REGION 9
SAN FRANCISCO, CA 94105

November 12, 2024

Grace Keesling
NEPA Program Manager, EIAP/NEPA Division (AFCEC/CIE)
Department of the Air Force
Joint Base San Antonio-Lackland Texas 78236

Subject: Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona Draft Environmental Impact Statement (CEQ/EIS No. 20240140)

Dear Grace Keesling:

The U.S. Environmental Protection Agency has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act (CAA). The CAA Section 309 role is unique to EPA. It requires EPA to review and comment on the environmental impact on any proposed federal action subject to NEPA's environmental impact statement requirements and to make its comments public.

The Air Force proposes to modify Special Use Airspaces throughout Arizona and a small portion of western New Mexico to allow for more low-elevation flight training. The Proposed Action would lower the floor of additional airspace to 100 feet for subsonic training and in several Military Operations Areas (MOAs), to 5,000 feet for supersonic training (currently operating at 30,000 feet). The Proposed Action also would extend the times of most MOA activities until midnight; would adjust the horizontal dimensions of some airspace; and would allow for use of chaff and flares at lower altitudes.

Review Summary:

EPA identified public health, welfare, or environmental quality concerns in the analysis that we recommend be addressed in the Final EIS. Specifically, the assessment of noise does not adequately evaluate noise impacts since it uses an inappropriate methodology/significance criterion for the project's noise emissions, which we had recommended against in our scoping comments. A more appropriate measure of noise impacts is essential to achieve NEPA's mandate to disclose impacts to decision-makers and the public.

We have recommendations to improve the impact assessment in our attached detailed comments but recommend the Air Force consider a less impacting alternative that will not subject such a large area to very loud and sudden noise effects, which could have health and safety implications. We recommend the smallest possible area be selected for additional airspace at the very low 100-feet elevation floor,

due to the very high noise levels associated with overflights at this low elevation, which already occurs in 2 MOAs. If Tombstone MOA is lowered to 100 feet as proposed, we recommend the inclusion of avoidance areas to reduce the potential for overflights over communities with environmental justice concerns, children's learning centers, and sensitive wildlife species, and that communications be established to monitor the effects of these very low overflights. We have concerns regarding the lowering of supersonic training from 30,000 feet to 5,000 feet for several MOAs, with no mitigation identified for noise or structural impacts. We recommend the option to reduce floors to 10,000 ft under Alternative 4 for supersonic training, and minimizing the number of MOAs where this would occur. We also recommend restructuring the impact assessment for natural/biological resources and evaluating additional data sources to provide more updated information.

EPA appreciates the opportunity to review the DEIS for the Regional Special Use Airspace Optimization to Support Air Force Missions in Arizona. Should you have any questions regarding this letter, please contact me at (415) 972-3629, or contact Martin Nguyen, the lead reviewer for this project, at 415-972-3590 or nguyen.martin@epa.gov.

Sincerely,

FRANCISCO DONEZ

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Francisco Dóñez
Manager
Environmental Review Section 2

Enclosure: EPA's Detailed Comments

cc: Kristi Regotti, FAA, NEPA Project Manager
Deena Lentz, NPS, Regional Environmental Coordinator
Wendy Ho Jaskins, USFS, Director
Tracy Bazelman, AZGFD, Regional NEPA Planner

NOISE IMPACTS

Impact Assessment Methodology

Metrics and significance thresholds

The impact assessment methodology underestimates noise impacts and their significance. The metric used to drive significance conclusions in the DEIS is the "Day-Night Average Sound Level (DNL), which averages short-lived but very loud aircraft overflight noise with long ambient quiet periods.[1] The result provides a low decibel estimate that is not representative of what people hear or experience. While the use of onset-rate adjusted DNL (Ldnmr) attempts to weigh the value to account for the "surprise factor", the adjusted DNL values are not appreciably different from DNL. These values are compared with the significance threshold of 65 dB DNL from the consolidated Federal agency land use compatibility guidelines, which deem noise levels below 65 dB DNL as generally compatible with residential and public/recreational land use (p. 3-27).[2] While this methodology is acceptable for noise assessments *where the noise is relatively steady*, such as patterned or continuous noise environments associated with airfields, for this action involving extremely loud but highly sporadic activity in special use airspace, it is an inadequate methodology to gauge the magnitude and significance of noise from low altitude overflights within Military Operations Areas.

