.3.1. Wind turbine projects – evaluate for possible radar interference to airfield and weather radar, long-range radar, aircraft-borne radar, and for hazards to flight;

2.20.3.2. Geothermal projects – determine whether the height of the steam towers would create hazards to flight, and if the steam could create visual interference. Depending on the type of geothermal technology and location of the plant, evaluate the potential for ice fog.

2.20.3.3. Solar energy – assess technologies such as photovoltaic (PV) panel arrays or concentrating solar power, which use reflective materials like mirrors and lenses to concentrate sunlight to generate thermal energy, for glint and glare issues for pilots and/or the air traffic control (ATC) tower.

2.20.3.4. Biomass power – review generating plant designs and locations to determine if the emissions stacks will create an obstruction. Assess whether the emissions (dust/smoke/steam) will obscure pilot or ATC vision; and whether the design of the biomass feedstock storage area could attract birds, wildlife, or their prey and therefore contribute to increased potential for BASH;

2.20.3.5. Transmission lines – evaluate the compatibility of any new above ground transmission lines that would be required to connect the source to the electrical grid. DoDI 4165.57 includes compatibility criteria for transmission lines in the APZs.

2.20.4. Installations can engage with energy developers if they find out about proposed energy development projects that may have the potential to impact their mission; however, there are limits to what installation personnel can tell the developer. Should installation personnel find out about a proposed energy development prior to it coming through the Military Aviation and Installation Assurance Siting Clearinghouse (or informally, the OSD Siting Clearinghouse) process, it is highly recommended that the issue be elevated to SAF/IEIM via the MAJCOM MST lead for further guidance. The OSD Siting Clearinghouse of the Office of the Assistant Secretary of Defense for Sustainment, coordinates the DoD assessment of all renewable energy projects to prevent or mitigate adverse impacts on military operations, in accordance with 32 CFR, Part 211. SAF/IEIM is the DAF lead for the energy review process and has additional resources and guidance to help support as needed. Outreach can be sent to saf.iei.encroachment@us.af.mil. See <https://www.acq.osd.mil> for additional information.

2.21. Applicability of AICUZ to DAF Land and Facilities. Guidelines for developing compatible to our operation applies on-base as well as off-base. New DAF facility sitings, construction, and land use designations within the Installation Development Plan must be consistent with the land use compatibility recommendations in DoDI 4165.57 and height restrictions for that installation. Any land uses proposed for DAF lands within the AICUZ footprint that are not consistent with the AICUZ land use recommendations will require documentation justifying the proposed incompatible development and appropriate approvals prior to planning and programming the project.

2.22. Land Use in the Clear Zone. Existing DAF facilities and land uses may continue; however, the Base Civil Engineer will program replacement facilities as part of the normal planning and programming process and site such replacement facilities outside the Clear Zone. People intensive facilities and facilities not related to flight operations should be relocated outside the Clear Zones where possible. Navigational aids and essential operational requirements are exceptions, which, because of their functions may need to be in the Clear Zone for optimum performance.

2.23. Conclusion. The overall goal of the DAF AICUZ Program is to protect the health, safety, and welfare of our neighbors while preserving our defense missions. We achieve these goals by promoting development compatible with our operations.

Chapter 3

WHEN TO UPDATE AN AICUZ STUDY

3.1. Introduction. There is an art to knowing when to update an AICUZ Study. Too long between updates and the community may lose confidence in the information and recommendations contained in an existing study. Too frequent updates may cause a community to lose confidence in its ability to make informed, long-term planning decisions beneficial to a base and its missions. While priorities within local communities may change with respect to land use and property rights, the procedures set forth within the AICUZ Program can provide future planning stability for both the community and the base. This chapter discusses AICUZ Study maintenance, including when you should review operational data and when an AICUZ study or update is or is not required. Operations vary depending on missions, world events, and budgetary considerations. Installations will receive new airframes – will the new aircraft expand or contract the contours? Will changes in training tactics increase night operations and expand noise contours? Will a new departure affect a new noise sensitive area? These factors might drive an AICUZ update.

3.2. AICUZ Exemptions. Not all installations require AICUZ studies. Before you decide whether your base needs an AICUZ amendment or update, you need to know if the installation is exempt from preparing and releasing an AICUZ. The AICUZ Program allows exemptions under the following circumstances:

3.2.1. The installation's AICUZ footprint does not extend beyond the installation boundary. Review current mission and planning noise contours, as well as APZs, HAFZ and any identified areas of critical concern to determine the full geographical extent of the AICUZ footprint. Noise zones may not extend off base if the installation has extensive acreage and the airfield is located well within the installation boundaries. At smaller installations, the noise zones will not typically extend outside the installation's boundaries if there are less than 10 jet or 25 propeller-driven aircraft operations or less than 250 helicopter operations on an average annual day.

3.2.2. The installation is located on a civilian owned and operated airfield (see DAFI 32-1015 for more detail).

3.2.3. Just because a base is exempt from preparing an AICUZ study and releasing it to surrounding communities doesn't mean the base cannot prepare a study. Depending on local conditions and the base's relationship with the community, an AICUZ study could be the basis for a protective overlay zone or other development control that promotes land use compatibility or a Compatible Use Plan (CUP). The local IMST should consider the possible benefits of preparing an AICUZ in cases where a study is not required. This is a rare exception to the general rule for AICUZ studies and requires letters from the Installation Commander and the IMST, approval from AFCEC/CIP, and AF/JAOE-FSC to be considered an option. Additionally, it requires the AFCEC/CIP ability to execute.

3.2.4. Even if a review of the operational data and subsequent contour map indicate that the AICUZ Study should be updated, there are certain circumstances where the preparation and release of a fully updated study may not be required or appropriate:

3.2.4.1. An AICUZ Study update is not required if the local community has adopted the current AICUZ Study and the applicable zoning ordinances in effect meet the

recommended compatible land uses for the AICUZ footprint. The lead planning agency should have a written request on file with the Base Civil Engineer's office for maintaining the existing AICUZ Study.

3.2.4.2. Even if the local community has adopted an older AICUZ Study, it does not mean that a new Study update should not be considered in the interest of providing updated land use and re-validating noise contours. This is something that can benefit the base and community.

3.2.4.3. The local government acceptance of the AICUZ Study recommendations must be clearly documented, with an airport comprehensive land use plan, general land use plan, zoning ordinance and map, airport overlay zone, or a defined Military Influence Area.

3.2.5. The IMST reviews requests for AICUZ Study update exemptions and forwards them to AFCEC/CIP.

3.3. When to update your AICUZ. Having a published AICUZ or an AICUZ exemption does not end an installation's AICUZ responsibilities. All installations must annually review the qualitative AICUZ Update Checklist to determine if an installation needs an AICUZ update. In addition to operational data that could affect noise zones, the checklist also covers operational changes that could affect APZs, major changes in off-base land use and changes to AICUZ guidance (particularly on land use). During the annual review, the AICUZ PM examines the data to see if their Study requires updating while installations with AICUZ Study exemptions determine if the criteria used to establish the exemption remain valid. If an existing AICUZ Study is outdated or the exemption criteria are no longer valid, the installation must initiate Phase I of a new Study – AICUZ data collection. The AICUZ Update Checklist is available on the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox tab. Among the items covered by the checklist are the qualitative and quantitative processes for noise contours.

3.3.1. The Qualitative Noise Contour Screening Process is a cursory review of operational changes in the previous Noise Study Report since the last AICUZ may reveal if an update to the AICUZ noise contours is warranted. Generally, the noise contours will not have changed if there have been no major changes to aircraft flight and maintenance operations. However, even if such changes have occurred, they may not signal a need an update. If an increase or decrease is due to a temporary change (e.g. shifting operations to or from a base due to runway repair, increase in training or readiness operations due overseas contingencies, temporary deployment of squadrons), examine the overall trend to see if any change is just an aberration.

3.3.2. The Quantitative Noise Contour Screening Process requires full operational data collection for the generation of noise contours. You would normally take this step if the qualitative screening process showed an appreciable change in the soundscape. The threshold for an AICUZ update is a change in Day-Night Average Sound Level (DNL) or Community Noise Equivalent Level (CNEL, California only) of 1.5 dB or more in a noise sensitive area identified in the last publicly released noise exposure map. NOISEMAP, the DoD-approved suite of noise modeling computer programs, can determine if your operations exceed the threshold at selected critical locations. AFCEC/CIP can assist the base with a determination.

3.4. Relationship with Environmental Impact Analysis Process. A proposed action analyzed through the DAF EIAP could drive an AICUZ Study update. Sometimes, a number of small operational changes may drive an update of the noise zones. These minor changes may have

individually qualified for categorical exclusions (CATEX), but cumulatively, they could represent a major impact. They may warrant updating the AICUZ Study.

3.5. AICUZ Study Amendments. Up to this point, the preparation process has applied only to situations that require significant revisions to AICUZ studies. When the changes are few and minor in nature, the change requires little explanation, or if no controversy exists; only amendments to AICUZ studies may be needed.

3.5.1. Amendments typically consist of targeted changes to the existing AICUZ Study (e.g. revised pages or relabeled maps). The approval process for AICUZ amendments begins with preparation of the draft submittal package. The package consists of any revised pages and draft of the transmittal letter to the local communities.

3.5.2. If the installation AICUZ PM thinks there is a need to amend the AICUZ Study, they should contact AFCEC/CIP to discuss whether an AICUZ Amendment would be advisable. If the consensus is to move forward with amending the existing document, the AFCEC/CIP AICUZ Program Manager will prepare the draft submittal package for IMST coordination. The installation planner will have the wing/base leadership sign the transmittal letter and ensure AFCEC/CIP receives a copy. Any changes will be coordinated through AFCEC/CIP AICUZ PM.

Chapter 4

PREPARING AN AICUZ STUDY

4.1. Introduction. This chapter discusses in detail the five steps for preparing an AICUZ Study (see [Table 4.1.](#)).

4.1.1. Implementation of the AICUZ Program is an ongoing process. Nearly all air installations have completed and released AICUZ studies, although some installations may be exempt (see [Section 3.2](#)). Installation Commanders are responsible for ensuring that each air installation has an active AICUZ Program. The Base Civil Engineer normally appoints the AICUZ PM who is typically the base planner, although the program may fall under another organization. Duties of the AICUZ PM include preparing and releasing updated AICUZ studies, data validation and program implementation. [Chapter 6](#) discusses these duties in detail.

4.1.2. An accurate AICUZ Study requires the full support and participation of all installation functions including Installation/Wing leadership, Civil Engineering, Bioenvironmental Engineering, Legal, Public Affairs (PA), Airfield Management, Air Traffic Control, Aircraft Maintenance, Safety, Weather, Comptroller, tenant units, and other appropriate functional areas. Support and participation by each functional area is particularly important during the data collection and analysis step but should occur throughout the entire AICUZ process. See DAFI 32-1015 for more details on these roles and shared responsibilities.

Table 4.1. Five Steps for Preparing an AICUZ Study.

Step I	Study Kickoff
Step II	Data Collection
Step III	Operational Data Review and Validation
Step IV	AICUZ Study Preparation
Step V	AICUZ Study or Amendment Public Release

4.2. Step I: Study Kickoff. The data-gathering week begins with an on-site kickoff meeting. To ensure situational awareness and secure project support, the AICUZ PM should brief both the Installation/Wing leadership and the IMST prior to the AICUZ kickoff. Inform any impacted tenants of the effort as well.

4.2.1. The project kickoff meeting is restricted to on-base stakeholders. The following representatives from the installation should attend: Base and/or wing leadership; flying and maintenance units; legal; public affairs; Operations Support Squadron, Airfield Management the AICUZ PM; and members of the IMST. Also attending will be the COR; representatives from the respective AFIMSC Detachment; representatives from AFCEC/CIP; and contractors from the A/E firm. While the data collection team will later meet with off-base stakeholders to gather community land use data, these stakeholders do not have a role in defining the noise contours. The meeting starts with a project overview, including COR, A/E, and installation responsibilities, the week's agenda, and project milestones. Data-gathering interviews are set up with installation personnel and the A/E firm while the AICUZ PM works with the local

communities to set up the off-base interviews. AICUZ PM involvement with this outreach is important to maintaining the relationships that will ease implementation. Minimally, the AICUZ PM would introduce the contractors conducting the Study. Preferably, the AICUZ PM would attend the data-gathering meetings and lead the conversation.

4.3. Step II: Data Collection. You build a successful AICUZ Program on accurate information. There are two types of data gathered at this stage: operational data and local land use information. The operational data comes from aircraft flying and maintenance units. The collection team will also interview units that conduct ground testing and training activities, if applicable. The team will then focus outside the fence for information on existing and future local land use and development data, such as comprehensive plans, zoning regulations, economic development goals, population changes, master plans and planned developments, capital improvement projects, etc. The data-gathering should go beyond reading plans to interviewing key individuals on both sides of the fence. Local planners can explain development pressures and needs. Only pilots can describe how the aircraft are flown (e.g. roll angles, power settings, flight paths, and activity defining landmarks).

4.3.1. In most instances, an Architect/Engineer (A/E) firm under contract to the DAF will collect the data and prepare the AICUZ. All contact with the A/E should be through the Contracting Officer Representative (COR) unless otherwise specified by the COR. If AFCEC contracts out the AICUZ Study, AFCEC/CIP will appoint the COR. When contracted through the HQ AFRC or HQ ANG, the COR will be appointed by the appropriate organization. In all cases, AFCEC/CIP will provide technical and review support. Note: AFCEC/CIP may choose to develop the AICUZ noise contours and Study in-house rather than use an A/E firm.

4.3.2. A post-award pre-kick-off meeting with the A/E contractors, installation representatives, AFIMSC Detachment representatives, and AFCEC/CIP personnel should immediately follow acquisition's Notice to Proceed. This meeting allows all the players to review the project statement of work and ensure mutual understanding of the work, the schedule, and the deliverables. It also serves as an opportunity to introduce the Government and contractor personnel associated with the project; discuss the contractor's plan for accomplishing the work; identify any special requirements for interviews, documents or other information; and identify all Government furnished materials needed to perform the work, including previous AICUZ, ICEMAP, Mission sustainment Risk Reports, and CUP studies, if applicable.

4.3.3. The AICUZ PM normally serves as the installation's POC for the contracted AICUZ Study. They should be familiar with the AICUZ Study task order and scope of work. Prepare for the A/E data-gathering visit by coordinating the effort through the IMST to ensure all key players/organizations attend the on-base project kickoff and that representatives are available for interviews.

4.3.4. Most data-gathering interviews take less than an hour. These interviews build on the data gathered after the initial pre-kickoff meeting. Limit the number of operators/support personnel in each interview session. This encourages individual participation and perspective, discouraging "group think" and information by consensus. If you have several operators in the same interview period, having someone in their leadership chain present will help ensure all interviewees participate. In addition to current mission, operators and base/wing leadership should opine about expected changes to operations over the 5-10 year planning horizon and

inform the AICUZ team about recent basing alternatives for the installation. These potential changes will inform the development of planning contours in Step III. DAFI 32-1015, Chapter 4, provides more information on planning contours.

4.3.5. All affected land use planning authorities should be included in the data collection process including local communities, counties, regional planning organizations, and councils of government (COG). If the community has already established a Compatible Use Plan (CUP)—previously called Joint Land Use Study—be sure to interview someone of authority from the CUP committee. For the meetings with off-base stakeholders, always include a representative from the base present (usually the AICUZ PM and possibly a public affairs specialist). Information needed during this phase includes current and future land use plans, zoning information, community populations, and necessary GIS layers. Interviews also include discussions of any airport or military overlays, if applicable. This is an opportunity to discuss growth pressures the community is facing and how the development community is responding as well as climate, infrastructure, and energy challenges. The AICUZ and its subsequent planning efforts may be able to help.

4.3.6. To keep the project on schedule it is important that wing and base leadership stay involved in the process. Normally, the data collection team, through the AICUZ PM, schedules an out brief with wing/base leadership for the end of the week. At that time, with concurrence from leadership, the data collection team establishes deadlines for any outstanding data gaps.

4.4. Step III: Operational Data Review and Validation. The AICUZ Program, like any successful activity, is dependent on the quality, accuracy, and completeness of its data inputs. The AICUZ Program requires a comprehensive review and validation process because these data are the basis for all conclusions and the recommendations that will hopefully shape the region's development patterns. There is also the possibility that someone could challenge the data in litigation. The operational data review and validation of Step II provides the quality assurance the AICUZ Program requires.

4.4.1. During Step III, the contractor and base, along with the AFIMSC Detachment and AFCEC/CIP personnel, review the Step II data package for adequacy. Data packages will vary from base to base. A comprehensive review helps to identify and correct deficiencies before the public release. Some portions of the program require the AICUZ PM to exercise a significant degree of judgment, particularly when it comes to analyzing land use compatibility. This is especially true where regions experience extreme development pressure or where multiple jurisdictions control land use. There is no “one size fits all” approach to assessing data. Local conditions vary from one place to another, generating unique circumstances for each installation and its surrounding community. In addition to evaluating the content and quality of Step II data, Step III offers the opportunity to identify instances where assistance is required to close data gaps. Errors or omissions in Step I can easily compromise subsequent Steps.

4.4.2. There are five basic steps in Step III:

4.4.2.1. Determine if all elements of Step I have been completed. After the data-gathering trip, the COR should set up a meeting (online, conference call or in person) between the COR, A/E, AICUZ PM, respective AFIMSC Detachment, and AFCEC/CIP to identify any data gaps where information is still pending and then proceed through the AICUZ PM to contact those units' individuals responsible for the missing data.

4.4.2.2. Ensure flight, maintenance, and non-aviation operational data are accurate.

4.4.2.3. Review the non-operational land use elements in detail. Check the data for accuracy. If required, the AICUZ PM will request further information from the appropriate internal and external stakeholders.

4.4.2.4. Correct the errors and augment insufficient data with the information obtained.

4.4.2.5. Finally, review results of the corrected data package to ensure they are accurate and return the data package to the A/E to begin analysis.

4.4.3. Once the AICUZ team is satisfied that all the elements are complete and data gaps closed, the contractor will turn to the internal and external stakeholders to validate the data. The NMODD, noise reports, and NEPA studies capture all this information (see [Chapter 3](#)). For the operational data, ask flight and maintenance personnel and personnel from appropriate non-flying missions (such as ground weapons ranges) if the data sheets properly captured the information. Wherever possible, ensure that the same personnel who provided the information for the data sheets review them.

4.4.4. To validate the land use data gathered from local governments, the AICUZ PM should bring the applicable portions of the data package to the appropriate land use authorities. Off-base stakeholders should review only those parts of the package to which they contributed. Remember, all conclusions and noise contours remain draft and are “Controlled Unclassified Information” until the base leadership approves the updated AICUZ Study.

4.4.5. The operational data review and validation may lead to the preparation of the noise contour map. If necessary, it is the “long pole in the tent” when preparing an AICUZ Study update. Until the contour map is complete, land use analysis cannot begin.

4.4.6. Whether an A/E contractor or AFCEC/CIP develops the noise contours, initially it will focus on current operations. The AICUZ PM, base, AFIMSC Detachment, and AFCEC/CIP AICUZ staff conduct a technical review of the noise contours. If any concerns are identified, the AICUZ PM will notify the COR and set up a meeting of the stakeholders to resolve the concern.

4.4.7. Having defined the current mission noise contours, the A/E will prepare planning contours based on assumptions provided by the base that have concurrence from AFCEC/CIP AICUZ staff. See [section 2.5](#) of this Handbook and Chapter 4 of DAFI 32-1015 for more information and guidance on planning contours.

4.5. Step IV: AICUZ Study Preparation. At this stage, the AICUZ team has reviewed all the collected data. They have prepared and validated the noise contours NMODD, noise report or NEPA study. Importantly, the COR has given the A/E approval to prepare the AICUZ Study and its associated products.

4.5.1. The AICUZ Study contract deliverables are the Study, the NMODD, the Citizen’s brochure, the digital storytelling, and the AICUZ poster station graphics. Digital storytelling is a computer application that integrates maps, legends, text, photos, and videos to help the audience explore the content of the study. Digital storytelling guides site visitors through the program features and digital narratives ensuring users get the information they need to participate in (and understand) the project outcomes. The digital storytelling application must be interactive, simple to navigate, easy to understand, and engaging with simple and direct

language. It must be visually appealing using high-quality photographs and a consistent style throughout the project (color scheme, fonts, etc.). It must be consistent with and based upon final AICUZ Study content.

4.5.2. The audience for the AICUZ Study consists of the public, land planning agencies, and elected officials. The AICUZ Study gives an overview of the AICUZ. It includes noise contours, APZs, HAFZ, off-base land use analysis, and specific recommendations for achieving compatible development. Additionally, the Study will give an overview of the base history, mission, and economic impact. The AICUZ PM should ensure that the A/E writes the Study for a layperson with little knowledge of the base mission or AICUZ. An AICUZ Study template is available at the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox tab: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

4.5.3. The Noise Model Operational Data Documentation is a compilation of the aircraft operational data used for the noise modeling. It contains points of contact for information providers, all assumptions, spreadsheets used to calculate daily operations, aircraft configurations (i.e., flight profiles) for aircraft operations in the airfield and SUA, as well as information on engine runs and munitions usage for ranges. For models using BASEOPS, you can generate this information from the report module.

4.5.4. The AICUZ public brochure covers the topics of the AICUZ map brochure in a condensed version with a small-scale composite AICUZ map. Normally the size of a sheet of legal-sized paper, it is tri-folded to create six columns for text and maps and to fit in a #10 envelope. The AICUZ public brochure is of a size easily mailed or distributed at meetings.

4.5.5. The AICUZ poster station graphics usually consist of five large posters or banners that you can display on easels for AICUZ public release:

4.5.5.1. Poster 1 addresses the Base mission, history, and economic impact;

4.5.5.2. Poster 2 discusses flight operations at the installation to include flight track overlays and based aircraft flight frequency;

4.5.5.3. Poster 3 is an overview of the noise planning contours, safety zones, APZs, height and obstruction criteria, and compatible land use recommendations;

4.5.5.4. Poster 4 is a composite map of the previously approved AICUZ noise contours overlaid with the new AICUZ noise planning contours on a community map showing existing zoning, APZs, and flight paths. The noise contours will show gradational shading no lower than 50 dB DNL/CNEL; and

4.5.5.5. Poster 5 addresses the roles and responsibilities for DAF and local governments' staff, real estate professionals, developers, and the public.

4.5.6. AICUZ studies should leverage new technologies for outreach as appropriate. Current contracts call for digital storytelling elements such as videos and story maps accessed by Quick Response (QR) codes. These applications are intended to integrate interactive or static maps, narrative text, and other multimedia content from the final AICUZ report. QR codes will help the public find and explore project content. It is anticipated that a lot of useful data will be mapped and analyzed for the project, and it is important for the public to understand what they are viewing without being overwhelmed.

4.5.7. If there are additional topics that the base wishes discussed (such as ground weapons noise, weapons danger zones or an auxiliary field), you can add additional poster stations. For meetings where aircraft noise may prove of high interest, a second poster 4 should be prepared and displayed. The AICUZ PM, in consultation with the AFCEC/CIP AICUZ Program staff and the COR, must identify any additional products or studies and have them included in the contractor's scope of work in Step I.

4.5.8. The A/E shall mount the posters on foam board with the composite AICUZ map (Poster 4) presented at a large enough scale for the public to locate their property in reference to the noise contours, APZs, and flight paths.

4.5.9. The COR for the AICUZ task order will normally schedule two reviews of the draft AICUZ (at 50% and 90% completion) and use the NMODD, noise report, or NEPA study to validate air operations. Normally, the implementation tools (AICUZ map brochure, public brochure, and poster station graphics) undergo their 50% review later as they must be based on the reconciled AICUZ 50% review. The 90% review addresses all AICUZ products.

4.5.10. The reviews will be accomplished by the COR, AICUZ PM, base, AFIMSC Detachment, and AFCEC/CIP staff. After each review, staff comments will be reconciled with the A/E.

4.6. Step V: AICUZ Study or Amendment Public Release. Step V places the AICUZ Program into the public forum. During this step, a coordinated team effort is imperative to ensure that the public, local governments, and agencies who may be affected by the AICUZ are brought into the release process. At the same time, the release of an updated AICUZ Study or Amendment gives the air installation a chance to “kick start” the AICUZ Program through the momentum provided by the public release. Increased community awareness opens opportunities to pursue new land use strategies that will benefit both the community and the air installation.

4.6.1. The public release of an Amendment is primarily accomplished through newspapers and other media and through the distribution of the Amendment in the same way an AICUZ Study update is released. Although public meetings on the Amendment are not required, the base/wing leadership should consider such a meeting if they feel there is significant public interest. AFCEC/CIP can provide assistance with organizing a public meeting. Conversely, a meeting may be useful in generating public interest in the installation and surrounding land use compatibility.

4.6.2. The public release of an AICUZ Study or Update includes public notification, distribution of the Study and culminating in the Installation/Wing leadership releasing the AICUZ Study in a live or virtual public release meeting. The members of the IMST will assist Installation/Wing leadership in all steps of the public release, with the AICUZ PM, Public Affairs and Legal playing major roles.

4.6.3. For unique cases, the MAJCOM MST, on the recommendation of AFCEC/CIP, may consider waiving the public meeting requirement. To receive a waiver, the installation commander must prepare and submit a waiver request along with full explanation and justification to MAJCOM MST. If the MST approves the waiver, the notification of the release of the update is still published in papers and other appropriate media. The installation should simultaneously distribute copies of the Study to all the key individuals. Since AICUZ

amendments do not require a public release meeting, a waiver is unnecessary. However, the base may opt for a public release if desired.

4.7. Preparing for an AICUZ public release. The public release includes both distribution of the update or amendment as well as the public meeting. It is critical to coordinate all elements of the public release effort to meet a series of tight deadlines. Once the installation receives AICUZ Update implementation tools deliverables after the 50% review, they can schedule a firm release date and arrange for a venue of the AICUZ public meeting. Plan for a virtual meeting as well.

4.7.1. The first task is preparation of the AICUZ release notice for publication in the local newspapers and the media plan. Both should be coordinated through the IMST, if applicable, noting all the deadlines that must be met for a successful AICUZ public release. Public notification about the AICUZ release should start 14 days prior to the public release meeting. Make use of broadcast, print, and social media to get out the message.

4.7.2. The installation should simultaneously send copies of the AICUZ Study or Amendment to the applicable agencies, local governments, key organizations, state government points of contact, interested parties listed in [Table 4.2](#), as well as to local libraries or community centers, and individuals known to have an interest. AFCEC/CIP will make available digital copies of the AICUZ to the appropriate regional HUD and VA offices for use in federally guaranteed loan programs. The base may provide the public with copies (hard or electronic) upon request.

4.7.3. HQ AF/A4C distributes the update or Amendment to the Congressional delegation in Washington, DC as requested. The A/E firm provides electronic copies of the AICUZ Study and citizen's brochure/map, or Amendment to HQ AF/A4C at least 15 days prior to the public release of an updated study or the public notification of an amendment.

4.7.4. In addition to the public release activities, the AICUZ PM should make available digital copies of the AICUZ Study or Amendment to Public Affairs, Legal Office, and Civil Engineering. Provide an enlarged copy of the AICUZ map to the Housing Management Office and base library for display in a conspicuous area to ensure DAF personnel seeking off-base housing are aware of the noise or accident potential impacting adjacent land areas.

4.7.5. Typically, the DAF holds the public release meeting off-base to encourage maximum participation and avoid the perception of undue influence by the base. Carefully consider the location for the public release. A good or bad venue could set the tone for the entire meeting.

4.7.6. The timing of the meeting is important. Normally, the meetings run 3-4 hours, starting in late afternoon and going into early evening, to allow participants to attend after work. Tuesday and Thursday normally work best, with Thursdays preferred. Avoid Mondays, Fridays, holidays, and holiday-shortened weeks as people tend to make other plans. Check to make sure there are no conflicting community meetings (i.e., City Council, Planning Commission, etc.) scheduled for the time of the release.

4.7.7. Make a list of agencies, organizations, elected officials, community leaders, local planners, and other key individuals who should be invited to the release meeting (see [Table 4.2](#)). Consultation with the AFIMSC Detachment and AFCEC/CIP and networking with nearby air installations can help you identify stakeholders, anticipate questions, and develop your (the DAF's) message.

Table 4.2. Possible Invitees to AICUZ Public Release Meeting.

Agencies	Regional Department of Veterans Affairs Regional Federal Housing Administration Housing and Urban Development Field Office Dept. of Agriculture Rural Housing Program Other applicable State and Federal Agencies
Tribal, Local, and Regional Governments	Tribal Governments County Commissioners City Council members Planning Commissioners Councils of Government leaders Local State Representatives U.S. and State elected officials Key Staffers Planning Directors City, County and Regional Planners
Organizations	Real Estate professionals Commercial Builders Organizations Chambers of Commerce Home Builders Associations Economic Development Councils Civic Organizations and Clubs
Interest Groups	General Public Home owners' associations Key land owners and developers Veterans organizations Installation opposition groups

4.7.8. The AICUZ public meeting is an information session normally held in an “Open House” format. Traditionally, government agencies have used “Town Hall” meetings to provide information to the public, but it may also be perceived as “us against them” and may become adversarial. Town hall meetings limit the amount of information presented and public participation and interaction. The open house meeting is less formal and has no set presentations. Instead, it allows the public to interact one-on-one with various subject matter experts at poster stations and allows the public to access information at their own pace (see [Figure 4.1](#) for the layout of a typical open house meeting).

Figure 4.1. Open House Format Meeting.



4.7.9. Remember the following key points when it comes to the AICUZ open house:

4.7.9.1. Take advantage of the meeting to help stakeholders better understand the defense mission. Remember, the AICUZ release open house is both educational and informational.

4.7.9.2. When discussing the base mission, always include its place in the economy, i.e., number of employees, total economic impact, etc.

4.7.9.3. In a situation of low trust and high concern by the public, keep messages simple and straightforward. Make no more than three main points, each backed up by three facts; and,

4.7.9.4. Respect stakeholders with differing viewpoints and look for areas of common ground.

4.7.10. AFCEC/CIP will assist the base with planning and execution of the public release meeting. The AFCEC staff and A/E team will typically arrive on-base the day before the public meeting to brief Installation/Wing leadership and provide training in AICUZ and risk communications for the installation staff who will be participating in the AICUZ public release.

Chapter 5

AICUZ PROGRAM IMPLEMENTATION

5.1. Introduction. “We must train the way we fight” is more than a platitude. Today’s DAF requires bases capable of day, night, and all-weather operations that can accommodate next generation aircraft. It requires training areas with unencumbered airspace and the necessary bandwidth for joint operations, net-centric fighters, and remotely piloted aircraft. Ranges that can handle standoff weapons and provide realistic threat training are also required. Where the needs of a modern DAF and a growing community meet, there exists the possibility for friction and conflict—or opportunity. While a fence separates the base and community, what we do can affect our neighbors and what they do can affect our mission. The AICUZ Program provides an opportunity for collaboration where both the base and community can not only coexist but also thrive.

5.1.1. That brings us to the Principles of Preservation of Military Bases:

5.1.1.1. Axiom I – Military bases do not operate in a vacuum but are subject to the influences of nearby political bodies. These bodies will follow the courses most expedient to their needs. Cities must look out for the needs of their citizens and ways to keep their growth healthy. At the same time, developers, landowners and special interest groups will use their influence with elected officials to achieve their own land use goals.

5.1.1.2. Axiom II – Changing the course of a political body in motion will sometimes create friction. The further a body deviates from the prescribed course, the greater the energy required to redirect that body. The first time the AICUZ PM inserts the installation’s interests into the planning process, it may cause friction. The military, however, has a right to an active role in the land use planning process. Over time, the installation’s interests and its role in the community will be recognized and the installation will be viewed as a legitimate stakeholder and accepted as part of the process.

5.1.1.3. Axiom III – Urban encroachment will slow when a political body assumes the base’s viewpoint is most expedient to its needs.

5.1.2. The sooner the base enters the planning process on an issue the more open a developer is to changes in its proposal. Once the developer commits resources and money to the project, they will often fight any changes tooth and nail. An installation that works with the community, and is an active member in the community, will thrive.

5.2. Terminology. Let’s define some key terms. Additional terms and acronyms are in [Attachment 1](#).

5.2.1. According to the Merriam Webster dictionary, the term ‘encroachment’ means, “to enter by gradual steps or by stealth into the possessions or rights of another.” Remember – encroachment doesn’t mean the same to everyone. Perceptions of what encroachment is or is not can vary from community to community. We – the Department of the Air Force – must ensure communities understand what encroachment means to us, and we must understand what encroachment means to them.

5.2.2. AFI 90-2001, *Mission Sustainment*, defines encroachment as “any deliberate action by a governmental or non-governmental entity or individual that does, or is likely to inhibit,

curtail, or impede current or future military activities within the installation complex and/or mission footprint; or any deliberate military activity that is, or is likely to be incompatible with a community's use of its resources.” In simple terms, encroachment is what others do to us (DoD), what we do to others, and what we do to ourselves. Encroachment is a two-way street. We may look at new housing in a high noise zone as an encroachment. It is very likely that people who find their dream home in a noise zone that has expanded due to a mission realignment or new aircraft beddown may feel it is the DAF doing the encroaching. Also note, we can create self-encroachment through DAF or DoD activities that interfere with a military mission.

5.2.3. The AICUZ Program Manager is part of the Installation Mission Sustainment Team (IMST) that serves as the base's focal point for land use compatibility issues. It is a cross-functional decision-making team for long-term, collaborative planning and problem solving. The team will analyze issues, develop responses, monitor activities, coordinate with higher MSTs, and engage internal and external stakeholders.

5.2.4. The IMST Executive Director acts as the installation lead for coordinating Mission Sustainment Program activities, reports to the installation commander, and serves as the primary advisor to leadership on mission sustainment hazards/encroachment challenges and proposed controls.

5.2.5. IMST members are drawn from foundational programs already supporting Mission Sustainment. Tenant and/or mission partner participation in the IMST is important.

5.2.6. Traditionally, they have focused on the area around the air installation when attempting to address encroachment challenges or concerns. While the airfield is of primary importance, flying units accomplish most of the training mission using military training routes, airspace training areas, and ranges that fall within the Installation Complex/Mission Footprint (IC/MF) – sometimes in adjoining states. The mission sustainment hazards within the IC/MF, away from the airfield environs, are normally the responsibility of the IMST unless assigned to the AICUZ Program Manager.

5.2.7. Depending on an installation's training requirements, owned or controlled assets may not adequately allow for completion of training requirements and the installation may need to use other assets. The Mission Footprint is composed of the Installation Complex plus any land, facilities, airspace, and ranges which are not managed by the installation but provide direct, routine support to the mission. For example, Bureau of Land Management (BLM) lands used for training would fall into the Mission Footprint.

5.2.8. The Region of Influence (ROI) is the geopolitical area the installation operates within, including both the base and other assets, such as airspace and training areas. This may include communities and agency-controlled lands at any government level. The ROI Priority Area is a geographic area where critical mission operations take place or stakeholder actions incompatible with mission operations are more likely. It defines priority areas for encroachment concerns and helps prioritize key stakeholders.

5.3. Strategy. AICUZ implementation is not a rigid, linear process dictated by doctrine. The process can be adapted to the local conditions, political environment, and personalities of the stakeholders. But a structure is helpful in connecting the AICUZ Study with the final outcomes

and determining the progress in between. AICUZ implementation typically follows these four phases. Sometimes the process loops back to previous steps as circumstances change.

Table 5.1. Four Phases for AICUZ Implementation.

Phase I	Organize
Phase II	Assess
Phase III	Engage
Phase IV	Monitor

5.3.1. **Chapter 6** begins laying out this simple AICUZ Program structure in greater detail as it has been used successfully at many installations.

Chapter 6

PHASE I: ORGANIZE

6.1. General. Preparing and releasing an AICUZ Study is just the first step in implementing the AICUZ Program as part of the installation's comprehensive efforts to prevent and minimize the impacts of encroachment. It locates potential conflicts. As a foundational program for mission sustainment, it is not surprising to see the similarity to the Mission Sustainment Risk Management Process. The AICUZ Program, however, focuses primarily on the area around the air installation, while the mission sustainment program also looks beyond the airfield to cover all aspects of the IC/MF, examining a variety of mission sustainment hazards (see AFI 90-2001). Since the AICUZ predates the mission sustainment program by four decades, bases may not have fully integrated the two programs. In those circumstances, the programs may operate separately. For those installations that have an active AICUZ Program, chapters 6, 7, 8, and 9 show how to properly implement the AICUZ Program. Remember, AICUZ is advisory. The local communities control land use. A successful AICUZ Program requires collaboration with your neighboring communities.

6.2. The AICUZ Program Manager. Traditionally, the base planner served as the AICUZ PM – Para. 3.2 of DAFI 32-1015 gives responsibility to appoint the AICUZ PM to the Base Civil Engineer. However, the DAFI also recognizes the AICUZ Program may fall under another organization. In either case, the responsibilities of the AICUZ PM remain the same. See [Chapter 3](#) in the DAFI for AICUZ PM responsibilities.

6.2.1. The AICUZ PM must be skilled in the AICUZ and mission sustainment programs, as well as knowledgeable of mission operations and urban planning. Few AICUZ PM's enter into the position with the requisite skill sets, and training is available through many sources.

6.2.2. Understanding the principles of urban planning is essential since land use planning is the primary means by which the program achieves its goals. Joining a professional organization serving community planners, such as the American Planning Association (APA), is a good step in that direction (official endorsement of this organization is neither expressed nor implied). Also check with the municipalities – they often hold orientation training for new planning commissioners. They may allow a base representative to attend. Instruction aside, training through professional organizations and especially the local municipalities is an excellent way to begin building the relationships that AICUZ implementation relies on.

6.2.3. The AICUZ PM should understand topics such as installation master planning and the National Environmental Policy Act (NEPA). Training in these and much more are available through the Air Force Institute of Technology. The Navy's Civil Engineer Corps Officers School (CECOS) also offers courses in NEPA and Risk Communication among others.

6.2.4. Public speaking and working with the installation's public outreach team are essential skills for the AICUZ PM. A verbal presentation of the recommendations, tailored to the audience and time available, may be the only opportunity to convince the jurisdiction's leaders to support the AICUZ Program. If you feel uncomfortable talking before an audience, take a course in public speaking at a local community college and join an organization that offers public speaking opportunities. Working with the public is an acquired skill, developed by experience but there are resources available to help with this task. Help in this area is often

available through the installation PA office and with environmental personnel, both of which should have experience in this area. AFH 33-337, *The Tongue and Quill*, is a very good resource for learning basic communications skills. The FAA's *Community Involvement Manual* provides a good overview. It and primers on related topics are available on the AFCEC/CIP Regional Development SharePoint® site in the Outreach and Engagement folder under the AICUZ Program Toolbox tab. Assistance and guidance is also available from the AICUZ planners at AFCEC/CIP.

6.2.5. The military's operational side is often a mystery to people without military service experience. The AICUZ PM should spend time visiting with operational units and attend their open houses and air shows. In addition, the AICUZ PM should learn about the installation's assigned aircraft, flying missions and the type of air operations performed at the base. Attend Airfield Operations Board meetings; build interpersonal relationships with Airfield Ops staff; regularly visit the Airspace Manager and Standardization/Evaluation offices and ask operational units for mission briefings. Consider enrolling in DAF Professional Military Education and join the Air Force Association. Take advantage of the base library for military professional reading lists. Visit the air traffic control tower and have Terminal Instrument Procedures (TERPS) explain your base's published departures, arrivals, and flight publications. Learning the "language" and terms unique to the operators and understanding their culture will build trust and credibility with them.

6.3. The AICUZ Team. Once you have a grasp of your facility's AICUZ Program, it is time to brief your internal stakeholders, to include the MST and base leadership. Remember, AICUZ is leadership driven. It is important that you get buy-in from your leadership. Without that buy-in, you do not have a functioning program.

6.4. Resources. The following resources are useful to the AICUZ PM:

6.4.1. AFCEC/CIP publishes a bi-weekly compilation of worldwide AICUZ and mission sustainment related articles to provide a glimpse of public and media perceptions of noise, AICUZ, and encroachment. Additionally, CPP publishes a mission sustainment newsletter that provides readers with case studies, lessons learned, frequently asked questions, and technical articles on AICUZ, encroachment, and mission sustainability. Archived issues of the AICUZ and encroachment-related articles and the newsletter are under the Media Monitoring tab at the AFCEC/CIP Regional Development SharePoint® site: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

6.4.2. The Office of the Secretary of Defense (OSD) has sponsored a series of primers on planning, outreach and engagement that will assist the AICUZ PM in working with various governmental agencies. These primers include:

Table 6.1. Primers to assist in working with governmental agencies.

Working with State Legislators.
Working with Local Governments.
Working to Preserve Farm, Forest and Ranch Lands.
Commander's Guide to Community Involvement.
Collaborative Land Use Planning.

Working with Regional Councils.
Outreach for Mission Sustainability: Working with Conservation Districts.
A Practical Guide to Compatible Civilian Development near Military Installations.
A Guide for Military Installations.

6.4.2.1. These primers are available on the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox tab in the Outreach and Engagement folder.

6.4.3. AICUZ PMs must be familiar with all land use studies associated with their base. Read the AICUZ Study, Installation Development Plan, Installation Complex Encroachment Management Action Plan (ICEMAP), and, if available, the U.S. Department of Defense Office of Local Defense Community Cooperation OLDCC) Compatible Use Plan (CUP was formerly known as Joint Land Use Plan or JLUS), and Military Installation Resiliency plans.

6.4.4. The air installation complex consists of the main base and any annexes, ranges, and other training areas owned or scheduled by the base. While this may encompass considerable land, the mission footprint is larger – often extending into neighboring states. Besides the installation complex, the mission footprint includes lands and airspace the installation does not own or schedule, including low level routes and training areas, such as Military Operating Areas (MOAs) and Off-shore Warning Areas. Remember that, without these areas, your mission may be impaired.

6.4.5. The AICUZ PM must also engage with the Installation Mission Sustainment Team (IMST). Find out how your IMST is organized and visit with the IMST Executive Director to find out the role the AICUZ PM will play on the team. Learn your mission sustainment chain of command and meet with your PA and Legal offices to ensure you understand the rules for working outside the fence and representing your base to your counterparts in the community. If you need to establish an IMST, AFCEC/CIP regional planners can help you get organized.

6.4.6. The AICUZ PM should prepare and maintain a formal presentation of the AICUZ Program. Customize the presentations for various audiences, such as citizens' groups, local planning commissions, city councils, county legislatures, county planning commissions, councils of government and other interested agencies. These presentations should inform the public on the AICUZ Program, installation mission, economic impact, any issues, and the need for collaborative land use planning. The presentation, or some adaptation of it, may also be given to organizations (e.g., Chamber of Commerce, Real Estate Board, neighborhood associations, service clubs, etc.), elected officials and the public. Elected officials are ultimately responsible for compatible land use development. However, they typically receive land use recommendations from a planning commission (made up of appointed local citizens) advised by a planning department. The biggest impact for elected officials, however, comes from the concerns of the public as well as vested interests. Review your presentation frequently and keep it up to date. If you need help, the AICUZ staff at AFCEC/CIP is available to help with sample presentations, graphics, videos and advice.

Chapter 7

PHASE II: ASSESS

7.1. Research. At this stage, the AICUZ PM must ensure the AICUZ Study is current (see Section 3.3). Learn and understand the local political and planning environment in which you must operate.

7.1.1. Identify government agencies, organizations, and individuals the AICUZ PM must successfully work with to execute the AICUZ Program. Aside from federal, state, regional and local governments and planning bodies; other organizations often play a role in the process. **Table 7.1** lists agencies that may have an interest in the program. It is by no means inclusive. Your counterparts at other bases in the region may know locally unique players in the process.

7.1.2. Learn how your local governments are organized. Know who can educate you on the planning process. Know the decision makers and opinion leaders – they are often not the same people!

7.1.3. Identify the key staffers who advise local government leaders on issues and network with them. They can explain the relationship between the installation and its neighbors. What were past issues between the base and community, and are there any outstanding issues or concerns?

7.1.4. Read the local news outlets and study your noise complaints, as well as blogs and social media. You will stay current on what is happening in your community and who is making it happen.

7.1.5. Become familiar with all the municipal plans the installation will affect and learn how the local planning process operates. For instance, know which boards, commissions, and committees perform project review and approval. Identify opportunities for the base to enter into the planning process. For airports in your ROI, review any FAA Part 150 studies and Airport Improvement Plans – these documents should show you how commercial and municipal airports approach encroachment. If there are other bases within your ROI, their planners may be able to shed light on the political climate. Finally, review your state statutes for military compatibility legislation and fair disclosure requirements. If such measures have been proposed but didn't pass, find out why and who proposed them. Maybe an updated AICUZ is the spark they need.

Table 7.1. Potential Agencies and Organizations Interested in AICUZ Information.