The noise significance criteria identified for the FAA also relies on DNL and has the same limitations, but provides better disclosure since it identifies changes in noise levels. According to the DEIS, the FAA criterion for areas with existing noise between 45 and 60 dB DNL, deems a 5 dB increase to be "reportable." We note that several areas have existing noise levels below 45 (Table 3.4-14). The DEIS states "The FAA recognizes that there are settings where the 65 dB DNL standard for land use compatibility may not apply. These areas would likely be areas of extreme quiet, very rural areas, or natural areas with little human activity, such as wilderness areas or other protected natural areas" (p. 3-28). The project setting is a rural area of extreme quiet containing wilderness and protected areas, thus the land use compatibility guidelines; thus the current impact assessment methodology and significance criteria are not appropriate. Conclusions of "not significant" in Table 3.4-14 should reflect the existing setting of extreme quiet, as well as FAA's acknowledgement that the conditions are such that the residential and public/recreational land use criteria are not appropriate in this case.

> ***Recommendation:*** We recommend disclosing all "reportable" impacts in Table 3.4-14 and elsewhere as significant noise effects. It is implausible that a quadrupling of perceived noise[3] (4 times louder), even using the flawed DNL metric, would not be considered significant by sensitive receptors. We recommend significance determinations include supplemental metrics, which the DEIS indicates can provide supplemental information but are not significance indicators (p. 3-29). Explain in the FEIS why these more appropriate metrics are not being used to assess significance considering that the rule of reason, inherent in NEPA, necessitates that agencies use common sense and reason when evaluating the environmental impact of a

[1] The analysis uses C-weighted DNL for sonic booms which has the same limitation, being an averaging metric.
[2] Federal agency land use compatibility guidelines at: https://www.faa.gov/sites/faa.gov/files/reports_noise_analysis.pdf
[3] A possible increase near 20 dB represents a quadrupling of perceived noise.

proposed action and are expected to use their expertise to analyze the effects based on the specific circumstance and not simply apply a rigid set of rules.

Additional metrics – sleep disturbance

Sleep disturbance is not evaluated in the DEIS. The proposed action would have hundreds of additional flights both in the evening and after 10pm (Tables 3.4-9 and 3.4-13) with half of the MOAs expanding their usage to midnight (Table 2.1-1). Noise-induced sleep disturbance is considered the most deleterious non-auditory effect of environmental noise exposure.[4] The DEIS does not discuss this impact except to say it is included in the DNL metric and refers the reader to Table 3.4-2 that shows the relationship between annoyance and DNL. This is not sufficient disclosure for such an important impact as sleep disturbance, especially since it affects health.

> ***Recommendation:*** Using Lmax and Sound Exposure Levels (SEL), discuss sleep disturbance and the potential for awakenings for residents that would experience nighttime low-altitude flights under the MOAs. Identify how these effects could impact quality of life and health. Additionally, the EPA recommends Table 3.4-2 depicting the relationship between annoyance and DNL be updated with values from the FAA's new National Curve.[5]

Overflight probability estimates

We appreciate the efforts made to try to predict the probability of low-altitude (100 and 500 ft above ground) overflights in the MOAs (Table 3.4-6), since they are highly variable in occurrence and location; however, it appears that the overflight probability methodology may have inaccurate assumptions. According to the DEIS, the methodology calculates the area covered by a flight during its low altitude leg and uses "the ratio of that area to the area of the MOA" to calculate "the likelihood of any particular area experiencing that overflight event" (p. 3-32). The DEIS notes that this method of calculation assumes a randomized, even distribution of flights throughout the MOA's, and the resulting probability of direct overflight for any particular area relies on the area of the MOA. While this method of calculation predicts the probability of direct overflight for any given area on a conceptual basis, the EPA notes that people are not randomly distributed throughout the MOAs, and that population centers, Tribal reservations, and schools exist in congregated areas, with many concentrated along major roads.[6] Furthermore, considering USAF's protocols for avoiding direct overflight of populated areas,[7] aircraft ingress and egress locations tied to specific locations at Davis Monthan AFB, Luke AFB, and Morris ANGB, and the military training routes identified in Appendix H, Section 2.3.3, training flights throughout the MOAs would not be randomly distributed, and the probability of overflight over some areas may be higher than calculated in the DEIS, potentially exposing those that live in these

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[4] Aviation Noise Impacts: State of the Science. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5437751/?report=printable

[5] Neighborhood Environmental Survey. Available: https://www.faa.gov/regulations_policies/policy_guidance/noise/survey

[6] According to NEPAssist - https://nepassisttool.epa.gov/nepassist/nepamap.aspx

[7] The DEIS identifies USAF's protocols for avoiding direct overflight of populated areas and individuals, where an "aircrew would avoid congested areas, such as a city, town, or settlement, or open-air assembly of people, by a minimum of 1,000 feet above the highest obstacle within a radius of 2,000 feet in accordance with 14CFR 91.119" and that aircrews would also "avoid overflight of persons, vehicles, or structures while flying in uncongested areas by 500 feet in accordance with CFR91.119" (p. 3-30). Additionally, recommendations defined in the FAA Aeronautical Information Manual (paragraph 7-5-6) concern National Parks, Monuments, Seashores, Lakeshores, Recreation Areas, and Scenic Riverways, National Wildlife Refuges, Big Game Refuges, Wildlife Ranges, Wilderness Areas and Primitive Areas (p. App F p. D2-5).