Federal Government

1. Tribal Governments 2. Department of Agriculture 3. U.S. Forest Service 4. Department of the Interior 5. Bureau of Land Management 6. Fish and Wildlife Service 7. National Park Service 8. Advisory Council on Historic Preservation 9. Department of Transportation 10. Federal Aviation Administration 11. Federal Highway Administration	12. Department of Housing & Urban Development 13. Environmental Protection Agency 14. Department of Education 15. Department of Commerce 16. Census Bureau 17. Department of Labor 18. Veterans Affairs 19. Department of Energy 20. Military (DoD, Navy/Marines, Army incl. COE, Coast Guard) 21. Health & Human Services
State Government	
1. Senators (local and key committees) 2. Representatives (local and key committees) 3. Planning Department 4. Economic Department 5. Employment Department 6. Highway Department 7. Recreation Department 8. Natural Resources 9. Fish and Wildlife 10. Land Department 11. Water Resources 12. Air Quality 13. National Guard	14. Agriculture 15. Emergency Response Agency 16. Transportation 17. Intergovernmental Review Single Point of Contact (EO 12372) 18. Aeronautics Department 19. State Historic Preservation Office 20. Conservation Department 21. Coastal Agency 22. Solid Waste Department 23. Environmental Agency 24. Health Agency 25. Military Affairs, if applicable
Local and Regional Government	
1. County & Municipal Departments (Planning, Development, Real Estate, etc.) 2. County & Municipal bodies (County Commissions, City Councils, Planning Commissions, Planning & Zoning Boards, etc.) 3. Councils of Government	4. Fire Districts 5. Emergency Response Agencies 6. School Boards 7. Districts (Water, Soil Conservation, Flood Control, Sewer, Solid Waste, etc.) 8. EO 12372 Designated Agencies
Special Interest Groups	
1. Service Organizations (Lions, Kiwanis, etc.) 2. Military-related Service Organizations (Air Force Association, American Legion, VFW, etc.) 3. Chambers of Commerce 4. Real Estate Organizations (incl. local and state chapters of the National Association of Realtors) 5. Boards of Real Estate and Brokers' Association 6. Homebuilders and Homeowners Association 7. Environmental Groups (including organized noise opposition groups)	8. Local Chapters of Professional Organizations (e.g., AIA, ASCE, APA) 9. Bar Association 10. Newspapers 11. Media Outlets (e.g., Radio & Television Stations) 12. Industrial Councils 13. Key Landowners and Developers 14. Unions 15. Retiree Organizations 16. Other Non-Governmental Organizations

7.1.6. Obtain calendars and agendas for key meetings. You can do this by visiting a city or county website, as they have codified this practice as part of the notification process. Some communities allow you to sign up for alerts automatically. Learn the procedures for submitting written comments and giving oral testimony. Times for submittal or even signing up to testify vary. If you don't submit comments in time, the DAF viewpoint will not be heard.

7.1.7. While the AICUZ PM will spend considerable time working with local governments, make sure you identify the various other organizations involved in the land use planning process. Real estate professionals, home builders' associations, appraisers, NGOs, and activists all have a role in these processes.

7.1.8. Identify the opinion leaders within the community. Opinion leaders are not necessarily elected officials – they are the ones the elected officials and citizens listen to as a voice of reason. Often they may be a retired general officer but could also be a business leader, pastor, or community activist.

7.1.9. Finally, learn who in the community supports your base and its mission and those who have concerns.

Chapter 8

PHASE III: ENGAGE

8.1. Introduction. At this point, it is time to share DAF’s mission needs and concerns with the community and to work collaboratively on land use planning. The AICUZ PM is the linchpin of this effort, serving as a liaison and bringing two diverse cultures with differing perspectives – the military and the community – together on issues of land use compatibility. Remember that liaison goes both ways – it is just as important that installation leadership understands the community position on land use issues as it is that the community understands why the DAF must train and fly. Before you go out to the community, however, there are some guidelines you need to understand.

8.2. Attitude. “Pardon my jet noise; it’s the sound of freedom.” For many years, this was a common sign outside the gate at military airfields. While some may agree with this sentiment, some citizens living nearby may perceive this statement as an insult. The noise may not be the real issue at all. They may object to war generally, government expenditures on a particular conflict, federal government intervention in local affairs, or the party in power. Jet noise may just be the focal point of their frustration. Empathy can be the basis for productive communication.

8.2.1. As noted earlier, what we (on base) do can affect our neighbors and what they do (off base) can affect our mission. Encroachment management is not about two parties facing down each other across a table. It is a team effort where diverse interests work towards mutually acceptable decisions with mutually beneficial outcomes. We build our relationships and credibility with the community by being a good neighbor, participating and volunteering in local activities and events. We best engage advocacy and opposition groups when we understand their motivations and concerns. We solidify those relationships when we keep the public informed of temporary extensions to our operations hours or flying tempo. We encourage dialogue when we are responsive to queries and treat everyone with respect. We garner trust when we are professional.

8.2.2. Less than two percent of the U.S. population has served in the military. Their only contact with the DAF may be when you respond to a question at a public meeting. At that time, you are representing the DAF, and there is no second chance to make a first impression.

8.3. Rules of Engagement. Many of the ground rules for working with communities are based in the law – the law defines what installations can and cannot do in everyday interaction with the public (see [Table 8.1](#)). Whenever the AICUZ PM has concerns as to what you legally can or cannot do, go to the base Legal Office, which has reach-back to AF/JAOE-FSC for specialized support.

Table 8.1. Engaging State and Local Governments: The Facts.

Common Issues	True/ False	What the Law Says	What This Means
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“DoD personnel cannot provide information to State and Local governments about legislation that would protect our military bases and ranges.”	FALSE	“No part of the money appropriation ...shall be used directly or indirectly to...influence a Member of Congress, a jurisdiction, or official of any government, to favor...or oppose any law, policy or appropriation.” 18 U.S.C. 1913]	IT IS OKAY TO: Share information about Administration positions. Share information necessary to the administration of laws for which a government agency is responsible. Provide pre-existing materials. Give speeches or testimony on Administration positions (as long as not exhorting the public to contact government officials in support of position). Send letters from Agency to members of Congress. Make statements to news media on Administration positions.
“Providing information on impacts of local development action on our installation is lobbying.”	FALSE	Applicable to lobbying at the State and Local level AND with regard to regulations and policy, not just legislation and appropriations.	
“Giving speeches or testimony on legislation is considered lobbying.”	DEPENDS	“No part of any appropriations contained in this Act shall be used for publicity or propaganda purposes...” [DoD FY05 Appropriations Act, PL 108-287 Sect 8001]	
“If State and Local governments take the military’s advice, the military may become liable for takings.”	FALSE	Nor shall private property be taken for public use, without just compensation.” [U.S. Constitution, Amendment 5]	IT IS OKAY TO: Testify or provide information to governmental agencies about impacts of actions on military operations. Make recommendations or otherwise be persuasive about impacts of actions. Prepare and submit comments on draft ordinances/legislation.
“Testifying to a local land use planning authority makes the government liable for takings.”	FALSE	“The United States may use its position as a landowner to influence local zoning authorities without incurring liability for a taking.” [Persyn v. United States, 32 Fed. Ci. 579, 585 (1995)]	

“Working with State and Local governments to combat encroachment is DoD Policy”	TRUE	“I recommend you direct more active involvement at the installation and Regional Coordinator level in all aspects of State and Local planning that could impact readiness.”	IT IS OKAY TO: Participate, communicate, build relationships, and share information. IT IS NOT OKAY TO: Avoid all interactions with local planners and organizations about land use issues.
Modified from <i>Working with State and Local Governments to Combat Encroachment</i> , Memo from Deputy Under Secretary of Defense (Installations and Environment), 23 August 2004.			

8.4. Understanding the Ground Rules. Table 8.2 expands on the Rules of Engagement to include lessons learned to help keep the discussion productive and respectful. Above all, be an active listener. Make it clear to the speaker and other attendees that you hear them and understand their concern. Really listening to other people is an effective way to defuse tension and see root causes.

Table 8.2. Rules of Engagement.

Do:	
1. Coordinate internally with tenant units and mission partners to fully understand all mission requirements and related encroachment impacts. 2. Attend public meetings to raise awareness of installation issues and understand community concerns. 3. Arrive early, leave late. 4. Ensure installation messages and communications are consistent with past language/interactions. 5. Stay on message. 6. Utilize DAF approved themes and messages to educate stakeholders about the role of the installation in the community. 7. Answer all questions. If you don't know the answer, let them know you will get back to them and do.	8. Provide concise answers. Upset people will hear what they expect to hear. 9. Treat all attendees with respect. 10. Determine when Installation/Wing leadership should be involved in engagement and when it is appropriate for staff and the AICUZ PM. 11. Identify stakeholders and establish relationships. Build on and sustain those relationships. 12. Learn to identify decision makers and opinion makers. 13. Reach-back for SME support as appropriate.
Don't:	
1. Accept or receive gifts from stakeholders. 2. Allow professional disagreements to dissolve into personal conflicts. 3. Approach community meetings with aggressive, rigid demands. 4. Assume that external stakeholders understand DAF missions or installation requirements. 5. Brief community members with unfamiliar jargon or acronyms.	7. Ignore community complaints or conversations regarding mission sustainment hazards. 8. Respond to community criticisms with attacks. 9. Shift blame or responsibility for DAF encroachment upon the community. 10. Use contradictory statements.

6. Express personal opinions.	11. View community concerns and complaints regarding DAF missions as a lack of patriotism.
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8.5. Proactive Engagement. Mission sustainment often requires a quick reaction to unfolding events to ensure the community hears the DAF viewpoint. Axiom II of *The Principles for Preservation of Military Bases* discussed in [Chapter 5](#) states: “The further a body deviates from the prescribed course, the greater the energy required to redirect that body.” To be truly proactive in the mission sustainment process, the AICUZ PM must find an early entry point into the planning process. Developers have the least invested early in the planning process and are looking to move their project forward. They are most receptive to working with the military to resolve compatibility concerns. However, the more time and money developers spend on a project, the less they become willing to compromise. Ideally, the AICUZ PM will participate in the early meetings between local planners and the developer. Not only are developers more willing to work with the DAF at this stage, but early engagement also gives the installation time to formulate a response. Taking a proactive approach through early participation in the planning process reduces friction and increases the likelihood of a successful collaboration. This in turn leads to a solid and reciprocal relationship between the installation and the community. Hearing about projects and getting invited to those early meetings is often a direct outcome of the AICUZ PM’s relationships with the local planners and leaders.

8.6. Internal Training and Education. A proactive approach is just as important on-base as it is off-base. Developing and holding regular AICUZ and mission sustainment training on-base also increases your likelihood for success. Installation/Wing leadership needs to emphasize how compatible development helps to protect the defense missions. As a foundational program to the mission sustainment program, basic training in AICUZ is essential for IMST members to ensure they understand how compatible land use guidelines work with the mission sustainment hazards. Education for the operational units is also essential. Educating the flying units on community concerns gives them an awareness of public concerns and why noise abatement techniques are essential.

8.6.1. Webinar recordings of AICUZ and mission sustainment conferences are available on AFCEC/CIP Regional Development SharePoint® site under the Training Documents\AICUZ, and the AICUZ Training tabs. Additional AICUZ resources, including videos, are available under the AICUZ Program Toolbox tab. Two of the videos, *AICUZ-The Commander’s Role* and *AICUZ-General Overview* are particularly useful for giving an overview of the program and command responsibilities. Additionally, AFCEC/CIP staff is available for assistance and mentoring.

8.7. Boots on the Ground.

8.7.1. You cannot implement the AICUZ Program from behind a desk; it is important that the AICUZ PM go to the field. Therefore:

8.7.1.1. Check social media sites and local news outlets every day.

8.7.1.2. Review planning meeting announcements and legal notices to determine if any of the upcoming actions have the potential to affect your installation’s defense missions.

8.7.1.3. Visit local government websites for public meeting agendas. Sign up for automated alerts and invitations to public hearings.

8.7.1.4. Coordinate with your PA to ensure you are on the distribution list for media monitoring articles concerning your base.

8.7.1.5. Get out of the office at least weekly and drive your installation perimeter and the AICUZ footprint. Look for rezoning notices, large parcels for sale, freshly cleared land, and other signs of potential development. Proposed utility expansions, such as sewers and waterlines, are also indicators of potential development. Look for new or expanded buildings, such as fire stations or police substations, as indicators of future population growth. Note buildings or large tracts of land that could potentially harbor incompatible uses. Finally, watch existing development for changes in use that may be incompatible with the installation mission. Factory buildings converted to apartments is the classic example.

8.7.2. To successfully monitor and evaluate off-base land development, installation personnel must establish and maintain contact with planners and other officials who handle land use issues. Establish lines of communication with other applicable government agencies (councils of government, airport authorities, other military installations, utility districts, etc.) and area offices of federal and state agencies (State Real Estate Commission, Offices of Economic Planning and Development, HUD/FHA, VA, FHWA, FAA, USDA, etc.). These agencies can influence proposed developments near air installations. Regularly attend and participate in appropriate zoning commission, city council, county board, and other meetings and hearings which could potentially affect the installation. Like any other landowner, the DAF has the right to express concern for planning and zoning issues. The DAF needs representatives at these groups' meetings to convey DAF interests.

8.7.3. To obtain additional information on future development plans or changes in use affecting the installation, attend and participate at meetings of local real estate associations, home builder associations, etc. These trade groups are where the local development community interacts. They are venues where concepts gel. Are elected and appointed officials discussing potential development issues not yet in the planning process? Does the public testimony include possible development issues or issues of concern about your base's missions?

8.7.4. When you identify a potential mission sustainment hazard the IMST cross-functional approach can assist in the preparation of the installation's response to the appropriate decision-making authority. When needed, enlist additional support from the flying wings, Airfield Management, etc. Remember, too, that reach-back support is available from the AICUZ planners at AFCEC/CIP. Maintain complete records of all AICUZ actions and enter those records in the IMST's minutes.

8.7.5. Once a land use proposal has been determined as incompatible with the AICUZ guidelines, the installation must assess the impact and inform the appropriate agencies of its concerns. Be sure to coordinate with Legal and PA before stating any preliminary or official position or making a presentation at a public meeting.

8.7.6. Transparent and early discussions with the applicant will determine the probability of implementing modifications to the proposal to avoid mission degradation. If a public hearing occurs, the AICUZ PM should attend to voice specific concerns. If the decision-making body is a board or commission, such as a local planning board, brief the members prior to the hearing. Some boards hold executive sessions prior to a public hearing. If the process allows,

present the installation's concerns both verbally and in written form. The installation should be prepared to provide information to the news media explaining the facts, reasons and key messages for not supporting the proposed development.

8.7.7. Presenting the installation's concerns is a team effort involving Installation/Wing leadership, the AICUZ PM, Public Affairs, Legal, and any necessary Subject Matter Experts (SMEs), such as the Airspace Manager, Frequency Spectrum Manager, Anti-Terrorism/Force Protection, etc. The team should determine who should speak, what information should be released, and to whom it should be directed. The installation should negotiate with the decision-making body to achieve a result protecting the vital interests of the installation. Investments with the best possible chance of success are in everyone's interest.

8.8. Networking. Networking is an informal interaction and free flow of information that builds effective relationships. It occurs at chance encounters or during down time at meetings. Because it is unstructured, networking may cover a wide range of topics, leading to serendipitous discoveries. Networking builds trust. Trust improves information flow and helps you understand the needs of residents. Better understanding of motivations leads to more effective and acceptable suggestions for change.

8.8.1. Networking is one of the most productive means of communication regularly practiced by urban planners. Take advantage of networking opportunities by meeting regularly with planning professionals, going out for coffee or even lunch. You will gain clearer insight into community issues while informally educating others on your installation's missions and concerns.

8.9. Communication, Outreach and Engagement. The ability to formulate and communicate complex thoughts sets humankind aside from the rest of the animal kingdom. Sometimes communication is succinct and to the point – other times it is not. In 1863, Edward Everett – known as the finest orator in the country – delivered a 13,607-word speech to dedicate a battlefield cemetery at a previously little-known community in Pennsylvania. However, the next speech eclipsed Everett's two-hour oration with just ten sentences. The 271 words delivered by President Abraham Lincoln in that speech is known today as the "Gettysburg Address." Poor communication skills and unclear messaging can lead to misunderstandings and community discord affecting our mission. Communication occurs via one-way, outreach, and engagement:

8.9.1. One-way communication allows the sender to frame a specific message often on short notice. By its nature, this approach allows little distribution control and no direct feedback, such as in press releases. Normally, PA prepares the one-way communications, vets them through the base legal office, and secures approval by installation leadership.

8.9.2. Outreach is a limited two-way communication approach that is presentational in nature, typically conducted by DAF personnel, and crafted for a specific audience. The briefings are informational with stakeholder questions following the presentation. These presentations are generally prepared by the AICUZ PM with assistance from PA and, depending on the level of audience, conducted by either the AICUZ PM or Installation/Wing leadership. Build your outreach briefing off a stable of existing presentations and tailor it toward a specific issue and/or stakeholder. [Chapter 6](#) of this Handbook discusses the AICUZ brief.

8.9.3. Engagement is two-way communication and conversational, involving true dialogue between the DAF and stakeholders. Because of its open and direct nature, engagement requires

a high level of preparation, possibly involving DAF SMEs and coordination with the legal and public affairs offices (see [Table 8.2](#) for some basic rules of engagement). Direct engagement is beneficial to both the installation and stakeholders as it helps build a collaborative environment. There are many venues suitable for engagement on AICUZ issues—these are just a few examples:

8.9.3.1. Air shows present unique opportunities for an installation to host the community on base, foster a better understanding of our mission and to meet our men and women in uniform. Often, with air shows and other special events, we provide opportunities for elected officials and community leaders to meet in a relaxed atmosphere with the Base/Wing leadership. Air shows often have a practice day without the public. Meet with your leadership and PA to propose inviting the staffers, planners, and community volunteers out with their families for this “special viewing” to get to know us and learn what we do for a living.

8.9.3.2. A Land Use Forum is a half-day to full-day event where external land use stakeholders (i.e., land use agencies, nongovernmental organizations (NGOs), developers, etc.) and DAF representatives participate in presentations and panels to discuss strategies for achieving compatible development. These forums develop a sense of collaboration between all stakeholders.

8.9.3.3. Community Leaders’ Forums, hosted by Installation/Wing leadership, provide local stakeholders a chance to meet key leadership and staff to learn about land use compatibility and mission sustainment. The stakeholders may be opinion leaders, senior staff from local and regional governments, and representatives from homeowners’ associations, NGOs, and Chambers of Commerce. After the DAF presents issues of interest, the stakeholders participate in a roundtable discussion of these and other issues.

8.9.3.4. Open House Meetings (other than the public release meeting) are excellent venues for two-way communications between the community and the DAF. The open house can be set up with poster stations and DAF SMEs to discuss issues of concern and interest to both the installation and the community. Stakeholders could include elected officials or staff from federal, tribal, state, regional, and local governments; real estate professionals; land use planning agencies; developers; landowners; and the public. See [Figure 4.1](#) for an example of the AICUZ open house.

8.9.4. See also [Attachment 7: The Role of Communication and Complaint Management](#). Additional resources on Outreach and Engagement are available on the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox tab: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

8.10. Special Stakeholders. [Table 4.2](#) presents a list of potential invitees to the AICUZ public release and [Table 8.1](#) presents a list of potential agencies and organizations with an interest in AICUZ. There are, however, certain groups with whom engagement is crucial in land use and mission sustainment issues:

8.10.1. Elected and Appointed Officials. While much of the communication with elected officials will occur at the Installation/Wing leadership level, the AICUZ PM needs to stay involved to ensure the DAF message on mission sustainment is seamless and consistent. One way to stay connected with elected officials is through their staff. The staff serve the elected

officials by helping formulate positions and assist with constituent communications. The AICUZ PM should look for opportunities to network with staff and educate them directly. One venue for educating elected and appointed officials and their staff is through public workshops for city councils and planning commissions. These meetings are normally open to the public as a condition of Sunshine Laws, which generally prohibit a “quorum” (a numerical majority of an elected body) from meeting and discussing official business without public participation.

8.10.2. Developers. Developers have little understanding of the AICUZ Program. However, through home builder associations, opportunities open up for training. Of particular interest is how incorporating noise level reduction into homes can increase the quality of life for those impacted by aircraft noise.

8.10.3. Media. At times, some may perceive the media as hostile – more likely, they are uninformed about the military with little experience in working with the armed services. Work with your PA to develop and release ‘good news’ stories about the base to educate the public, provide base tours, and develop ‘background’ briefs about the AICUZ and mission sustainment programs for the media. The concept of media has evolved. Today, anyone with a smart phone may distribute media and influence public relations. A smart phone thrust in your face at a public meeting can lead to a posting on YouTube®. Work with your PA on how to handle requests for impromptu interviews and where you can go for training.

8.10.4. Planners. Local and regional government planners help formulate land use policy and advise elected officials on land development. However, few planners have a general understanding of our national security mission or have direct experience with the AICUZ or mission sustainment programs. Opportunities exist for outreach and engagement, such as setting up AICUZ training directly with planning agencies or participating in national, chapter, and section meetings and events held by professional planning organizations. If you are in a region with multiple bases, consider partnering in your engagement efforts or jointly hosting a planning section meeting with AICUZ/MSP training that includes viewpoints and lessons learned from other bases/Services. AICUZ PMs and community planners should become intimately familiar with and speak fluently about development codes and zoning ordinances of their neighboring jurisdictions. This is critical for constructive conversations about land use controls, districts, annexations, environmental protection, open space conservation, agricultural preservation, and local government strategies to implement protective measures supporting the flying mission.

8.10.5. Real Estate Professionals. Real estate professionals also present a good opportunity for collaboration. Brokers subscribe to Multiple Listing Services (MLS) that allow them to access lists of homes for sale and the details of each property. They also have advance knowledge of property owners interested in selling. Real estate professionals play an important role in ensuring potential buyers are aware of noise and other impacts from nearby military installations. While not all communities require fair disclosure of noise and other impacts, real estate professionals still have a fiduciary responsibility to ensure their clients understand any potential issues that could affect their enjoyment of a new home. However, few real estate professionals are aware of the military mission or AICUZ, leaving open the opportunity for training. The AICUZ PM should work with the real estate professionals to ensure that prospective buyers see noise zones and APZs for affected properties. Almost every Tuesday or Wednesday, real estate brokers hold training for agents and they are always looking for guest speakers. Local chapters of real estate organizations, such as the National Association

of Realtors® (NAR), typically hold annual training workshops and often seek articles of interest for their respective newsletters and publications.

8.10.6. The Public. Often the public's concern over our operations could be as simple as late night operations keeping the baby awake. The AICUZ PM should look for opportunities to present the base mission, AICUZ and mission sustainment programs to the public. Often, homeowner associations are looking for relevant presentations for their meetings or articles for their newsletters. When attending meetings, you are the 'eyes and ears' of your command. Listen to your neighbors and bring their concerns back to the base for resolution, if possible. Often, just listening will reduce their concerns.

8.10.7. The AFCEC/CIP Regional Development SharePoint® site contains a video designed to educate real estate professionals on AICUZ and the need for disclosure. This video is available at the AFCEC/CIP Regional Development SharePoint® site under the AICUZ Program Toolbox tab. AFCEC/CIP staff is available for assistance on setting up training: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

8.11. Working with Other Bases. In regions where multiple bases and Services are located, ensure that community efforts are coordinated. All Services experience encroachment challenges to some degree, particularly those resulting from urban growth. The DoD message must be consistent, and this requires cooperation.

Chapter 9

PHASE IV: MONITOR

9.1. Monitoring. Monitoring for operational changes is critical to a successful AICUZ Program. Change is the only constant in our temporary world. Operational tempo varies depending on budget, mission and world events. New aircraft enter the inventory and legacy aircraft retire. Maintaining situational awareness is critical to mission preservation and sustainability. As missions and communities change and public perceptions evolve, we need to adapt our AICUZ implementation strategies to compensate.

9.1.1. The AICUZ PM is responsible for monitoring AICUZ implementation, which will generally involve the airfield environs. These responsibilities should be coordinated with the IMST to ensure that there are no gaps in coverage and that overlap is minimal. While we continue to monitor encroachment indicators through media monitoring, networking, and participation in the planning process, some events may be game changers:

9.1.1.1. New missions, addition or closure of a runway, introduction of a new aircraft, changes in flight tracks, etc., can cause changes on the airfield, possibly leading to changes in the AICUZ footprint. Be alert for operational changes that could alter flight tracks, runway preference, and operational tempo.

9.1.1.2. Changes in federal or state legislation or regulations may affect the mission. Federal air quality requirements could negatively affect aircraft basing by restricting operations in a non-attainment area. State legislation can result in granting or broadening zoning authority to local communities. However, legislators can also roll back existing enabling legislation and prevent communities that want to help protect bases and missions from adopting land use controls beneficial to our missions. As discussed in [Chapter 6](#), you should become familiar with the elected representatives for your community.

9.1.1.3. Noise contour updates and revisions to the AICUZ Study might require a change in strategy when working with the community. Communities seldom consider temporary operational changes, such as deployments or runway repairs, in their land use policy. Communities think long term when considering their development and growth in much the same way we think long term when considering the sustainability of our installations and missions.

9.1.1.4. On the local level, emerging development plans and even annexations could affect our AICUZ implementation strategies.

9.1.1.5. Political climates also change. The next election could bring in a pro-growth or no growth city council. Each election cycle will likely require an update of your stakeholders' list and changes in outreach strategy. It is essential that the AICUZ PM introduces themselves to newly elected officials and their staff, establishes positive relationships and seizes opportunities to advise and educate them about the base, the base missions and the AICUZ Program.

9.1.1.6. Finally, emerging technologies may create new mission sustainment hazards like the way renewable energy resources and personal communication systems have presented new challenges in the past two decades.

9.2. Conclusion. As changes occur, we improvise, adapt, and overcome. To stay relevant, we must modify implementation strategies when necessary to effectively promote and achieve compatible development.

Chapter 10

ACQUISITION OF REAL PROPERTY INTERESTS

10.1. General. Purchasing property in fee simple is the most effective means of controlling the use of a parcel. However, the acquisition of property based on noise contours may not be in the best interests of the United States. This is the most expensive means of control. Purchasing development rights or restrictive easements from a willing property owner is often a cost-effective option.

10.1.1. The following priorities apply to any program to acquire real estate interests to ensure land use compatibility with air installations:

10.1.1.1. The first priority area is the acquisition of the Clear Zone in fee or appropriate restrictive easements of land whenever practicable.

10.1.1.2. The next highest priority is the APZs. Acquisition of interests should only be considered when all possibilities for achieving compatible zoning (if the area is subject to zoning) or similar protection have been exhausted and the operational integrity of the air installation or mission is manifestly threatened.

10.1.1.3. Flight safety enhancements (e.g., HAFZ and Line of Sight/Look Angle Zones) are the next priority.

10.1.1.4. Because so many land uses can be successful in high noise zones and contours and missions change, acquiring real property interests in these areas solely based on noise is the lowest priority.

10.1.2. If acquisition is required, immediately notify your local Real Property office. Requestor will provide or maintain complete records documenting all discussions, negotiations, testimony with or before all local officials, boards, or commissions. This ensures that documentation is available to indicate that all reasonable and prudent efforts were made to preclude incompatible land use through cooperation with local government officials and that all recourse to such action has been exhausted. Acquisition of land or other interests, including temporary use, is authorized in Title 10 of the USC in Section 2663(b).

10.2. Guidelines. You cannot use this Handbook as sole justification for either the acquisition or the retention of owned interests beyond the minimum required to protect the Government.

10.2.1. If the Government currently holds or subsequently acquires fee title in an area where a community could develop compatibly and there is no requirement for fee interest except to prevent incompatible use, disposal actions should be considered in the following situations:

10.2.1.1. The parcel can be easily severed,

10.2.1.2. The disposal generates no additional cost, or

10.2.1.3. The disposal proceeds or maintenance cost avoidance are more advantageous to the Government.

10.2.2. The Service should retain only those rights and interests necessary to establish and maintain compatible uses. Where proceeds from disposal and costs of retaining the property would be inconsequential, we may consider retaining title.

10.3. Authorities and Methods. The Government may obtain the necessary rights to real property within the defined compatible use zone or mission critical area by purchase, exchange, or donation, in accordance with all applicable laws and regulations.

10.3.1. In addition to traditional land acquisition methods for acquiring real property interests, such as negotiated purchase through military construction authorization or minor land acquisition authority, there are other options available such as:

10.3.1.1. 10 USC Section 2684a. This statute authorizes the Secretary of Defense or the secretary of a military department to enter into agreements with eligible entities such as states, political subdivisions of the state, or other qualified private entities with conservation or land restoration goals to address the use or development of real property near, or ecologically related to, a military installation or military airspace.

10.3.1.1.1. The purpose of such an agreement is to limit incompatible development or preserve habitat in a manner that may eliminate or relieve current environmental conditions that might restrict or interfere directly or indirectly with military training, testing, or operations on an installation. The agreement shall provide for the acquisition of real property interests in the property as may be appropriate. The military department concerned and the eligible entity share the cost of the acquisition of real property interests. Opportunities exist when there are shared interests that can be achieved through a transaction. To use this authority, there must be a “partner,” (e.g., authorized eligible entity) and a landowner who is a willing seller.

10.3.1.1.2. To assist the Services with projects under this authority, OSD established the Readiness and Environmental Protection Integration (REPI) Program as a source of funding. DAF guidance for the REPI Program states that the projects should enhance DAF operational requirements for current and future mission needs. Any REPI projects should be part of a comprehensive compatible land use strategy.

10.3.1.2. 10 USC Section 2663(c) and (e)(2) allows a military department to acquire any interests in land needed for national defense by gift, purchase, exchange, or otherwise (to include temporary interest). Whether the land acquisition is considered a minor interest acquisition is determined by the upper dollar cost thresholds described in Section 2663(c). The acquisition is “to correct a deficiency that is life-threatening, health-threatening, or safety-threatening.”

10.3.1.3. 10 USC Section 2664 defines limitations on real property acquisition. Acquisitions must be expressly authorized by law, purchased within price limits appropriated by Congress, and not pay more than two percent of the purchase price on sales commission.

10.3.1.4. 10 USC Section 2869 allows the military department to enter into an agreement to convey real property, including any improvements thereon, to any person who agrees in exchange for the real property to transfer to the United States all ownership rights of the person in and to a parcel of real property, including any improvements thereon under the person’s control, or to carry out a land acquisition, including the acquisition of all right, title, and interest or a lesser interest in real property under an agreement entered into under 10 USC Section 2684a to limit encroachments and other constraints on military training,

testing, and operations. This section also covers those who agree to carry out a land acquisition in an agreement under 10 USC Section 2684a such as in the REPI Program.

10.3.1.4.1. Federal, State, and/or local agencies and private conservation organizations may work together to acquire or provide funding for land and water conservation projects that also can contribute to protecting the installation mission from incompatible development. Local communities or counties have purchased land or easements to support DAF missions. Communities might acquire land to achieve long-term planning goals and may be willing to work with the installation to identify parcels that meet both their and the installation's needs for open space.

10.3.1.4.2. Exchanging land between the DAF and a state or Federal agency, a landowner, local government, or other legal entities is another strategy to prevent incompatible development that we may execute using appropriate authorities.

10.4. Real Estate Interests in the Clear Zones. The Base Civil Engineer should initiate the process of acquiring a real property interest in fee or through appropriate restrictive easements over all land within the Clear Zones whenever practicable in accordance with AFI 32-9001, *Acquisition of Real Property*. In the event another federal agency owns the adjacent land, obtain formal agreements to restrict land use. On DAF installations, HQ DAF/A4C in coordination with SAF/IEI will determine exceptions to Clear Zone boundary and the real property interest that requires acquisition on a case-by-case basis. You should seek to acquire only those real property interests necessary to prevent incompatible land use, or to prohibit uses generating increased incompatibility (e.g. increased density, increased structure height, etc.) in the Clear Zone (except at certain joint use airfields that are exempt from the Clear Zone acquisition policy).

10.4.1. The installation is responsible for identifying private lands within the Clear Zone, determining the real property interest(s) to be acquired, and funding the acquisition(s) through programming avenues. Real estate interests for acquisition include the right to:

10.4.1.1. Make low and frequent flights over said land and to generate noises associated with:

10.4.1.1.1. Aircraft in flight, whether or not directly over said land.

10.4.1.1.2. Aircraft and aircraft engines operating on the ground.

10.4.1.1.3. Aircraft engine test stand/cell, and hush-house operations.

10.4.1.2. Regulate or prohibit the release into the air of any substance that would impair the visibility or otherwise interfere with the operations of aircraft, such as, but not limited to steam, dust, and smoke;

10.4.1.3. Limit or prohibit light emissions, either direct or indirect (reflective), visible or invisible (including lasers) that might interfere with pilot vision, airfield operations, or performance of instruments, equipment, or weapon systems;

10.4.1.4. Prohibit electromagnetic emissions that would interfere with aircraft and aircraft sensors, communications systems, weapons systems, or navigational equipment;

10.4.1.5. Prohibit any use of the land that would unnecessarily attract birds or other animals. Example uses include, but not limited to, operation of sanitary landfills,

maintenance of feeding stations, or the growing of certain types of vegetation attractive to birds or other animals;

10.4.1.6. Prohibit and remove any buildings or other non-frangible structures;

10.4.1.7. Top, cut to ground level, and to remove trees, shrubs, brush or other forms of obstruction that the installation commander determines might interfere with the operation of aircraft, including emergency landings;

10.4.1.8. Ingress and egress upon, over, and across said land for the purpose of exercising the rights acquired;

10.4.1.9. Post signs on said land indicating the nature and extent of the Government's control over said land;

10.4.1.10. Prohibit land uses other than the following:

10.4.1.10.1. Agriculture (except such uses that would attract birds),

10.4.1.10.2. Livestock grazing (except managed intensive grazing, concentrated animal feeding operations, feedlots, dairy herds, and intensive animal husbandry),

10.4.1.10.3. Permanent open space (open space recreational use, is authorized only if it conforms to the compatibility guidelines),

10.4.1.10.4. Existing water areas,

10.4.1.10.5. Rights-of-ways for fenced two-lane highways without sidewalks or bicycle trails provided they do not violate obstacle clearance criteria or cross the graded portion of the clear zone,

10.4.1.10.6. Rights-of-way for single-track railroads without terminals, or platforms as long as rail traffic does not extend into the flight path, and

10.4.1.10.7. Communications and utilities rights-of-way provided all facilities are constructed at or below grade,

10.4.1.11. Prohibit entry of persons onto the land except in connection with activities otherwise authorized;

10.4.1.12. Disapprove land uses not in accordance with DoDI 4165.57;

10.4.1.13. Control the height of structures to ensure that they do not become a flight hazard; and

10.4.1.14. Install airfield lighting and navigational aids.

10.5. Documentation of Real Property Interests Acquired in Support of the AICUZ Program. Confirm that any restrictive easements are recorded with the land records of the jurisdiction which governs the property. In addition to recording the easements in the real property inventory, maintain readable copies (paper copies or digital copies) of the restrictive use easements, aviation easements, or other less than fee-simple interests and ensure they are available for review by installation personnel working mission sustainment issues. The location of the land interests are included on a data layer in accordance with the latest appropriate Real Property geospatial data layers (parcels, installation area, etc.).

10.6. Monitoring Terms of Easements. The installation AICUZ Program Manager and installation Real Property Officer monitor the real property interests acquired through restrictive use easements to ensure that any restrictive use easements remain enforceable over time.

Chapter 11

CONCLUSION

11.1. Conclusion. In practice, we – the Department of the Air Force – may not achieve all the land use controls we seek. We need to know when to compromise. Sometimes getting something is better than getting nothing. There are also times we cannot reach agreement. At that point, we need to re-evaluate our strategies and our relationship with the community and try another approach.

11.1.1. This Handbook provides the tools you need to implement an AICUZ Program. However, it is not the end all in AICUZ and managing encroachment. Network with other AICUZ PMs to learn their strategies and what has or has not worked for their bases. Take advantage of available training and reach back support.

11.1.2. If you want to know more about AICUZ and Mission Sustainment, visit the AFEM SharePoint®. AFCEC/CIP is available for support and to assist you with your program.

BRIAN S. HARTLESS, Brig Gen, USAF
Director of Civil Engineers

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

10 USC §2663, *Land Acquisition Authorities*

10 USC §2664, *Limitations on Real Property Acquisition*

10 USC §2684a, *Agreements to Limit Encroachments and Other Constraints on Military Training, Testing, and Operations*

10 USC §2733, *Military Claims Act*

10 USC §2869, *Conveyance of Property at Military Installations to Limit Encroachment*

16 USC §470 et seq., *National Historic Preservation Act of 1966*

16 USC §§1531 et seq., *Endangered Species Act of 1973*

42 USC §§ 4901-4918, *Noise Control Act of 1972*

42 USC §§4321 et seq., *National Environmental Policy Act of 1969*

14 CFR §150, *Airport Noise Compatibility Program*, 24 September 2004

32 CFR Part 989, *Environmental Impact Analysis Process*, 20 June 2014

36 CFR Part 800, *Protection of Historic Properties*, 12 December 2000

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Department of Defense Noise Working Group Technical Bulletin, *Community Annoyance Caused by Noise from Military Aircraft Operations*, December 2009 (DNWG TB2009-1)

Department of Defense Noise Working Group Technical Bulletin, *Effects of Aircraft Overflights on Domestic Fowl*, December 2013 (DNWG TB2013-1)

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Abbreviations and Acronyms

%HA—Percent Highly Annoyed

AAD—Average Annual Day

AAM—Advanced Acoustic Model

A/E—Architect/Engineer

AEDT—Aviation Environmental Design Tool

AFB—Air Force Base

AEE—Federal Aviation Administration’s Office of Environment and Energy

AFCEC—Air Force Civil Engineer Center

AFCEC/GIO—Air Force Geospatial Integration Officer

AFEM—Air Force Encroachment Management

AFH—Air Force Handbook

AFI—Air Force Instruction

AFIMSC—Air Force Installation and Mission Support Center

AF/JAOE-FSC—Environmental Law Field Support Center, Environmental Law and Litigation Division of the Operations and International Law Directorate, Air Force Judge Advocate General.

AFM—Air Force Manual

AFMS—Air Force Mission Sustainment

AFPD—Air Force Policy Directive

AFR—Air Force Regulation

AFRC—Air Force Reserve Command
AFSEC—Air Force Safety Center
AFSIR—Air Force Spectrum Interference Office
AGL—Above Ground Level
AIA—American Institute of Architects
AICUZ—Air Installations Compatible Use Zones
AICUZ PM—AICUZ Program Manager
ANG—Air National Guard
ANSI—American National Standards Institute
APA—American Planning Association
APZ—Accident Potential Zones
ASCE—American Society of Civil Engineers
ATC—Air Traffic Control
BASH—Bird/wildlife Air Strike Hazard
CAL—Caliber
CATEX—Categorical Exclusion
CDNL—**C**—weighted Day-Night Average Sound Level
CEQ—Council on Environmental Quality
CFR—Code of Federal Regulations
CHABA—Committee on Hearing, Bioacoustics and Biomechanics
CNEL—Community Noise Equivalent Level
CNEL_{mr}—Onset-Rate Adjusted Community Noise Equivalent Level
CONUS—Continental United States
COR—Contracting Officer Representative
CSEL—**C**—weighted Sound Exposure Level
CUP—Compatible Use Plan (formerly JLUS)
CZ—Clear Zone
DAF—Department of the Air Force (includes Air Force and Space Force)
dB—Decibel
dB_A—**A**—weighted Decibel
dB_P—Unweighted Peak Decibel level
Det—Detachment

DNL—Day-Night Average Sound Level
DNL_{mr}—Onset-Rate Adjusted Monthly Day-Night-Average Sound Level
DNWG—Department of Defense Noise Working Group
DoD—Department of Defense
DoDI—Department of Defense Instruction
DRU—Direct Reporting Unit
Du/Ac—Dwelling units per Acre
EA—Environmental Assessment
EIAP—Environmental Impact Analysis Process
EIS—Environmental Impact Statement
EMI—Electromagnetic Interference
EO—Executive Order
EOD—Explosive Ordnance Disposal
EPA—Environmental Protection Agency (also USEPA)
ETR—Engine Thrust Request
FAA—Federal Aviation Administration
FAR—Federal Aviation Regulation or Floor Area Ratio
FHA—Federal Home Administration
FHWA—Federal Highway Administration
FICAN—Federal Interagency Committee on Aviation Noise (1993-Present)
FICON—Federal Interagency Committee on Noise (1990-1992)
FICUN—Federal Interagency Committee on Urban Noise (1979-1990)
FMC—Federal Management Circular
GIS—Geographic Information System
GSA—General Services Administration
HAF—Headquarters Air Force
HAFZ—Hazards to Aircraft Flight Zone
HE—High Explosive
HEDP—High Explosive Dual Purpose
HERO—Hazards of Electromagnetic Radiation to Ordnance
HQ—Headquarters
HUD—Department of Housing and Urban Development

IC—Installation Complex

ICEMAP—Installation Complex Mission Sustainment Action Plan

IC/MF—Installation Complex/Mission Footprint

ICUZ—Installation Compatible Use Zones

IMST—Installation Mission Sustainment Team

IFR—Instrument Flight Rules

INM—Integrated Noise Model

JLUS—Joint Land Use Study (now called a Compatible Use Plan)

kPA—Kilopascal

LAW—Light Anti-armor Weapon

LBCS—Land Based Classification System

LCdn—Symbol for C-weighted Day-Night Average Sound Level

LCeq—Symbol for C-weighted Equivalent Sound Level

Ldn—Symbol for Day-Night Average Sound Level

Ldnmr—Symbol for Onset-Rate Adjusted Monthly Day-Night Average Sound Level

LED—Light Emitting Diode

Leq—Symbol for Equivalent Sound Level

Leq8—Symbol for Equivalent Sound Level during an 8-hour Period

Lmax—Symbol for Maximum Sound Level

Lpk—Symbol for Peak Sound Level

MAJCOM—Major Command

MF—Mission Footprint

MM (mm)—Millimeter

MOA—Military Operations Area

MR_NMAP—Military Operating Area and Range NOISEMAP

MSP—Mission Sustainment Program

MST—Mission Sustainment Team

MTR—Military Training Route

NA—Number of Noise Events Above

NAL—Number of Noise Events Above a Threshold Sound Level

NEPA—National Environmental Policy Act of 1969

NGO—Non-Governmental Organization

NLR—Noise Level Reduction

NM (nm)—Nautical Mile

NMFS—National Marine Fisheries Service

NMODD—Noise Model Operational Data Documentation

NOAA—National Oceanic and Atmospheric Administration

NVG—Night Vision Goggles

OEA—Office of Economic Adjustment (Now Office of Local Defense Community Cooperation)

OLDCC—Office of Local Defense Community Cooperation (formerly OEA)

OPR—Office of Primary Responsibility

OSD—Office of the Secretary of Defense

PA—Public Affairs

PAA—Primary Aerospace Vehicle Authorized

PK—Peak Sound Pressure Level

PK 15—Peak Pressure Level Exceeded by 15 Percent of the Events

POC—Point of Contact

PSF—Pounds per Square Foot

PV—Photovoltaic

PWL—Sound Power Level

REPI—Readiness and Environmental Protection Integration

RFMSS—Range Facility Management Support System

RPM—Revolutions Per Minute

SAF (SecAF)—Secretary of the Air Force

SARNAM—Small Arms Range Noise Assessment Model

SDZ—Surface Danger Zone

SecDef—Secretary of Defense

SEL—Sound Exposure Level

SELr—Onset Rate-adjusted Sound Exposure Level

SGHAT—Solar Glare Hazard Analysis Tool

SLUCM—Standard Land Use Coding Manual

SM (sm)—Statute Mile

SME—Subject Matter Expert

SPL—Sound Pressure Level

SUA—Special Use Airspace

TAL—Time Above a Specified Sound Level

TERPS—Terminal Instrument Procedures

UAS—Unmanned Aircraft System

UFC—Unified Facilities Criteria

USC—United States Code

USDA—U.S. Department of Agriculture

USEPA—U.S. Environmental Protection Agency (also EPA)

USSF—United States Space Force

VA—U.S. Department of Veterans Affairs

VFR—Visual Flight Rules

Office Symbols

AFCEC/CI—Air Force Civil Engineer Center, Installations Directorate

AFCEC/CIE—Air Force Civil Engineer Center, Environmental Division

AFCEC/CIP—Air Force Civil Engineer Center, Comprehensive Planning Division

AFCEC/CIR—Air Force Civil Engineer Center, Regional Planning Division

AFCEC/CZP—Air Force Civil Engineer Center, Regulatory and Legislative Division

AFIMSC—Air Force Installation and Mission Support Center

AF/JAOE-FSC—Environmental Law Field Support Center, Environmental Law and Litigation Division of the Operations and International Law Directorate, Air Force Judge Advocate General.

HQ AF/A4CP—Headquarters Air Force/Civil Engineering Directorate, Installation Strategy and Plans Branch

HQ AFRC—Headquarters Air Force Reserve Command

HQ ANG—Headquarters Air Force Air National Guard

SAF/IEI—Office of the Assistant Secretary of the Air Force for Energy, Installations, and Environment/ Installations Directorate—

Terms

Acoustical Night—This is a term that may be used in documents to refer to the hours of 10:00 p.m. to 7:00 a.m., (those hours during which noise events have a 10 dB penalty applied when calculating DNL) to distinguish this period from the general use of the word “night.” The term “Acoustical Day” may also be used to refer to the hours between 7 a.m. and 10.00 p.m. See also “Environmental Night.”

Acoustic Environment—The acoustic environment is the surroundings or conditions related to sound in which people, animals, and plants live or operate.

Airfield Operation—Aircraft operations are counted by air traffic controllers for all aircraft operating in the airfield environment. One aircraft operation is counted each time an aircraft passes the departure end of the runway, and one aircraft operation is counted each time an aircraft passes the approach end of the runway. When determining the number of aircraft operations occurring in the airfield environment, one aircraft sortie generates a minimum of two aircraft operations, one for the initial departure, and one for the final landing. When aircraft are practicing additional Instrument Flight Rules (IFR) or Visual Flight Rules (VFR) approaches (i.e., IFR Closed Patterns or VFR Closed Patterns), two aircraft operations are counted for each pattern: one when they approach the runway to land and one when they depart the runway. It is important to recognize that aircraft operations used for air quality calculations are fewer than aircraft operations used for noise as they are counted differently. For air quality, one operation is counted for a departure, one for an arrival, and one for a closed pattern. Reference AFI 32-7002, Environmental Compliance and Pollution Prevention, Chap 4, for Air Quality guidance.

Air Installation—Installations whose mission include the operation of fixed-wing or rotary-wing military airfields.

Air Installation Compatible Use Zones Amendment—Defined by the AICUZ Update Checklist. Generally, an Amendment is a “freshening” of the current AICUZ if the Study is less than 2 years old, the mission has had few and minor changes, and little explanation is needed.

Air Installation Compatible Use Zones Update—An Update is a revisiting of the AICUZ due to a new mission or major changes to current operations. An Update typically follows closely after the final decision (Record of Decision) on the environmental analysis (Environmental Assessment or Environmental Impact Statement) of an action.

Air Traffic Control—The organization responsible for controlling aircraft movement on the ground and in the air.

Ambient Noise—The total of all noise in the environment, other than the noise from the source of interest. This term is used interchangeably with “background noise.”

Annoyance—A summary measure of the general adverse reaction of people to noise that generates speech interference (i.e., being able to use the telephone or listen to television or radio without interruption), sleep disturbance, and desire for a tranquil environment.

American National Standards Institute—A private, non-profit organization that administers a voluntary standards and conformity assessment system in the U.S. via a paid subscription service. ANSI standard S1.1 includes many of the scientifically agreed upon definitions for acoustics.

Attenuation—A decrease in a property, as energy, per unit area of a wave or a beam of particles, occurring as the distance from the source increases because of absorption, scattering, spreading in three dimensions.

Average Annual Day—The AAD represents the average number of daily airfield operations that would occur during a 24-hour period based on 365 flying days per year. AAD is calculated by dividing the total annual airfield operations by 365 days.

A-weighted Sound Level—When measuring community response to noise, it is common to adjust the frequency content of the measured sound to approximate the response of the human ear. With A-weighting, low and high frequencies are de-emphasized because the ear does not respond equally to sounds of all frequencies, and is less efficient at low and high frequencies than it is at

medium or speech range frequencies. A-weighting is appropriate for transportation noises such as aircraft overflight and ground vehicles as well as small arms noise. See also “C-weighted Sound Level.” (See ANSI S1.1 for scientifically agreed upon definition.)

BASEOPS—A computer program for entering operational data needed to compute the total noise exposure around an installation. BASEOPS is the user interface for NOISEMAP.

BNOISEx—calculates and displays blast noise exposure contours from large gun and explosive charge operations. The software considers type of weapon and ammunition, number and time of rounds fired, range attributes, weather, and assessment procedures and metrics. It accounts for spectrum and directivity of both muzzle blast and projectile sonic boom, which facilitates accurate calculation of noise footprints.

C-weighted Day-Night Average Sound Level (symbol LCdn)—CDNL is the C-weighted sound level range used for low frequency impulsive sounds, such as sonic booms, heavy weapons, and other explosions. They are perceived by humans not only by the ear, but also by the whole body as pressure or vibration. When experienced indoors, impulsive sounds can create secondary noise from rattling and vibrations of the building. See DNL for additional discussion. (See ANSI S1.1 for scientifically agreed upon definition.)

Community Noise Equivalent Level (symbol Lden)—CNEL is similar to DNL but adds an evening penalty of 5 dB to all operations occurring between the hours of 7:00 p.m. and 10:00 p.m.. CNEL is used for land use planning and environmental analysis for all installations in the State of California. (See also DNL.). NOTE: The symbol Lden should not be confused with the noise descriptor used in Japan, Day, Night, Evening Level, abbreviated Lden. Although CNEL and Lden are similar, in that each has an evening penalty, California’s CNEL defines evening as a three-hour period, and Japan’s Lden defines evening as a four-hour period.

Day Night Average Sound Level (symbol Ldn)—A twenty-four hour, A-weighted sound level for all subject sounds in a given day with the addition of a 10 dB weighting to account for the increased sensitivity of humans to noise that occurs between the hours of 10 p.m. to 7 a.m., and because ambient sound levels at night are typically lower than during the daytime hours. (See ANSI S1.1 for scientifically agreed upon definition.)

Defense Noise Working Group—The Department of Defense forum for acoustics staff (policy and technical) across all Services. DNWG manages the DoD Operational Noise Program as authorized by DoDI 4715.13.

DNL/CNEL Contours—Lines of equal DNL/CNEL value.

Environmental Night—This is a term that may be used in documents to refer to the hours of 10:00 p.m. to 7:00 a.m. to distinguish this period from the general use of the word “nighttime.” See also “acoustic[al] night.”

Equivalent Sound Level (symbol Leq)—A cumulative noise metric that represents the average sound level over a specified period of time. Leq does not include any penalty for evening or night time noise events. Leq is the constant sound level that contains the same sound energy as the time-varying sound level over the same time period. For example, L_{eq8} is often used to represent a school day. (See ANSI S1.1 for scientifically agreed upon definition.)

Geographic Information System—Spatial information analysis and mapping tools that highlight the location and proximity of data components for different perspectives and interpretations.

Hazards to Aircraft Flight Zone—The DAF defines as objects or conditions that endanger flight safety in the area on the ground within the “Imaginary Surfaces” that are described in the UFC 3-260-01 and in Title 14 CFR, Part 77.9. This is the area where land uses will be evaluated for compatibility related to height, visual interference, glint/glare, bird/wildlife aircraft strike hazard, and radio frequency/electromagnetic interference.

Installation Complex—The land, facilities, airspace, and ranges which provide direct mission support to and/or are managed by the installation. This includes a combination of land and facilities comprised of a main installation and its noncontiguous properties (e.g., auxiliary airfields, annexes, missile fields) that provide direct support or that the installation supports.

Installation Complex Encroachment Management Action Plan—The comprehensive study is a three-volume document (Action Plan, Reference Book, and Community Brochure) that addresses current and future encroachment (i.e., mission sustainment) hazards facing DAF installations and their surrounding communities.

Installation Mission Sustainment Team—A cross-functional team established in accordance with section 3.3.2.3 of AFI 90-2001, designed to address encroachment issues within the installation complex.

Land Based Classification Standards—The Land Based Classification Standards (LBCS) classify land uses by refining traditional categories into multiple dimensions, such as activities, functions, building types, site development character, and ownership constraints. Each dimension has its own set of categories and subcategories. See also Standard Land Use Coding Manual.

Large Caliber Weapon—A weapon firing a projectile of 20mm diameter or greater.

Maximum A-weighted Sound Level (symbol L_{max} or LAF_{mx})—This is the highest A-weighted sound level within a stated time interval. For DoD the time interval is typically the duration of the noise event. (See ANSI S1.1 for scientifically agreed upon definition.)

Military Operating Area and Range NOISEMAP (symbol MR_NMAP)—The version of NOISEMAP used for Military Operating Areas, ranges, and Special Use Airspace.

Mission Sustainment—The strategic Department of the Air Force objective to proactively manage the risk of hazards and thereby protect current missions, prepare for future missions, and ensure the sustainability of all mission-related operating areas.

Mission Sustainment Working Group—A cross-functional team at the headquarters-level responsible for reviewing and monitoring comprehensive status of mission sustainment across the DAF enterprise. The working group is chaired by a representative from SAF/IEI and is co-chaired by designated representatives from Headquarters A3 (Operations) and A4 (Logistics, Engineering, and Force Protection). It meets monthly in Washington, DC and via teleconference.

Mitigations—These are measures to avoid, reduce, or repair impacts. Mitigating the effects of aircraft noise on sensitive land uses such as schools, residential areas, and churches can take many forms. Modification to time of day or frequency of use, flight path parameters (location, altitude, etc.), or changes to the listener’s environment (adding building insulation) are all examples.

Noise Contour Line—Lines on a map connecting points of equal noise levels.

NOISEFILE—A database that contains actual (or estimated) noise measurement data formatted for use by NOISEMAP and MR_NMAP . The database is used to generate the noise versus

distance curves for specific aircraft configurations (engine power setting, airspeed) and atmospheric conditions (average temperature and relative humidity).

Noise Level Reduction—The amount sound exposure reduced by mitigation or abatement. NLR is a common metric of the acoustic performance of sound insulation in buildings beyond what typical construction provides. It is measured in decibels.

Noise Model Operational Data Documentation—A compilation of the aircraft operational data used in a noise model with the results released in public documents. It contains points of contacts for the providers of information, all assumptions, spreadsheets used to calculate daily operations, aircraft configurations (i.e., flight profiles) for aircraft operations in the airfield and SUA, as well as information on engine runs and munitions usage for ranges. Other possible sources of operational noise data are noise reports or NEPA studies evaluating actions.

Noise Sensitive Area—An area where noise can interfere with normal activities associated with its use. Speech interference and sleep disruption are important determinants. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites.

NOISEMAP—A suite of computer programs developed for prediction of noise exposure in the vicinity of an installation due to aircraft flight, maintenance, and ground run-up operations.

Noise Zone—A range of noise levels generally bounded by two noise contours, e.g. 65-70 dB DNL or >75 dB DNL.

Number of Events Above or At a Specified Level (symbol NA)—Metric used to show the total number of noise events that meet or exceed the selected noise level threshold during a specified period of time (e.g., hour, school day, nighttime, etc.). Combined with the selected threshold level (L), the Number of Events Above (NA) metric is symbolized as NAL. The threshold can be defined in terms of either the SEL or Lmax metrics. A threshold level is selected that best meets the need for that situation. An Lmax threshold is normally selected to analyze speech interference, whereas an SEL threshold is normally selected for analysis of sleep disturbance.

Onset Rate-Adjusted Monthly Day-Night Average Sound Level or Onset Rate (symbol Ldnmr)—A supplemental noise metric combining the DNL with a penalty for a “startle effect.” Onset Rate is used in MOAs, SUAs, and ranges. It is not an FAA-approved metric.

Operational Data—Multiple types of data associated with aircraft operations (i.e., type of aircraft, power setting, altitude, flight track, etc.).

Peak Sound Pressure (symbol Lpk)—Level of peak sound pressure with stated frequency weighting within a stated time interval. The decibel version of the peak overpressure that is used as needed to describe a noise event such as a sonic boom or blast for the purposes of relating it to human and animal response. For impulsive sounds, it is the true instantaneous sound pressure (e.g., the peak pressure of the shock wave for sonic booms). This pressure is usually presented in physical units of pounds per square foot. DoD uses un-weighted peak, so make sure the weighting factor is denoted. (See ANSI S1.1 for scientifically agreed upon definition.)

Percent Highly Annoyed (symbol %HA)—This metric is the basis for federal policy on environmental noise. The December 2009 (DNWG Technical Bulletin Community Annoyance Caused by Noise From Military Aircraft Operations (DNWG TB2009-1) describes %HA as “the

primary effect of recurring aircraft noise on exposed communities is 'long-term' annoyance" and acknowledges that "the scientific community has adopted the use of long-term annoyance as a primary indicator of community response because it attempts to account for all negative aspects of effects from noise, including sleep disturbance, speech interference and distraction from other human activities." The %HA is the most useful metric for assessing people's responses to noise.

Pounds per Square Foot—This metric is used when analyzing over pressure effects on structures from supersonic flight and use of high explosives.

Probability of Awakening—An estimation of the probability that some part of a population sleeping indoors will be awakened by an outdoor noise event based on the SEL. The DAF uses the ANSI S12.9-2008 curve for predicting sleep awakenings from multiple noise events during a nightlong period (i.e., 10:00 p.m. to 7:00 a.m.).

Small Arms Range Noise Assessment Model—Calculates and displays noise level contours for firing operations at small arms ranges.

Small Caliber Weapon—A weapon firing a projectile of .50 caliber or less.

Sortie—A term to describe a single training event performed by one aircraft from takeoff through landing. A single aircraft may only log one sortie per flight.

Sortie Operation—A term to define the use of training airspace or ranges by a single aircraft. A single aircraft may log multiple sortie operations per flight by using different training areas or the same area several times throughout the same flight.

Special Use Airspace (SUA)—Any airspace with defined dimensions within the National Airspace System wherein limitations may be imposed upon aircraft operations. This airspace may be restricted areas, prohibited areas, military operations areas, ATC assigned airspace, and any other designated airspace areas.

Sound Exposure Level—A composite metric that represents both the magnitude and duration of a noise event that changes over a specified period of time, such as an aircraft overflight. The SEL is a single number accounting for the event as if it occurred during one second; it does not directly represent the sound level heard at any given time. Rather, it accounts for the noise heard through an entire event, beginning when the noise source first becomes audible, rising up to the maximum level at its closest point to the receiver, and ending when the sound diminishes. To illustrate, the SEL is the result of taking all of the energy in the figure and squeezing it into the 1 second area, leading to a SEL that is typically higher than the maximum sound level. SEL is the building block for calculating DNL/CNEL and has proven to be a good number to compare the relative exposure of different transient sounds. (See ANSI S1.1 for scientifically agreed upon definition.)

Sound Power Level—This is a logarithmic measure of the sound power in comparison to a specified reference level. Sound power is the acoustic energy radiated from a sound source over a unit of time and is measured in watts (W). PWL is also expressed in units of dB, but to avoid confusion, sound power level is usually denoted as "dB PWL." Unlike sound pressure, sound power is strictly a measure of the sound source strength and does not depend on location or distance. Sound power is the total power produced by the source in all directions. (See ANSI S1.1 for scientifically agreed upon definition.)

Sound Pressure Level—This is a logarithmic measure of the effective acoustic pressure of a sound relative to a reference value and is measured in decibels (dB SPL). The SPL is a ratio of a

measured pressure compared to a reference pressure. SPL is a measure of the sound magnitude at a particular location relative to the source. (See ANSI S1.1 for scientifically agreed upon definition.)

Special Use Airspace—Airspace of defined dimensions wherein training activities must be confined because of their nature, and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities.

Stakeholder—A person or organization, either internal or external to the installation complex, with personal, financial, or other manifest interest in an issue or decision. Air installation stakeholders include, among others: DoD Components; installation tenants; federal, state, regional and local governments and agencies; Tribal Councils; and individuals or groups outside of an installation or range, or beneath SUA.

Standard Land Use Coding Manual—Published in 1965 by the Federal Highways Administration and the Department of Housing and Urban Development, the SLUCM manual provided a detailed listing of land use categories with numeric codes assigned to them. This numeric coding system used two, three, four, or more digits to identify land use activities. See also Land Based Classification Standards.

Supplemental Metrics—Metrics used in addition to the primary metrics, DNL and CNEL, to help characterize the noise environment and observers' experiences.

Surrogate Aircraft—An aircraft used to represent another aircraft whose noise data is not available in the noise modeling database.

Time Above a Specified Level—A measure (expressed in minutes) of the total time that the A-weighted aircraft noise level is at or above a defined sound level threshold over any time period of interest. Combined with the selected threshold level (L), the TA metric can be used to indicate that the sound level at identified locations exceed that noise level for a certain number of minutes per day. TAL is commonly used to quantify speech interference during a school day.

Training Exercise—The short-term increase in the normal day-to-day operations-tempo of any training area.

Weapon System—A combination of one or more weapons with all related equipment, materials, services, personnel, and means of delivery and deployment (if applicable) required for self-sufficiency. For the purposes of this Handbook, a weapon system includes aircraft, weapons, and munitions.

Weighted Sound Levels—A- and C-weighting are frequency filters applied to sounds that attempt to account for the human perception of loudness in light of the sounds' different characteristics. They are used in noise assessments because weighted sound levels have been shown to correlate moderately well with the human response to noise. When A-weighting is applied to noise levels, very high and very low sound frequencies that are outside the range of human hearing are screened out, thereby focusing on the sound people actually hear. A-weighting is typically used to assess the noise generated by transportation sources and small arms use. C-weighting is applied to intense low-frequency noise that can cause vibrations, such as heavy bombs and sonic booms. C-weighting does not apply adjustments to noise signals over most of the audible frequencies but does apply small adjustments to the very low and very high frequencies. (See ANSI S1.1 for scientifically agreed upon definition.)

Attachment 2

LAND USE COMPATIBILITY TABLES FOR CZS AND APZS

A2.1. DoDI 4165.57, Appendix 3B. DoDI 4165.57, Appendix 3B, provides compatibility recommendations based on historic aircraft mishap locations on or near air installations. The primary land use objective is to discourage people intensive land uses in areas of high accident potential.

A2.1.1. While the table uses Standard Land Use Coding Manual (SLCUM) categories for organization, it varies from SLUCM as the coding system does not differentiate based on population density. Some uses warrant additional evaluation due to the variation of densities of people, intensity of use, or other characteristics that could impact safety of flight. Floor area ratio (FAR) recommendations are included within the table to guide suggested maximum density for non-residential uses. General notes and specific footnotes at the bottom of the table provide additional information and compatibility considerations.

A2.1.2. The recommendations are intended to support compatible land use planning both on and off base; they do not constitute a federal determination that any use of land is acceptable or unacceptable under local zoning.

Attachment 3

RECOMMENDED LAND USE COMPATIBILITY IN AIRCRAFT NOISE ZONES

A3.1. Aircraft Noise. DoDI 4165.57, Appendix 3C, provides compatibility recommendations based on yearly DNL or CNEL on and around installations. The primary land use objective is to discourage noise-sensitive land uses in areas of higher noise exposure.

A3.1.1. The table is organized based on *Standard Land Use Coding Manual* categories; however, it varies from SLUCM as the coding system does not differentiate based on noise-sensitivity. Some uses warrant additional evaluation due to potential for annoyance and activity interference. General notes and specific footnotes at the bottom of the table provide additional information and considerations for compatibility determinations.

A3.1.2. The recommendations are intended to support compatible land use planning both on- and off-base; they do not constitute a federal determination that any use of land is acceptable or unacceptable under local zoning.

Attachment 4

RECOMMENDED LAND USE COMPATIBILITY IN WEAPONS NOISE ZONES

A4.1. Tables A4.1 and A4.2 show recommended land use compatibility guidelines in noise zones for small arms weapons, and Table A4.3 for large weapons (artillery) and explosives. The primary objective is to discourage noise-sensitive land uses in areas of higher noise exposure. These land use compatibility recommendations are intended to support land use planning on- and off-installation. They do not constitute a federal determination of whether a use of land is acceptable under local zoning.

Table A4.1. Land Use Compatibility in Small Arms Noise Zones.

LAND USE	Peak Levels (unweighted)		
LAND USE NAME & SLUCM Category	<87dBP	87-104 dBP	>104 dBP
Residential Use Group (SLUCM Category 10)			
Residential uses, inclusive of all residential units i.e. any type of single or multiple dwelling units.	Y	N ¹	N
Mobile home parks or courts	Y	N	N
Transient lodgings	Y	N ¹	N
Manufacturing Use Group (SLUCM Categories 20 & 30)			
Manufacturing and Industrial uses (Food products; Textile mill products; Stone, clay, glass, primary metal and fabricated metal products; Fabric products; leather and similar materials; chemicals and allied products; petroleum refining and related industries; Rubber and miscellaneous plastic products; Lumber and wood products; furniture and fixtures; paper and allied products; printing, publishing, and allied industries, other miscellaneous manufacturing)	Y	Y ²	Y ³
Precision manufacturing (professional scientific and controlling instruments; photographic and optical goods)	Y	Y ²	Y ³
Transportation, Communication, and Utilities Use Group (SLUCM Category 40)			
Rail, motor vehicle, aircraft, marine, and other transportation; communication systems; and utilities	Y	Y ²	Y ³
Highway and street right-of-way, automobile parking	Y	Y	Y
Telephone, cellular and radio communication	Y	Y ²	Y ³
Solid waste disposal, (landfills, incinerators, etc.)	Y	Y	Y
Trade Use Group (SLUCM Category 50)			
Wholesale trade	Y	Y ²	Y ³
Retail trade - building materials, hardware, paint, and farm equipment sales; food such as groceries, bakeries, confectionaries, meat markets, and fast food establishments; automotive, marine craft, aircraft, and accessories; apparel and accessories, furniture, home, furnishings and equipment; other retail trade	Y	Y ²	Y ³
Mass retailing, super stores, strip malls, shopping centers, discount clubs, home improvement stores, etc. eating and drinking establishments.	Y	Y ²	Y ³

Table A4.2. Land Use Compatibility in Small Arms Noise Zones.

LAND USE	Suggested Land Use Compatibility (C-weighted)	
LAND USE NAME & SLUCM Category	87-104dB	>104 dB
Residential Use Group (SLUCM Category10)		
Residential uses, inclusive of all residential units i.e. any type of single or multiple dwelling units.	N ¹	N
Mobile home parks or courts	N	N
Transient lodgings	N ¹	N
Manufacturing Use Group (SLUCM Categories 20 & 30)		
Manufacturing and Industrial uses (Food products; Textile mill products; Stone, clay, glass, primary metal and fabricated metal products; Fabric products; leather and similar materials; chemicals and allied products; petroleum refining and related industries; Rubber and miscellaneous plastic products; Lumber and wood products; furniture and fixtures; paper and allied products; printing, publishing, and allied industries, other miscellaneous manufacturing)	Y ²	Y ³
Precision manufacturing (professional scientific and controlling instruments; photographic, optical goods; watches and clocks)	Y ²	Y ³
LAND USE	Suggested Land Use Compatibility (C-weighted)	
LAND USE NAME & SLUCM Category	87-104dB	>104 dB
Transportation, Communication, and Utilities Use Group (SLUCM Category 40)		
Rail, motor vehicle, aircraft, marine, and other transportation; communication systems; and utilities	Y ²	Y ³
Highway and street right-of-way, automobile parking	Y ²	Y
Telephone, cellular and radio communication	Y ²	Y ³
Trade Use Group (SLUCM Category 50)		
Wholesale trade	Y ²	Y ³
Retail trade - building materials, hardware, paint, and farm equipment sales; food such as groceries, bakeries, confectionaries, meat markets, and fast food establishments; automotive, marine craft, aircraft, and accessories; apparel and accessories, furniture, home, furnishings and equipment; other retail trade	Y ²	Y ³
Finance, insurance and real estate services; personal, professional, or miscellaneous service		
Services Use Group (SLUCM Category 60)		
Finance, insurance and real estate services; personal, professional, or miscellaneous service	Y ²	
Cemeteries	Y ²	Y ³
Warehousing and storage; repair services	Y ²	Y ³
Hospitals, medical facilities, nursing homes; childcare and development services	N	N

Governmental	Y ²	Y ³
Educational services	Y ²	N
Cultural, Entertainment, and Recreational Use Group (SLUCM Category 70)		
Cultural activities (including religious activities)	Y ³	N
Nature exhibits	N	N
Public assembly	N	N
Auditoriums, concert halls	Y ³	N
Outdoor music shells, amphitheaters	N	N
Outdoor sports arenas, spectator sports	N	N
Amusements	Y	N
Outdoor recreational activities	N	N
Resorts, camps, parks, and other cultural, entertainment, and recreation	N	N
Resource Production and Extraction⁶ Use Group (SLUCM Category 80)		
Agriculture and forestry	Y ⁴	Y ⁵
Livestock farming and animal breeding	Y ⁴	N
Fishing activities	Y	Y
Mining and other resource production or extraction	Y	Y
Key: Y (Yes)–Land use and related structures compatible without restrictions. N (No)–Land use and related structures are not compatible and should not exist. Y^x–Yes with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript. N^x–No, with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript. Notes: 1. Although local demand for on- or off-installation housing may support noise-sensitive land uses within the 87-104 dBP contour, such land use is generally not recommended. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these contours. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 30 dB in the 87-104 dBP contour should be incorporated into building design and be considered in individual approvals. Existing residential development is considered as pre-existing, non-conforming land use. 2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low. 3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low. 4. Where residences are permitted, measures to achieve outdoor-to-indoor NLR of at least 30 should be incorporated into the design. 5. Residential buildings should not exist. 6. The land uses within this category include necessary associated resource management activities, for example, wildfire management activities for forestry.		

Table A4.3. Land Use Compatibility for Artillery/ Explosives.

LAND USE	Suggested Land Use Compatibility		
LAND USE NAME & SLUCM Category	CDNL 57-62	CDNL 62-70	CDNL 70+
Residential Use Group (SLUCM Category 10)			
Residential uses, inclusive of all residential units i.e. any type of single or multiple dwelling units.	Y ¹	N ^{2, 3}	N ³
Mobile home parks or courts	Y ¹	N ^{2, 3}	N ³
Transient lodgings	Y	Y	N
Manufacturing Use Group (SLUCM Categories 20 & 30)			
Manufacturing and Industrial (food products; textiles; apparel; lumber and wood products; printing; furniture and fixtures; chemical and allied products; petroleum industries; rubber and plastics, stone, glass, clay, and metal products)	Y	Y ⁴	Y ⁴
Precision manufacturing (professional scientific and controlling instruments; photographic and optical goods; watches and clocks)	Y	N	N
Transportation, Communication, and Utilities Use Group (SLUCM Category 40)			
Rail, motor vehicle, aircraft, marine, and other transportation systems	Y	Y	Y ⁴
Highway and street right-of-way, automobile parking	Y	Y	Y
Communications	Y	N	N
Utilities	Y	Y	Y ⁴
Other transportation, communication, and utilities	Y	Y	N
Trade Use Group (SLUCM Category 50)			
Wholesale trade	Y	Y	N
Retail trade—building materials, hardware, and farm equipment	Y	Y	N
Retail trade—mass retail, shopping centers, discount clubs, home improvement stores, superstores, etc., food and beverage establishments; automotive; apparel; home furnishings and equipment	Y	Y	N
Services Use Group (SLUCM Category 60)			
Finance, insurance and real estate services; personal, professional, and miscellaneous services;	Y	Y	N
Cemeteries	Y	Y	Y
Warehousing and storage	Y	Y ⁴	Y ⁴
Repair services	Y	Y	N
Hospitals, medical facilities, nursing homes, child care, and development services	Y ¹	N	N
Governmental	Y	Y	N
Educational services	Y	Y	N
Cultural, Entertainment, and Recreational Use Group (SLUCM Category 70)			
Cultural activities (including religious activities)	Y ¹	N	N
Nature exhibits	Y ¹	N	N
Public assembly	Y ¹	N	N

LAND USE	Suggested Land Use Compatibility		
LAND USE NAME & SLUCM Category	CDNL 57-62	CDNL 62-70	CDNL 70+
Auditoriums, concert halls	Y ¹	N	N
Outdoor music shells, amphitheaters	Y ¹	N	N
Outdoor sports arenas, spectator sports	Y	N	N
Amusements	Y	Y	N
Outdoor recreational activities	Y	N	N
Resorts, camps, parks, and other cultural, entertainment, and recreation	Y	N	N
Resource Production and Extraction⁵ Use Group (SLUCM Category 80)			
Agriculture and forestry	Y	Y	Y
Livestock farming and animal breeding	Y	N	N
Fishing activities	Y	Y	Y
Mining and other resource production or extraction	Y	Y	Y

Notes:

1. The CDNL 57-62 noise contour functions as a buffer for the CDNL 62-70 contour. Communities and individuals often have different views regarding acceptable or desirable levels of noise. To address this, some local governments have implemented land use planning measures in areas below 62 dB CDNL. In addition to mitigating current noise impacts, implementing land use controls within the CDNL 57-62 noise contour can create a buffer to prevent the possibility of future noise conflicts.
2. Although local demand for on- or off-installation housing may support noise-sensitive land uses within CDNL 62-70 contour, such land use is generally not compatible within CDNL 62-70. Measures to achieve overall noise level reduction inside structures do not solve noise difficulties outside the structure. Barriers and insulation are not effective reducing the noise from blasts and explosives. Additionally, noise level reduction inside structures does not mitigate the vibration and secondary noise sources (e.g. loose window panes, plates, hanging pictures) generated by the low-frequency energy of large caliber weapons firing and detonations.
3. Existing noise sensitive land uses are considered as pre-existing incompatible land uses. In most cases these uses are not a risk to mission sustainment or a community's quality of life. Most long-term community members near installations or range and training area activities acknowledge hearing military operations and activities and are usually not alarmed or bothered by the noise. However, landowners, occupants, or other users may change over time; therefore, the comfort or familiarity with military noise will not remain constant. Try to limit further incompatible development, seek mitigation opportunities, and where practicable roll back pre-existing incompatible land uses.
4. Although noise levels may be compatible, exercise caution in siting any activity that may be sensitive to vibration. For example, computer chip manufacture is an industrial activity compatible with high noise environments but highly sensitive to vibration.
5. The land uses within this category include necessary associated resource management activities, for example, wildfire management activities for forestry.

Attachment 5

THE DEPARTMENT OF THE AIR FORCE NOISE PROGRAM

A5.1. Purpose. Reduce adverse effects from noise associated with military operations while maintaining military readiness and ability to fulfill its critical testing and training requirements.

A5.1.1. The DAF Noise Program will achieve this through a variety of actions:

A5.1.1.1. Ensure the availability of computer models to predict present and future noise environment, investigate specific noise concerns in support of Department of the Air Force planning and encroachment programs, and support Congressional inquiries and questions from senior leadership.

A5.1.1.2. Ensure appropriate management of aircraft/weapon system noise data, computer modeled operations data input files, and computer modeled output files to ensure resources are readily available and provide the ability to reflect on current operations.

A5.1.1.3. Establish the primary and supplemental metrics used in support of the AICUZ Program and noise impact analysis.

A5.1.1.4. Standardize the methodology for identifying, analyzing, and describing impacts from military testing and training generated noise and mitigation options.

A5.1.1.5. Enhance installation personnel and DAF leadership's understanding of the impacts of noise and vibration from military operations in order to better mitigate noise and facilitate public outreach and engagement.

A5.1.1.6. Support the development of a comprehensive noise complaint/inquiry management methodology to improve communication, dialogue, and relationships with the surrounding communities. Identify trends and issues with the potential to impact future beddowns and/or realignments.

A5.1.1.7. Identify and advocate for noise related research/studies to support environmental analysis of noise impacts in compliance with 42 USC §4321 et seq. and Section 7 consultations under 16 USC §§ 1531 et seq. and Section 106 under 36 CFR Part 800.

A5.2. Computer Models. The DAF and its contractors use the latest versions of the noise models described below for predicting noise in various testing and training environments. You can find further details about these models, their use, and the type of operational data required for each model in [Attachment 6](#).

A5.2.1. The DoD version of the NOISEMAP suite (BASEOPS/NOISEMAP, AAM, and NMPLLOT) is used to predict noise exposure aircraft activity (flight operations and maintenance) at the military airfield. You can then utilize the noise exposure information for the AICUZ Program and environmental analyses in United States and its territories. The use of non-DAF versions of these models requires prior approval from AFCEC/CI. Overseas locations can use NOISEMAP for environmental analysis; however, the noise contours are for internal DAF use only. AICUZ noise contours developed for overseas installations should be limited to the land area within the installation boundary. Before generating any noise contours for an overseas location, consult the appropriate Combatant Command's HQ for direction.

A5.2.2. The noise-modeling program is not controlled and maintained by one agency or Service. AFCEC/CIP, in coordination with 711 HPW/ RHCB, maintains and controls NOISEMAP, MR_NMAP3, and BOOMAP. The U.S. DOT's Volpe Center (Volpe) maintains and controls the AAM model within the NOISEMAP suite. The US Army Engineer Research and Development Center (EDRC), Construction Engineering Research Laboratory (CERL) maintains and controls BNOISEx and SARNAM. PCBOOM7 is managed by the National Aeronautical and Space Administration (NASA).

A5.2.3. The Aviation Environmental Design Tool (AEDT), the current FAA-approved noise and air quality model, is used for preparing Noise Exposure Maps for airports that participate in the FAA's Part 150 program (14 CFR Part 150). It is also used for environmental analysis of noise impacts for actions involving Air National Guard installations or Air Reserve Stations located at civilian airports. For these airfields, the civilian aircraft operations are modeled with AEDT, and the military operations are modeled with NOISEMAP.

A5.2.4. The different functions for each program within the NOISEMAP suite are described below:

A5.2.4.1. BASEOPS is the user interface for the NOISEMAP suite of tools. BASEOPS is the data entry portion of the suite, and it also controls the noise calculations and provides reporting tools.

A5.2.4.2. NOISEMAP (NMAP) is the noise calculation program. It is based on an integrated flight trajectory assumption for easier calculation of noise from aircraft flight operations.

A5.2.4.3. Advanced Acoustic Model (AAM) is a new noise calculation program that utilizes simulation-based calculations. This program provides a more detailed prediction of aircraft noise.

A5.2.4.4. Military Operating Area and Range NOISEMAP (MRNMAP) is used for predicting noise exposure from aircraft operations in Special Use Airspace and Airspace for Special Use, and air-to-ground ranges. This area operations model is for activities that do not have well-defined tracks, but that occur within a defined area (such as air-to-air combat within a MOA).

A5.2.4.5. Air Gunnery Noise Model (AGNM) is used for predicting noise levels from airborne weapons use.

A5.2.4.6. NMLOT converts grid file results from the NOISEMAP suite of programs into noise contours and generates and exports the results into shape files for input into GIS programs (such as ArcMap) for further analysis.

A5.2.5. Other noise models approved for DoD environmental noise analysis are the following:

A5.2.5.1. PCBOOMx is used for predicting carpet and focus sonic boom footprints created by individual supersonic flights within Special Use Airspace. PCBOOMx, combined with other software, is used to predict space vehicle and hypersonic weapon noise.

A5.2.5.2. BOOMAP is used for analysis of the cumulative sonic boom environment for air combat maneuvering that includes supersonic flight.

A5.2.5.3. Blast Noise (BNOISEx) is used to predict noise generated by large caliber weapons (20 millimeter and above) and explosives.

A5.2.5.4. Small Arms Range Noise Assessment Model (SARNAM) is used to predict noise levels generated from small arms (.50 caliber and below) ranges.

A5.2.5.5. SELCalc3 is a simple noise prediction tool that provides basic single event metrics from flight operations. This tool allows quick comparisons among aircraft type, engine power, airspeed, climb/dive angle, and altitude. However, you should not use this tool for noise impact analysis.

A5.2.6. In cases when planners analyze construction noise, they should use the Federal Highway Administration's 2006 *Construction Noise Handbook* as a guide.

A5.3. Noise Model Data Management. The computer models require several types of data including weather data, terrain and elevation data, location specific operational data, and reference noise data (NOISEFILE) derived from aircraft overflight noise measurements, weapon systems, or explosive sound levels. The weather, terrain, and elevation data come from existing authoritative sources, while the location specific operational data for aircraft comes from interviews with the pilot, Air Traffic Control, and maintenance personnel. For DAF led Joint Bases with an Army supported component, data for small arms range and other ranges comes from the Range Facility Management Support System (RFMSS). Operational data for Army helicopters come from the airfield managers.

A5.3.1. The following data management guidelines described in this Handbook will ensure the installation always has a set of noise contours and associated operational data representing current flying and testing and training operations available for planning readiness. The data management guidelines will help streamline data input while validating the model output data files.

A5.3.2. All final noise BASEOPS input and NMPLLOT output files, including all supporting data (i.e., Geographic Information System (GIS) background data, digital elevation, topography, impedance, and operations calculation files) are sent to AFCEC/CIPR for database entry and archiving.

A5.3.3. All information used during the noise modeling process is included in the Noise Study Report or NEPA study. This includes:

A5.3.3.1. Detailed notes from operational data collection efforts.

A5.3.3.2. Spreadsheets used for documenting and calculating daily activity with all cells visible and active formulae used. Hyperlinks should be avoided to ensure the data and calculations are clearly understood by the next user.

A5.3.3.3. The operational data (e.g., aircraft configurations, flight paths, firing points, target locations, weapons use, and amount of ammunition used) inputs of the respective noise model and details of all assumptions made during the modeling process.

A5.3.3.4. Flight track and profile maps for all permanently assigned aircraft and flight profile operations summary as generated through the BASEOPS program.

A5.3.4. The Installation Noise Program Manager should retain the Noise Study Report and provide AFCEC/CIPR an electronic copy for archiving. The most current noise model data

available from AFCEC/CIPR or the FAA (for civilian airports) will be the basis for data review and revalidation or subsequent modeling.

A5.3.5. AFCEC/CIP reviews the Noise Study Report to ensure cumulative effects are accounted.

A5.3.5.1. The Noise Study Report used to generate installation Day Night Average Sound Level (DNL)/Community Noise Equivalent Level (CNEL) contours should be reviewed and validated biannually, with a complete collection of current operational data conducted every 5 years to ensure the Noise Study Report and the noise contours reflect current mission operations. An environmental analysis for proposed changes to flight operations or testing and training activities scheduled to be done prior to the biannual review and validation, can serve as the biannual validation.

A5.3.5.2. The operational data portion of the Noise Study Report should be certified as current by the Operations Squadron Commander, and Commander of Tenant Units that conduct testing and training activities, if appropriate. At DAF-led Joint Bases with an Army supported component, the Chief of the Range Control Office should validate Army range use and RFMSS data.

A5.3.6. NOISEFILE is the standard reference noise emissions database associated with each noise model. AFCEC/CIP controls changes to the NOISEFILE data. Noise emission data for the NOISEFILE database for military jet aircraft are collected in accordance with the American National Standards Institute (ANSI) BSR/ASA S12.75-2012, *Methods for the Measurement of Noise Emissions from High Performance Military Jet Aircraft*. This standard describes the procedures for ground run-up and flyover tests for conventional take-offs and landings, and short/vertical take-off and landings. Noise measurement field studies to gather data for noise emissions from aircraft not covered by ANSI BSR/ASA S12.75-2012 should be done in coordination with HAF/A4CPI.

A5.3.6.1. The DNWG should approve any changes to any NOISEFILE database associated with the NOISEMAP suite of programs or MRNMAP prior to use for noise modeling. All approved changes should be incorporated into the database controlled by AFCEC/CIPR and provided with updated releases of NOISEMAP and MRNMAP.

A5.3.6.2. Changes to reference noise file databases for SARNAM and BNOISEx (which is also used in the Air Gunnery model) are controlled by the US Army Engineer Research and Development Center, CERL.

A5.3.6.3. Surrogate/substitute data may be necessary when noise data are incomplete or unavailable for a new or existing weapons system or munitions. The aircraft or weapons systems used as substitutes must be chosen carefully and vetted broadly for the data to be useful. The use of surrogate or substitute data is only approved when actual noise data have not been and cannot be obtained for the weapons system or munition being modeled. When surrogate or substitute data is used due to lack of actual aircraft and weapon system noise data for environmental analysis, it will be handled as missing data as described in 40 CFR, Part 1502, Section 1502.21, Incomplete or Unavailable Information, and the text will include a discussion of the points in 40 CFR Part 1501, Section 1502.21(b/c)1-4 in the environmental assessment or impact statement. In all cases, the DNWG fully documents the use of surrogate/substitute aircraft. You can obtain a list of pre-approved

surrogate/substitute aircraft from the DNWG. The Army Public Health Center Operational Noise Program must review and approve the list of surrogate munitions in accordance with the SARNAM and BNOISEx end users' licensing agreement.

A5.4. Metrics. The descriptors associated with noise level outputs from modeling testing and training activities are referred to as metrics. There are two types of metrics, primary and supplemental. Primary metrics are those used for determining environmental impacts from testing and training noise levels. We use DNL and CNEL (in California) calculated with NOISEMAP as the primary metrics for determining NEPA compliance and land use compatibility for the AICUZ Program. Supplemental metrics can be used in addition to the primary metrics to help local community leaders and the public better understand how noise levels will change because of testing and training activities. The supplemental metrics used in an analysis of noise impacts will be determined in part by the issues raised during scoping or the context in which the action is occurring (e.g., if there are no schools in the region of influence then using Time Above (TA) based on school day hours is not necessary). [Table A6.4](#) lists the primary and supplemental metrics produced by the computer noise models. Note: Before generating any metrics for DAF overseas locations, consult with the appropriate Combatant Command's HQ regarding metrics.

A5.5. Analyzing Noise Impacts. The identification of noise impacts is part of the environmental analysis process. When the proposed or alternative action is determined to produce sound levels that could have an impact on aspects of the environment (i.e., biological, natural, social, economic, etc.), then a description of the acoustic environment and analysis of the impacts needs to be prepared. [Attachment 7](#) and *Planning in the Noise Environment* contain a more detailed discussion of the concepts that are important for developing a good analysis of noise impacts and a synopsis of the typical issues included in analyzing impacts of noise from military testing or training operations.

A5.6. Education and Communication. An effective noise program requires frequent communication and engagement with the public through a range of activities and programs including airmen training, noise inquiries and complaints response program, and the development of outreach materials and educational tools that can be used not only in support of the noise program but also the AICUZ and environmental analysis programs. Effective communication involves understanding stakeholders, defining communication strategies, and educating the public and military about noise and the effects that noise has on the surrounding communities. Although PA is primarily responsible for communicating with the public, effective communication about noise requires a combined effort from all organizations on an installation since questions and comments regarding noise from military training are often directed to other installation personnel. You can find more information on education and communication in [Chapter 8](#) and [Attachment 8](#).

A5.7. Comprehensive Noise Complaint Management Methodology. Noise inquiries and complaints are opportunities to engage and inform members of the public. These inquiries and complaints can provide insight into public perception and opinions. You can aggregate and analyze the information in an effort to identify potential weaknesses to manage or communicate about testing and training noise. You can also use the information obtained to identify problems for future beddowns and realignments. Developing a comprehensive management methodology informed by the host community requires standardizing the information collected from complainants and linking the complaint to information such as geospatial data (i.e., rough location relative to flight tracks or firing points), weather conditions, temporal factors (time-of-day, day-

of-week, and month), the event that caused the noise. The noise complaint/inquiry section of [Attachment 8](#) and *Planning in the Noise Environment* have more detail on the type of information installations should collect.

A5.8. Noise Research/Studies. The need for studies or research to better understand noise impacts can be identified by the DAF, another Service, or by other Federal or State agencies in their regulatory role or as a Cooperating Agency in compliance with 42 USC §§ 4321 et seq. Any study or research proposal agreed upon is to be designed so other DAF installations or DoD Services can use the information when faced with impacts and mitigation requirements for similar actions in other locations. You should take the following steps to ensure maximum returns on investment for any study or research related to the effects of aircraft and weapons noise to the human, structural, or biological environment.

A5.8.1. To avoid unnecessary expenses and duplication of efforts and prior to committing to a study or research project during the consultation process, the proponent of the proposed action or the DAF office involved in consultations should consult with the other Services to determine if they have had to address the same issue or have conducted a similar study but not published any findings. The 711 HPW/RHCB at the Air Force Research Lab, located at Wright Patterson AFB is available to help determine if research/studies done in the past can be used in support of the environmental analysis or consultations.

A5.8.2. Coordinate any research or study design proposed as a result of consultations with federal agencies (e.g., Fish and Wildlife Service, NOAA Fisheries (for marine habitats) or state agencies (such as the State Historic Preservation Office) to ensure all parties agree with the goals and objectives established for the study or research effort.

A5.8.3. Finally, provide electronic copies of final studies and reports to AFCEC/CIPR for archiving and future use.

Attachment 6

COMPUTER MODELING, DATA, AND METRICS

A6.1. General. This attachment provides additional details regarding the computer models, data required for each model, and the metrics the DAF uses for noise contours in support of the AICUZ Program and environmental analyses of testing and training activities. The discussions on models and data are organized by the type of operational environment in which they are used, e.g. military airfield, civilian airfield, SUA, air to ground ranges, ground ranges, and explosive ordnance disposal proficiency training ranges. At the end of this section, [Figure A6.1](#) summarizes the noise models used for predicting noise levels in each type of operational environment. [Table A6.1](#) lists the computer models and the usage rules related to each.

A6.1.1. Pay attention to the metrics used to describe acoustic impacts. For example, a common challenge is the use of Onset Rate (DNL_{mr} or Ldn_{mr}) to describe an observer's experience in a SUA or range. Metrics are described in detail below in the metrics portion of this section.

A6.2. Computer Modeling for Military Airfield Environment. NOISEMAP is used to predict noise exposure from all flight activity around an airfield, engine run operations, and the effects of the topography and ground impedance on noise exposure from aircraft operations. Only the most recent DoD version of NOISEMAP is to be used when preparing noise contours for environmental analysis or the AICUZ Program.

A6.2.1. Rotorcraft Noise Model computes the impacts of noise from rotary-wing and tiltrotor aircraft. The highly-variable nature of thrust from these aircraft is captured by sound pressure hemispheres. This approach differs from the linear flightpath sampling of NOISEMAP. RNM is a version of the Advanced Acoustic Model.

A6.2.2. Military Operating Area and Range NOISEMAP (MRNMAP) is, as the name implies, a version of NOISEMAP tailored to the broad, unfocused flight characteristics of SUA and range training.

A6.2.3. BASEOPS is the user interface for all data input and execution of the NOISEMAP suite of programs. It is the only program authorized for data input, model execution, and data output. The BASEOPS report functions can be used to generate the installation's NMODD, noise report, or NEPA study and document aircraft groupings and/or other unusual or non-standard operations.

A6.2.4. NMPLLOT converts grid file results from the NOISEMAP suite of programs into noise contours and generates and exports the results into shape files for input into mapping and spatial analysis programs (such as ArcMap). NMPLLOT also contains analytical features used to investigate noise complaints, research noise mitigation techniques, identify information regarding a single event, or provide cumulative noise levels at a particular location by supplying a list of the top 20 ranked aircraft contributing to the noise in the acoustical environment. Noise contours produced by NMPLLOT are not to be modified without full justification, documentation and written permission from AFCEC/CIP. This is to ensure that anyone trying to validate the results of the noise modeling can reproduce the output from NMPLLOT.

A6.3. Computer Modeling for Civilian Airfield Environment. The overall responsibility for aircraft noise in the civilian airport environment lies with the local airport authority. The most current FAA-approved noise model, AEDT, is designed specifically for modeling aircraft noise and air emissions at civilian airfields. FAA uses AEDT to predict noise exposure in support of 14 CFR Part 150, Airport Noise Compatibility Program and for analyzing noise impacts in the preparation of EAs and EISs in accordance with FAA Order 1050.1F, *Policies and Procedures for Considering Environmental Impacts*.

A6.3.1. When requested by the airport authority, the DAF will provide unclassified copies of the input and output files from the most recent DAF noise analysis to the airport authority for use in updating noise exposure maps. AEDT models civilian aircraft operations, and NOISEMAP models military aircraft operations. You then combine the results from each modeling run through NMPLLOT to produce a single set of DNL/CNEL contours.

A6.3.2. FAA must request to use NOISEMAP under certain conditions and in accordance with FAA Order 1050.1F, paragraph B-1.2, Appendix B. Those conditions are when the noise from a DAF proposed action dominates the civilian airport's acoustic environment and/or the AEDT standard flight profiles do not reflect local operating conditions or are unavailable.

A6.3.3. Civilian aircraft may be modeled in NOISEMAP for environmental analysis purposes if the airport is not participating in the FAA's Part 150 program, does not have an active noise management program, and AEDT files do not exist. In all situations, produce the affected environment noise contours and proposed action noise contours using the same noise model.

A6.4. Computer Models for SUA. You handle noise associated with SUA slightly differently than the airfield environment, because it involves more random flight activity where low altitudes and high airspeeds can produce high on-set rates and supersonic flights can produce sonic booms. You use the models below to predict noise in SUA. Note: In their role as manager of the National Airspace System, the FAA has approved specific noise models for modeling impacts from proposed actions involving SUA. The use of models and metrics other than the ones approved by the FAA requires prior approval by the FAA. FAA Order 1050.1F, Appendix A, Section 14 provides assistance in determining whether a noise analysis is warranted and helps identify what type of analysis should be conducted. The following is an explanation of different models.

A6.4.1. MRNMAP is a program used for predicting the noise exposure from aircraft operating at subsonic airspeeds within SUA. The FAA's Office of Environment and Energy (AEE) has approved the use of MRNMAP for use and analysis of SUA (FAA Order 1050.1F). MRNMAP is a version of NOISEMAP. It is an integrated type of model like AEDT using flight path segments to predict exposure.

A6.4.2. The BASEOPS program generates input files for MRNMAP. You use the BASEOPS report function to generate input into the installation Noise Study Report. NMPLLOT is used to display input and output from MRNMAP in graphical (contour) form.

A6.4.3. PCBOOMx is used when there is a need to predict the sonic boom footprint of individual supersonic flight operations. The program requires knowledge of supersonic flight parameters and sonic booms. PCBOOMx is designed to analyze sonic booms from single sorties, with emphasis on identifying the specific pattern and amplitude of the footprint. Use of PCBOOMx during the EIAP in which the FAA is a cooperating agency requires written

approval from the FAA's Office of Environment and Energy in accordance with FAA Order 1050.1F.

A6.4.4. BOOMAP is used when predicting the cumulative sonic boom environment for air combat maneuvering operations where speeds exceed Mach 1 and sonic boom events tend to be brief but occur often enough that cumulative effects are of concern. BOOMAP does not accurately predict sonic booms from aircraft with super-cruise capability, such as the F-22. Contact AFCEC/CIP for guidance in calculating sonic boom noise levels for aircraft with super-cruise capability. The FAA/AEE has approved the use of BOOMAP for use and analysis of SUA (FAA Order 1050.1F).

A6.5. Computer Models for Air-to-Ground Ranges. Noise associated with air-to-ground ranges is dependent on the use of the range. It is based on two factors, the aircraft overflight and the munitions used for training.

A6.5.1. MRNMAP is used to predict noise from subsonic aircraft overflight where inert munitions are used as described under SUA. Noise modeling is not required for use of inert munitions, i.e. (Bomb Dummy Units) because the noise associated with the aircraft would dominate the noise environment.

A6.5.2. Air Gunnery Model program is used to develop noise levels from air-to-ground firing. The model is designed to predict elevated weapon noise and is used for predicting noise from muzzle blast, rocket propulsion, and sonic booms resulting from the use of supersonic projectiles (i.e., bullets and rockets). Note: In regard to high explosive bombs, the explosion on the ground will be handled by BNOISEx.

A6.6. Computer Models for Ground Training Ranges and EOD Proficiency Training Ranges. Noise from ground sources have different characteristics than aircraft noise as well as different propagation paths. Additional computer models were designed to accurately capture these different noise effects. The computer models used for training ranges are described below.

A6.6.1. The Small Arms Range Noise Assessment Model (SARNAM) is used for predicting noise levels for small arms (.50 caliber or less). SARNAM is designed for ranges with fixed firing points and targets the model's use for other training tactics is limited. The Army Public Health Center Operational Noise Program must validate all SARNAM input files prior to release in a public document as required by the End User License Agreement from the U.S. Army Engineer Research and Development Center.

A6.6.2. Noise level predictions for ranges for large caliber weapons (20 millimeter or greater) and EOD proficiency training ranges is done using the most current version of BNOISE. BNOISE files require validation by the Army Public Health Center Operational Noise Program prior to release in a public document. BNOISEx version control is the responsibility of the U.S. Army Engineer Research and Development Center.

Figure A6.1. Noise Model Usage.

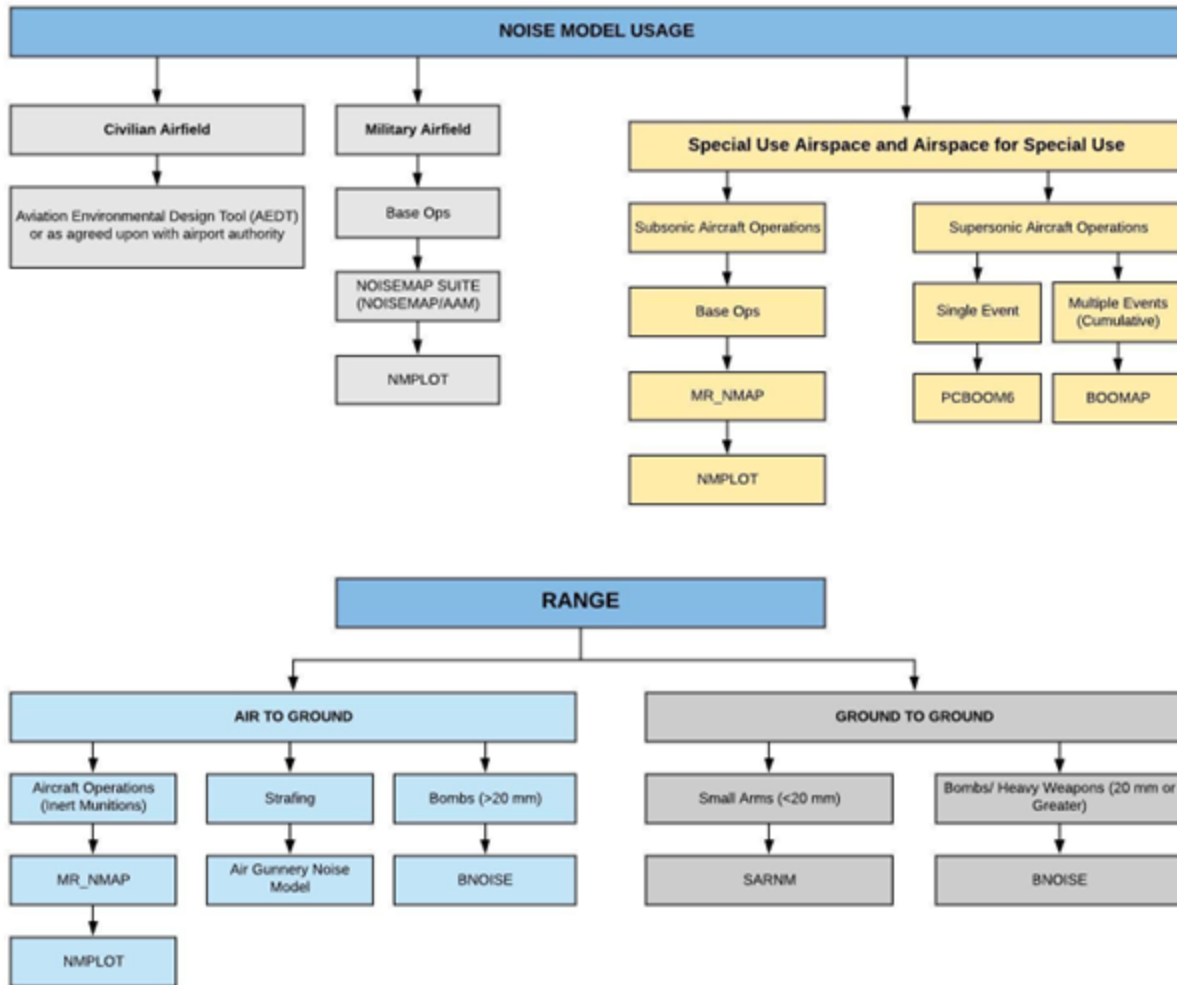


Table A6.1. Noise Models Usage Guidelines.

Model	Guidelines
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NOISEMAP Suite (BASEOPS, NMAP, AAM, and NMPLT)	Used for noise prediction and analysis for all military airfield environments in the United States and its territories. [Use for overseas installations not required if host nation agreements require use of other models]. All input is to be done using the BASEOPS input program. Used for single event estimation at sensitive receptors in the airfield vicinity Used to analyze activity interference on such speech interference and sleep estimation in the airfield vicinity For installations outside the Continental United States installations, noise model output is to be used for on-base planning purposes only and will be provided to the host nation only if requested. No public release of these contours without prior permission from numbered Air Force.
Aviation Environmental Design Tool (AEDT)	The FAA model for noise analysis. Use at civilian airports in support of the Federal Aviation Administration regulations 14 CFR Part 150 noise exposure maps and environmental analysis. Request exemptions as necessary for military aircraft.
Military Operating Area and Range Noise Model (MRNMAP)	Used for predicting noise exposure from aircraft operations in SUA and air-to-ground ranges. Analytical capability using supplemental single event metrics at sensitive receptors used for environmental analysis.
PCBOOMx	Used for predicting both carpet and focus boom footprints created by supersonic flight in Special Use Airspace for environmental analysis. Used in conjunction with other specialty models to assess launch vehicle noise.
BOOMAP	Used for analysis of the cumulative sonic boom environment for air combat maneuvering that include supersonic flight. Use for predicting sonic booms from aircraft with super-cruise capability not supported, contact AFCEC/CIP for direction.
Air Gunnery Noise Model	Used for predicting the noise levels from airborne weapons usage.
Blast Noise (BNOISEx)	Used to predict noise generated by large caliber weapons and high explosives (20 mm and larger) for environmental analysis and AICUZ studies for DAF led Joint Bases with an Army supported component. Input files require validation by the Army Public Health Center Operational Noise Program prior to release in a public document.
Small Arms Range Noise Assessment Model (SARNAM)	Used to predict noise generated from small arms ranges (.50 caliber and smaller) for environmental analysis and AICUZ studies for DAF led Joint Bases with an Army supported component. Input files require validation by the. Army Public Health Center Operational Noise Program prior to release in a public document.

A6.7. Data Needed for Noise Level Predictions. Each noise model has its own operational data requirements and methods for obtaining operational data. Tables [A6.2](#) and [A6.3](#) contain examples of operational data used by several of the computer models.

A6.7.1. Aircraft operations and engine run-up data for based aircraft is specific to each installation and is be obtained from and validated by the operators, maintainers, and certified by each squadron commander.

A6.7.2. Yearly traffic counts provided by air traffic controllers should be used only to validate the operational numbers used to generate noise contours.

A6.7.3. Use of standard flight profiles contained within BASEOPS is limited to transient aircraft not using the airfield on a daily basis or where base-specific operational profiles are unobtainable through pilot interviews. Standard profile data will be adjusted as necessary to accurately reflect local flying rules and noise abatement procedures. When there are multiple types of transient aircraft with very few daily operations (less than 0.50), aircraft may be grouped with similar aircraft in an appropriate category for noise modeling purposes. In all cases, document aircraft groupings in BASEOPS for future reference.

A6.7.4. Topography and elevation files will be used, during the noise modeling process. There are two ground types when it comes to noise modeling, “soft” and “hard.” Soft ground types include all non-water areas (~200 kPa per square meter). Open water and areas designated as wetlands that are inundated more than 50 percent of the year, are considered as hard ground, otherwise use soft ground. All noise contours used for the “affected environment” developed for the acoustical environment section in environmental analysis documents, that were not originally developed using topography and elevation files, will need to be revised using those files. This may result in noise contours that do not match those previously released in a public document. In these instances, a statement that the baseline noise contours have been updated to include the effects of topography and elevation resulting in changes in the noise environment will be included.

A6.8. Special Use Airspace and Ranges. Defining the affected acoustical environment used in environmental impact analysis documents for the SUA, air-to-ground ranges, and small arms and ground ranges requires current operational data. Existing records can be used if they have been reviewed and validated by the appropriate airspace manager or range operating authority as being representative of current operations in accordance with DAFMAN 13-201, *Airspace Management*, AFMAN 13-212V1, *Range Planning and Operations*, and AFI 36-2654, *Combat Arms Program*. Operational data for Army ground ranges and small arms ranges at an DAF led Joint Base with an Army supported component for the proposed action and alternatives should be provided by the proponent of the action. All operational data should be reviewed and validated by the Director of Plans, Training, Mobilization and Security Directorate or Chief of Range Control.

A6.8.1. High-speed aircraft, engine power settings, and airspeed are to be restricted to the settings in the NOISEFILE associated with MR_NMAP.

A6.8.2. You can find the minimum data points needed for MR_NMAP model in [Table A6.2](#). Data should be provided for each dissimilar mission. The minimum data points needed for SARNAM and BNOISEx are found in [Table A6.3](#). Data should be provided for each range training area.

Table A6.2. Sample MR_NMAP Data Requirements.

Mission Name		
Aircraft Type	F-22	F-16
Airspace Unit	R-2301	R-2301
Number of sorties per year	5,000	2,000
Number Daytime Operations (0700-2200 (or 1900 for CA))	4,000	1,500
Number of Evening Operations 1900-2200 [CA only]	0	0
Number of Night Operations (2200-0700)	1,000	500
Average time (in minutes) in airspace per Operation	60	60
Average Power Setting	90% ETR ¹	90%RPM ²
Average Indicated Airspeed (in knots)	450	425
Percent time by altitude block (in Above Ground Level (AGL)) (Each column should add to 100%)		
100 - 300 feet	0	0
300 - 500 feet	0	0
500 - 1,000 feet	5	5
1,000- 2,000 feet	20	20
2,000 - 3,000 feet	15	15
3,000-5,000 feet ³	10	10
5,000 - 10,000 feet	25	25
10,000 + feet	25	25
Total	100%	100%
Notes: 1. Engine Thrust Request 2. Revolutions Per Minute 3. Required to support Air Quality Analysis		

Table A6.3. Sample SARNAM or BNOISEx Data Requirements.

Description	Weapon Type	Ammunition Type	Day	Night	Annual Total Ordnance/ Ammunition Estimated Expenditure (Rounds)
			0700-2200 (Rounds)	2200-0700 (Rounds)	
Combat Pistol Range	Pistol	9 mm	1,000	5,000	6,000
		.45 cal.	23,000	5,000	28,000
	Shotgun	12 gauge	6,240	1,560	7,800
		5.56 mm	6,100	0	6,100

Multi-Purpose Range	Rifle	7.62 mm	15,600	0	15,600
		.50 cal.	4,800	1,200	6,000
Live Hand Grenade Range	Hand Grenade	HE Fragmentation	50	0	50
Field Artillery Indirect Fire Range	Artillery	155 mm HE	800	20	8020
		155 mm Illum	0	100	100
		155 mm Smoke	400	0	400
	Mortar	120 mm HE	320	80	400
		120 mm Illum	0	100	100
		120 mm Smoke	100	0	100
Light Anti-Armor Weapon Live Range	Rocket (Personnel)	LAW	100	0	100
		84 mm	181	45	226
Light Anti-Armor Weapon Live Range	Grenade Launcher	40 mm HEDP	500	0	500
Multi-Purpose Training Range	Machine Gun	.50 cal.	4,000	1,000	5,000
Notes: mm = millimeter; cal = caliber, HE = High Explosive, HEDP = High Explosive Dual Purpose, Illum = Illumination, LAW = Light Anti-armor Weapon.					

A6.9. Noise Metrics. The computer models can produce noise levels using several descriptors or metrics. [Table A6.4](#) at the end of this section summarizes which metrics are produced by which computer models. Depending on the source of the noise, noise levels used in the DAF are either A-weighted or C-weighted. Human hearing is less sensitive at very low and very high frequencies, so weighting applies frequency filters to sounds to account for the human perception of loudness. A-weighted noise levels are not to be combined with C-weighted noise levels (nor will the contours be joined).

A6.9.1. A-weighting emphasizes the mid-frequency sounds that are more closely related to human hearing. A-weighting should be used when assessing noise effects related to subsonic aircraft operations and small arms (less than 20 millimeters). When the majority or all noise levels in a document are A-weighted, it is acceptable to drop the “A-weighted” and use “dB” as long as the use of A-weighting is understood.

A6.9.2. C-weighting slightly emphasizes the lower frequencies but does not emphasize other frequencies that are treated as un-weighted sounds. C-weighting should be used when assessing the potential noise effects on humans, terrestrial wildlife, and marine life from supersonic aircraft operations, large weapons (20 millimeters or greater), and blast noise sources.

A6.10. Primary Metrics. Primary metrics associated with noise modeling and used in environmental reports and documents are described below.

A6.10.1. Day-Night Average Sound Level (DNL). DNL is the primary metric used by federal agencies for analyzing noise effects. It does not represent the actual sound level heard at any one point in time. DNL is a conflation that takes into account the sound exposure levels of all

individual events that occur during a 24-hour period. Acoustic night operations are penalized to account for an increased sensitivity to noise during sleeping hours and decreased ambient sound levels that help mask operations during the day. DNL accounts for day and night operations dividing the sum by the total number of seconds in a day (FICON, 1992). DNL is the best single system of noise measurement that can be uniformly applied in communities around airports for compatible land use planning and for which there is a relationship between projected noise and surveyed reaction of people to the noise (Schultz Curve 1978 and Finegold et al. 1994). DNL is the primary noise metric used for describing long-term noise impacts for sub-sonic aircraft operations and small weapons noise, and is the primary metric used to describe the noise environment in the airfield vicinity for programs such as AICUZ and EIAP.

A6.10.2. Daily operations for noise modeling are calculated using the Average Annual Day (AAD) method (i.e. yearly operations divided by 365 days per year). The number of AAD operations are to be rounded to the nearest hundredth (i.e., two decimal places), and the number of arrivals and departures should always be equal. The airspace and range evaluations are an exception. When calculating Onset Rate (Ldnmr), the average day operations during the busiest month (i.e. number of operations during the busiest month divided by 30 days per month) is used.

A6.10.3. To ensure the reader of any NEPA document or AICUZ Study understands that noise levels do not abruptly stop at the 65 dB noise contour, or any other contour line, you will often use gradational shading with color bands that gradually transition from red at the upper noise levels to yellow, to green to purple at the lower noise levels. The use of gradational shading allows features on the installation maps to show through for the reader. This technique communicates the actual noise exposure because the colors reflect noise levels lower than 65 dB, this does not mean that you should show additional noise contour lines, nor does it indicate a change in the significance attached to the noise contour 65 dB or higher noise contours. **Figure A6.2** is an example of the use of gradational color shading to portray noise zones.

Figure A6.2. Example Noise Contour Gradational Shading with Color Bands.

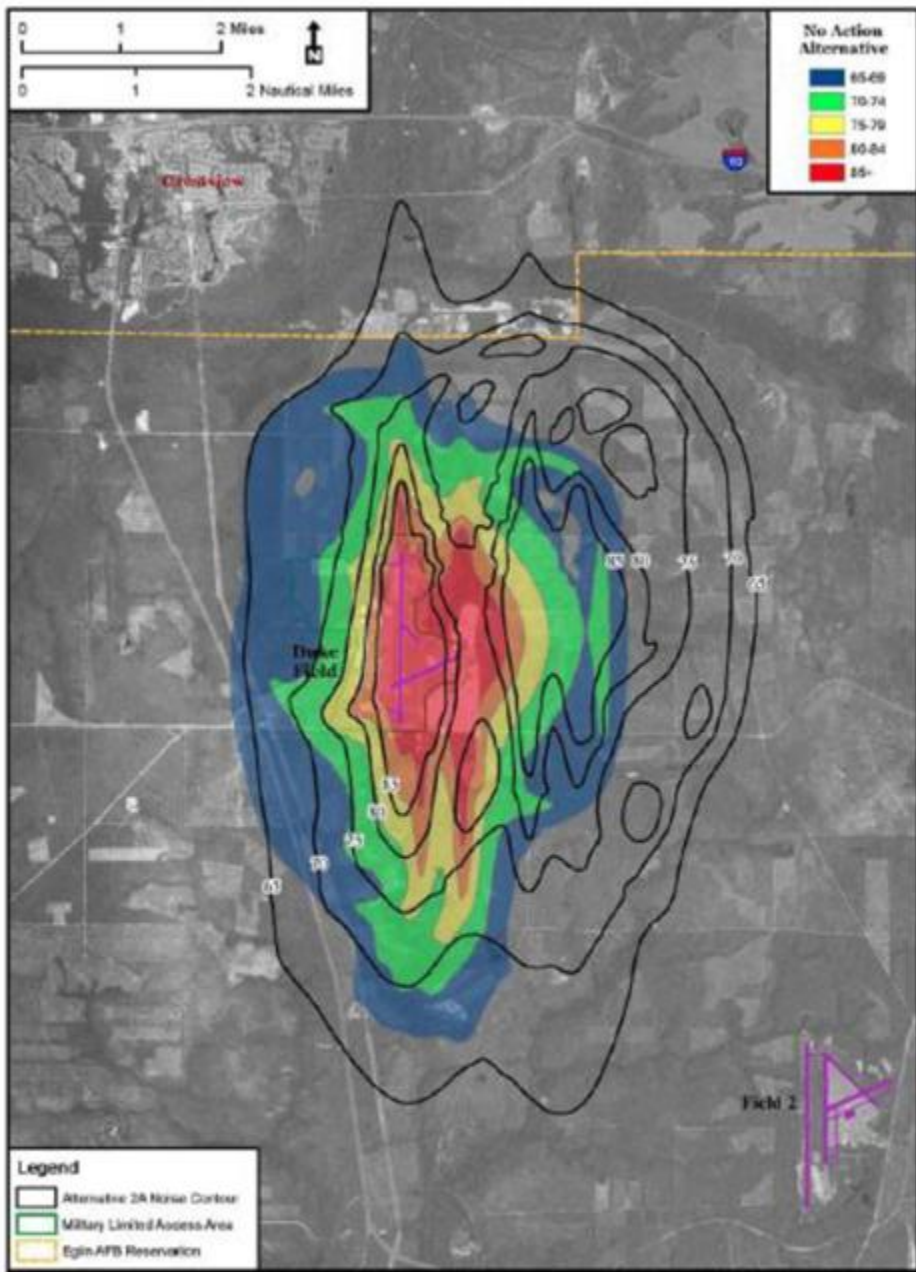


Figure ES-10. Noise Levels from F-35 and All Other Aircraft in the Vicinity of Duke Field Under Alternative 2A and the No Action Alternative

December 2013

Final Executive Summary
Supplemental Environmental Impact Statement
for the F-35 Beddown at Eglin Air Force Base, Florida

- 29 -

A6.10.4. You use Community Noise Equivalent Level (CNEL) contours in AICUZ studies and for analyzing noise impacts in NEPA documents in California.

A6.10.5. When necessary for environmental analysis or public outreach, operations for short-term military training exercises may be calculated based on the duration of the event and presented as short-term DNL/CNEL contours to supplement the traditional DNL contour. All presentation materials are to be clearly marked as “Training Exercise Noise Contours - Not for

Land Use Planning Purposes.” When using this method, you place the emphasis on the Name of the Exercise and Number of Days per year the exercise is expected to occur. Short-term noise contours do not replace the AAD noise contours presented in the AICUZ Study or other land use planning documents.

A6.10.6. C-weighted Day-Night Average Sound Level (CDNL or LCdn). This metric is used for large weapons (20 millimeter and greater) and other blast noise sources when predicting noise exposure on military ranges. It does not represent the actual sound level heard at any one point in time. C-weighting is appropriate for low-frequency impulsive sounds, such as sonic booms, heavy weapons, and other blast noise sources. For DAF-led Joint Bases with an Army supported Component, C weighted DNL contours are to be plotted in 5 dB increments from 62 dB to 80 dB. Sonic booms CDNL contours are plotted in 5 dB increments. When discussing C-weighted metrics, it should be disclosed that when experienced indoors, impulsive sounds can create secondary noise from rattling and vibrations of the building.

A6.10.7. Peak Sound Pressure Level (Lpk) is the primary metric for small caliber weapons (.50 caliber or less) and for small arms range noise modeled with SARNAM.

A6.10.8. Other countries may use other noise metrics for aircraft noise. Some countries have dedicated offices that generate official aircraft noise metrics. Check with the appropriate AFCEC/CIP before generating any AICUZ noise contours or preparing analysis of noise impacts for environmental reviews at DAF installations overseas.

A6.11. Supplemental Metrics. All environmental analyses need to communicate their findings to the public. Acoustics is a complicated function of physics that is difficult to explain. That is made more difficult when the observer’s opinions about the source of the sound or its impact can change their outlook toward it. Using a variety of ways to tell the story to the observer can help. Supplemental metrics are other ways of looking at the sound to relate the phenomenon before someone experiences it. DNL/CNEL can be supplemented by other metrics to characterize specific effects and to help the reader understand what they might experience. The supplemental metrics are intended to enhance the understanding of pertinent facts surrounding the change in the noise environment. These may include the use of metrics such as Equivalent Sound Level (Leq) or single event metrics such as SEL and Lmax, or descriptions of the noise environment in terms of the number of times or minutes of exposure at a specific location during an average day.

A6.11.1. Uses for each supplemental metric are listed below. Additional discussion can be found in Defense Noise Working Group’s (DNWG) Technical Bulletin *Using Supplemental Noise Metrics and Analysis Tools* (DNWG TB2009-2), *Improving Aviation Noise Planning, Analysis and Public Communications with Supplemental Metrics: Guide to Using Supplemental Metrics* (DNWG TB2009-3); and DoD’s *Planning in the Noise Environment*, (located in the Noise Toolbox on AFCEC/CIP’s SharePoint® site. These metrics are not be used in place of DNL for determining significance of aircraft noise at bases in CONUS and US Territories.

A6.11.2. Equivalent Sound Level (Leq) is a useful metric for describing the total aircraft noise exposure over a specific period of time without any penalties applied. The specified time can be an hour, a school day, daytime, nighttime, a full 24 hours, or even a weekend. Leq values for less than a 24-hour day can be useful for determining impacts to sensitive locations. For example, an 8-hour Leq (Leq₈) can be calculated for the time of day that a school is in session and used to determine classroom impacts (providing that operational data is available for that

time period). Leq may also be used when predicting habituation to aircraft overflights by domestic animals and wildlife. When used, Leq is shown in tabular format for discrete locations of interest. Leq contours are used for calculating the number of people that may have increased risk of hearing loss but should not be published in public documents to avoid them being confused with DNL contours.

A6.11.3. Sound Exposure Level (SEL) is an A-weighted decibels metric used when analyzing the probability of awakening from aircraft operations, noise effects to domestic animals and wildlife, and when comparing sound levels from different types of aircraft and different aircraft operations.

A6.11.4. Maximum Sound Level (Lmax) is an A-weighted metric used in the assessment of speech intelligibility and interference. Additionally, it may be used independently or together with SEL to compare noise levels from different aircraft and different aircraft configurations, and for noise effects to domestic animals and wildlife. Lmax is not to be used to measure the overall intrusiveness of an event.

A6.11.5. Onset Rate-adjusted Sound Exposure Level (SELr) is an A-weighted metric used in the SUA/ASU to compare noise levels from individual events (see also SEL).

A6.11.6. Onset Rate-adjusted monthly Day-Night average sound Level (DNLmr or Ldnmr) metric is used for quantifying noise impacts in SUA and for predicting noise exposure resulting from subsonic aircraft operations using SUA and air-to-ground ranges. You may develop noise contours for SUA associated with air-to-ground ranges where the DNLmr of 65 dB extends outside of the range boundaries. DNLmr levels are documented in table format for all other SUA.

A6.11.7. Un-weighted Peak Sound Pressure (Lpk) may be used when referencing noise from sonic boom, small arms, large weapons, and blast noise to human responses. Peak levels also correlate well with airborne vibration and structural response. BNOISEx primarily uses Peak 15 (PK15) and Peak 50 (PK50) level metrics used because they show the influence of weather conditions, however BNOISE can use any peak level metric. Peak 15 represents adverse conditions and Peak 50 represents neutral weather conditions. If operations were to take place under all conditions, the Peak 15 level metric would be the single event peak level exceeded by 15 percent of events, (i.e. 85% of the events will fall within the Peak 15 band). Only under extreme propagation conditions (i.e., low clouds or temperature inversion) will peak noise levels be louder than the predicted Peak 15. Peak 50 is the single event peak level exceeded by 50 percent of events and represents neutral conditions. Be aware that peak levels can also be significantly lower than predicted PK15 and PK50 levels under favorable conditions. The contour generated by SARNAM when the Peak metric is selected, is actually Peak 15 vs an average peak (i.e., Peak 50).

A6.11.8. Number of events Above (NAL) answers the questions of how many aircraft would be expected to fly over a given location or area at or above a certain sound threshold level. It has a distinct advantage in communicating current and projected noise exposure that is not capable through other metric and tools. NAL is the only supplemental metric that combines single event noise levels with the number of aircraft operations. NAL is a useful metric to indicate the effects that aircraft noise has on certain human activities, specifically, the number of times a day (or other time period) that a person's activities could be interfered with, or the number of nighttime noise events that may cause some level of sleep disturbance. You should

not report NAL as an absolute number. When using NAL is in an airfield environment, it should include an explanation of runway usage with a normalized flying schedule that contains typical times of day for mission departures and arrivals. Similarly, when used in SUA or Range environments, you should provide supporting explanations of flight training procedures. When used, NAL is shown in tabular format.

A6.11.9. Time Above (TA) is useful for describing the noise environment in schools, particularly when comparing different operational scenarios. TA analysis can be conducted along with NA analysis so the results show not only how many events occur above the selected threshold(s), but also the total duration of those events above those levels for the selected time period. When used, TA can be portrayed for single or multiple locations and is to be shown in tabular format.

Table A6.4. Computer Noise Models and Associated Noise Metrics.

Model	Output/Metric	
	Primary	Supplemental
NOISEMAP (NMAP)	DNL, CNEL, Leq, Leq(c)	SEL, SELc, Lmax, NA, TA, Leq SPL, SPLA, SPLc
AEDT	DNL/CNEL	SEL, Lmax, NA, TA, Leq
MR_NMAP	DNL _{mr} , CNEL _{mr}	SEL _r , Lmax, NA, TA
PCBOOMx	Lpk, psf	CNEL
BOOMAP	CDNL	
Air Gunnery Noise Model	CDNL, Lpk	
BNOISEx	CDNL, Lpk	CSEL, PK ₁₀ , PK ₅₀ , PK ₉₀
SARNAM	Lpk	DNL, SEL

Attachment 7

THE ROLE OF COMMUNICATION AND COMPLAINT MANAGEMENT

A7.1. Public Outreach and Communication. Open communication with the public about an installation's noise sources is a critical component of a successful noise program. By maintaining a dialog with the public through publications and electronic news media, the installation can help improve the public's understanding of the sound generated from military activities and what the installation is doing to minimize it. Often, when a community believes the installation is acting as a 'good neighbor,' the annoyance level of the public decreases, reducing noise complaints. These lines of communication also provide a mechanism for the public to educate the installation personnel about their noise concerns. It is important to understand that given the subjective nature of noise (i.e. unwanted sound), that even the most robust communication strategies may not always change the public's opinion about the noise. However, without any communications, the public's opinion may become more negative.

A7.1.1. The Installation Public Affairs (PA) Office(r). Typically takes the lead when it comes to communicating with the public, but other members of the installation staff maybe needed to assist in developing the messages and have a role in delivering these messages. It is crucial that all messages about noise generating activities be developed in coordination with the installation PA as detailed in AFI 35-101, *Public Affairs Operations*.

A7.1.2. People who live near military installations typically become familiar with routine military operations and sounds in their surrounding environment and have expectations as to what levels of noise they will hear and when they will hear it. A change to noise generating activities often creates uncertainty in people's minds and often results in an increase in inquiries or complaints. Notifying the public through press releases, social media sites, or other outreach methods in advance of any changes to normal operations (i.e., training exercises, air shows) resets the public's expectations (i.e. establishes a new "norm") of what they will hear and when. Experience has proven that advance notification typically minimizes the inquiries and complaints. This requires open communication across installation organizations to ensure all appropriate offices associated with the activities and with noise related responsibilities are working with the Public Affairs office.

A7.1.3. The use of brochures or fact sheets providing general background on the installation, its mission, major noise sources, and contact information can be a helpful outreach tool. These brochures can be provided to a variety of stakeholders and can be an effective public awareness tool for local engagement activities, such as civic or local government meetings, news coverage, or base tours. Social media provides an additional communication tool. Examples of brochures and fact sheets and other communication tools are in the Noise Toolbox on AFCEC/CIP's SharePoint® site: <https://usaf.dps.mil/teams/afcec-portal/CI/CIP/SitePages/Homepage.aspx>

A7.1.4. Education of Installation Personnel. Before engaging the public, installation personnel should ensure they understand local noise concerns and are ready to respond to them if necessary. Training of installation personnel should include information on communicating about noise and focus on establishing trust and credibility with the public based on primary messaging that is open, honest, and conveys empathy. Facts and figures such as DNL contours, noise levels of individual noise events, and number of people exposed may be difficult for the

general public to understand and should be considered as secondary messaging. AFCEC/CIP can provide noise focused specific risk communication training for personnel talking to the public about noise.

A7.1.5. Handheld Sound Level Meters and Cell Phone Apps. Easy-to-use and publicly available technology such as low- cost sound level meters and sound meter application software developed for downloading onto any smart phone presents an increasing challenge when members of the public begin to collect measurements and dispute documentation published by the DAF.

A7.1.5.1. Handheld sound level meters are not designed to discriminate between sources of noise and often report results in metrics other than those being disputed (i.e., disputing a noise level present on a DNL contour map with a Lmax reading). Note that DNL contours cannot be validated using handheld sound level meters. Installation personnel should be able to explain the difference between noise metrics used by the DAF and measurements from the sound level meters.

A7.1.5.2. When the public raises an issue based on the use of handheld sound level meters, or if the complainant appears to be experienced in the acoustic environment, installation personnel should consult with personnel who have an in depth understanding of noise metrics and sound level meters for assistance. These include the installation Bioenvironmental Engineer, or AFCEC/CIP.

A7.1.6. Noise Inquiries and Complaints. Not all phone calls or emails about military noise are complaints. Many times people will call or email with an inquiry about a noise event (e.g., questions about an unusual noise event and what caused it). Complaints may be non-specific and result when there is an accumulation of issues that have finally risen to a level that an individual feels they need to make their concerns known to the installation, or they may be about a specific noise event. There are typically two types of callers/writers: 1) those individuals who call routinely letting the installation know that they are not happy with the noise or other activities, and 2) those who call occasionally. The latter typically call when there have been changes to operations or about a specific type of activity that is generating noise. It is important to distinguish between inquiries, and complaints and the type of callers/writers in order to take advantage of any information that the caller or writer may be able to provide. Both are opportunities to inform and learn.

A7.1.7. Documenting Noise Inquiries and Complaints. Documenting all noise inquiries and complaints makes it easier to inform the Commander of public concerns. It is important for the installation commander to be briefed on noise complaints and inquiries so responses can be prepared and possible mitigations explored and implemented if necessary. Many installations have a phone number or hotline dedicated to noise inquiries and complaints. Installation personnel should treat all callers with respect and integrity and assure the individual that a detailed log of their complaint is being recorded and will be reported to the installation commander. It may not always be possible to answer all calls in real time. Calls received but not answered directly by installation personnel (i.e., after hours) should be addressed within 24 hours. When documenting noise inquiries/complaints, gather as much information from the caller about an event or issue as possible because it will make it easier for installation staff to identify trends and patterns. Some bases have their own protocols for

the information collected from callers, but for those that don't, [Table A7.1](#) provides the minimum data that should be collected.

Table A7.1. Noise Inquiry and Complaint Log Information.

Identifying Information	Why This is Important
Name of Installation Personnel Recording Complaint:	To gather follow-up information or clarify.
Date:	To link the noise incident to an activity.
Caller Name, Address, Phone Number:	To resolve the concern after the facts are known and report the outcome.
Location (physical address) of the caller and/or location at time of incident:	To identify the noise source by overlaying flight paths or other spatial data.
Date and time the incident occurred:	To identify the noise source by comparing to training/flight schedules.
Source of the Noise (e.g., aircraft, explosion, sonic boom, vehicle)	To isolate possible sources from the one in question.
Questions to Ask Caller	
How did the noise affect the caller (e.g., startled, interfered with conversation, interfered with ability to hear television or radio, vibrations)?	To better understand the impact, urgency, and staff to notify. It also helps identify the source in that the effects suggest possible causes.
Was there any damage as a result of the event?	To better understand the impact, urgency, and staff to notify.
How many times did the disturbance occur and has it occurred in the past?	To identify the noise source through patterns or trends.
How long did the disturbance last?	To identify the noise source.
Is there any other information about the noise disturbance?	To identify the noise source. Different aircraft sounds have characteristics that can identify them and rule out others.
What were the weather conditions during the time of the incident (e.g., temperature, wind conditions, rainy or dry, hot, humid)?	To identify the noise source Sound transmits differently based on weather conditions, so weather conditions at the location of the incident can help locate the source direction and therefore the source.

A7.2. Responding to Inquiries and Complaints. The Installation Public Affairs Office has the lead for handling these inquiries and complaints; however, input from other installation organizations is often required. No matter who is responding to the inquiries/complaints, the

responses should be as consistent as possible. The installation and community relationship is based on trust. The foundation of that relationship is the public's understanding that the DAF takes all noise complaints seriously and works to adjust operations whenever possible as long as it doesn't create negative impacts on testing and training activities. Our response to inquiries and complaints reinforces their understanding and maintains that trust.

A7.2.1. After the noise inquiry or complaint is logged, the incident should be investigated with the appropriate DAF agency. Wing Operations should review all complaints, and when appropriate, notify the responsible flight or range squadron and identify any deviations from standard procedures.

A7.2.2. In order to promote "good neighbor" practices, installation personnel may choose to meet with the complainant or invite them to visit the installation to improve community relations. This is a particularly useful approach with frequent callers. Effective complaint management and response requires installation personnel to be courteous and interested in the complainant's noise concern. In some circumstances, there may already be accurate information concerning the noise event that has occurred; if so, installation personnel should provide a brief explanation to the complainant.

A7.2.3. Installation personnel should always follow-up with the complainant after the installation commander has reviewed the information and the responsible flight or range squadron has been contacted. Personnel may provide supplementary information and an explanation of the noise event. If changes were implemented because of the noise inquiry or complaint, installation PA should follow-up with the complainant to determine if the issue of concern has been resolved.

A7.3. Identifying Patterns and Trends. You can use data from noise inquiries or complaints to identify patterns/trends, problem areas, or for planning future mitigation of noise concerns. The noise program manager should retain records in accordance with the records disposition schedule. Maintaining long-term records allows the installation to maintain accountability and monitor flight patterns and weapon system use. That results in good management of public inquiries or complaints for future analysis, mitigation, and community relations.

A7.3.1. By evaluating and understanding these patterns, installation personnel may be able to identify strategies to mitigate noise in areas in the surrounding community or sensitive locations. The installation can map noise inquiries or complaints with existing noise contours that extend outside the installation and more easily relate the location of complaints/inquiries with flight tracks (departures, arrivals, pattern work), to identify possible changes in flight operations that might mitigate the public concerns. For example, mapping concerns may show a geographic feature that naturally amplifies or reflects sound. Flight paths might be adjusted to avoid this feature or minimize its effects.

Attachment 8

GEOSPATIAL DATA

A8.1. General. The AICUZ Program is heavily reliant on mapping and other locational or geospatial data to analyze the compatibility of land uses and mission activities. Most of the AICUZ area of influence lies outside the installation and will require the acquisition and use of geospatial data that comes from external sources, as well as DAF generated geospatial data layers. The DAF has developed a suite of AICUZ geospatial data layers, map templates, and guidance to support enterprise program management and analysis (i.e. graduated noise levels, incompatible land use, real property interests, and safety hazards). Other AICUZ geospatial data layers are generated by other federal agencies, tribal, state, and local sources. The standardized AICUZ data and map templates enable simple to complex queries from the tactical to the strategic level in desktop applications. These facilitate integration into broader and more complex enterprise planning and scenarios. All geospatial data used in support of the AICUZ Program must adhere to the latest DoD geospatial data standards, SDSFIE-V 4.0, as maintained by DAF GeoBase Program and AFCEC/CI.

A8.2. AICUZ Geospatial Data Layers. Layers that are created by the DAF or its contractors must follow the geospatial guidance. Feature-classes are available in a point (_P), line (_L), and/or polygon (_A) formats.

A8.2.1. Historic, current, and planning aspects of the DNL/CNEL noise contours-are plotted in 5 dB increments starting with 80 dB DNL and going to 65 dB. Some locations may expand to 60 dB locations. “NoiseZone A” and “NoiseZone L” are areas (or the external boundaries of areas) describing the sound levels attributed to a noise source. The following descriptions come from the spatial data standard provided by the OSD Defense Installation Spatial Data Infrastructure (DISDI) office.

A8.2.1.1. Historic and Current aspects of the CDNL noise contours: are plotted in the following increments: 57-62 dB CDNL, 62-70 dB CDNL, and 70+ dB CDNL.

A8.2.1.2. Historic Peak and Current Peak Noise Contours for Small Arms Ranges: are two contours, 87-104 dB Peak, and >104 dB Peak.

A8.2.1.3. Safety Zones (to include Clear Zones, APZs I and II): AirAccidentZone_A are areas at the end of runways or beneath approach and departure flight paths where there is a higher potential for aircraft accidents. Clear zones are areas immediately beyond the end of the runways with a high potential for accidents.

A8.2.1.4. Hazards to Aircraft Flight Zone (defined by the airfield imaginary surfaces): AirfieldImaginarySurface_A include the hypothetical surfaces above and around an airfield where there are height restrictions that prohibit obstructions to navigable airspace. These surfaces include approach zones, transition zones, etc.

A8.2.1.5. Line of Sight/Look Angle Zone: RadarEquipment_A and RadarEquipment_P are feature-classes that locate equipment used for determining the presence and position of an object by measuring the direction and timing of electromagnetic waves.

A8.2.1.6. Non-Conforming Uses with Airfield Criteria (location of obstructions within the HAFZ): AirfieldObst_P is feature-class whose height intrudes into navigable airspace.

A8.2.1.7. Primary Flight Tracks (to include departure, arrival and closed pattern): are displayed in the MilFlightTrack_L feature-class. This includes flight paths in and out of the airfield traffic area on the installation. MilTrainingRoute_L – Layer contains Low level military training airspace. Flights Regulations governing the airspace are conducted under either Instrument Flight Rules (IFR) or Visual Flight Rules (VFR). The airspace is classified as IFR Military Training Routes (IR), VFR Military Training Routes (VR), or Slow Speed Military Training Route (SR). MilLocalFlying_A is airspace in the local area to an installation that supports routine, training activity. These areas are normally developed in conjunction with local FAA controllers and airspace managers and are de-conflicted with other airspace such as Class B, C, or D airspace or Special Use Airspace (SUA). Note: Primary Flight Tracks are separate from SUA and MTRs.

A8.2.1.8. Real Property Interests (restrictive use easements/aviation easements): LandUseControl_A are locations where land use is restricted due to environmental restoration or compliance purposes.

A8.2.1.9. Development Proposals Reviewed by the Base: FutureProjects_A and FutureProjects_P are locations used to represent construction projects, tasks, or activities that are designated to occur at a later date.

A8.2.1.10. Existing Incompatible Land Uses within the Clear Zones and APZ I and II: IncompatibleLandUse_A displays current or future specific land use deemed to be incompatible based on aircraft operations, including but limited to noise contours, accident potential zones, and/or height restrictions.

A8.2.2. Externally generated AICUZ geospatial data layers include:

A8.2.2.1. The Current Zoning Map: is used for land use compatibility analysis in the AICUZ Study and utilizes the LocalGISDataAreas feature-class. This is a forward-leaning map of potential construction. Local data in this map may include, but is not limited to, land uses allowed by right or possible by exception, locations of approved building permits for construction; the boundaries of neighborhoods, housing subdivisions and housing communities; conditional and ancillary uses; occupational density; characteristics of the activities in the zones (Performance Zoning); and references to Bulk Regulations (size of buildings in relation to their lot sizes (Floor-Area-Ratio) and Build Restriction lines). Keep the data in its native format and provide documentation for the source of the data, contact information, and battle rhythm for updates so the latest version can be downloaded as revisions are made by the data steward.

A8.2.2.2. The Current Land Use Map: is used for land use compatibility analysis in the AICUZ Study. LandUse_A is the way land is developed and used in terms of the types of activities allowed (e.g., airfields, farming, buildings, forest, hunting, recreational, etc.). Where the Current Zoning Map is aspirational about the community's goals for development, the Current Land Use Map documents how the area has been built.

A8.2.2.3. The Future Zoning Map: is used for land use compatibility analysis in the AICUZ Study. LocalGISDataAreas is a placeholder for local GIS/geospatial data. The Future Zoning Map is the implementation tool for a Comprehensive or General Plan. It communicates changes to the current zoning that reflect the community's vision for its future.

A8.2.2.4. Future Land Use Map: is a component of a Comprehensive Plan used to communicate land use goals to residents and developers. FutureProjectsLandUse_A is the layer name.

A8.2.2.5. Local Planning Area Maps: is used to facilitate conversations with the local planning department. LocalGISDataAreas is a placeholder for local GIS/geospatial data. Local data in this map may include, but is not limited to, locations of approved and/or executed building permits for construction; the boundaries of neighborhoods, housing subdivisions, and housing communities within 10 miles of the installation complex; and land sales. Keep the data in its native format and provide documentation for the source of the data, contact information, and battle rhythm for updates so the latest version can be downloaded as revisions are made by the data steward.