areas to high noise levels (L_{max} and SEL values) with more frequency than the model predicts. We also note that explicitly disclosing the probability percentage of an overflight of 100 or 500 ft in all of the MOAs in the *text discussion,* as well as in the tables, would help interpret the data in Table 3.4-6 for the reader; for example, the DEIS text identifies the probability of an overflight at 500 ft. AGL in the Jackal Low MOA only. Including this text description for the other MOAs would allow people living there to know what to expect.

> ***Recommendation:*** In the FEIS, we recommend that the analysis of the probability of low altitude overflights use the most probable flight paths, factoring in avoidance areas, points of origin, military flight paths identified in Appendix H and other factors that would serve to direct flights along certain paths. This would evaluate the probable flight path as opposed to a less likely random and even distribution of flight paths. We also recommend the FEIS discuss how probabilities for receptors on the borders of an MOA are affected and captured under the methodology.
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> Additionally, the EPA suggests disclosing overflight probability for the other MOAs in the text, as was done for Jackal Low MOA, to clearly present DAF's conclusions for the public. We also suggest identifying the probability of overflight for representative points of interest such as concentrated population areas, Tribal reservations, and schools, and not just by MOA, in Table 3.4-6. Also see environmental justice comment below.

Noise impacts on hearing

The potential for hearing loss was not sufficiently evaluated. The DEIS uses DNL estimates to conclude that no noise-induced hearing loss would occur because no person or place beneath any of the training airspace associated with this EIS would be exposed to noise levels greater than 80 dB DNL (p. 3-24). As we discussed above, DNL is not appropriate in the MOA context since it averages sporadic but very loud noise from low-altitude overflights with long very quiet ambient periods. For the assessment of hearing loss for this action, it would be appropriate to use maximum noise levels (Lmax). For cumulative exposures, Sound Exposure Levels (SEL) is the appropriate metric for single aircraft flyovers, not DNL.

There are several sources that indicate that even a small number, possibly even one exposure, at a high Lmax could cause hearing loss. The Lmax levels predicted to occur under the alternatives range from 124 dB Lmax to 131 dB Lmax (Table 3.4-3 through 5). The Air Force previously disclosed that noise in low-altitude military airspace, especially where Lmax can exceed 115 dB, "is of concern."[8] At least one 1999 study concluded that events with Lmax greater than 114 dB have the potential to cause hearing loss.[9] The USAF's Occupational Noise and Hearing Conservation program[10] establishes a maximum sound level of 115 dBA, over which any exposure duration is forbidden for unprotected workers, indicating consideration for the potential to harm hearing at this level and above.

[8] Noise Supporting Document for *Airspace Optimization for Readiness for Mountain Home Air Force Base Environmental Impact Statement*. p. 32.

[9] ibid

[10] Occupational Noise and Hearing Conservation Program, : https://static.e-publishing.af.mil/production/1/af_sg/publication/afi48-127/afi48-127.pdf Tables A2.1 and A2.2

According to the National Institutes of Health, loud noise exposures can also cause tinnitus—a ringing, buzzing, or roaring in the ears or head.[11]

> ***Recommendation:*** Discuss the potential for temporary and permanent threshold shift (hearing loss) from exposure to the very high noise levels identified in the DEIS, including residual long-term damage to hearing even after recovery from temporary loss (temporary threshold shift). Disclose the possibility that this could occur from one or very few exposures. Identify representative points of interest within the most impacted MOAs where this could occur. Indicate whether flight paths that avoid sensitive receptors can be identified. Discuss other auditory affects such as tinnitus.

Startle effects from sudden noise

The DEIS does not disclose the full effects resulting from the "surprise factor" associated with rapid onset low-altitude flights. For example, the sudden loud events can disrupt occupational activities, some requiring precision, and startle effects can be hazardous to workers.[12] In addition, noise levels associated with the action, specifically Lmax noise levels of 124 dB Lmax and above, can cause momentary pain.[13]

> ***Recommendation:*** Disclose in the FEIS that the project effects could cause pain to individuals if exposed to higher noise levels. Discuss how startle effects to rural communities and workers could cause health and safety risks.

Nonauditory health impacts/Environmental justice

Potential non-auditory health impacts from noise exposure are dismissed, with the DEIS stating on page 3-29 that:

> "The current state of scientific knowledge cannot yet support inference of a causal or consistent relationship between military aircraft noise exposure and non-auditory health consequences for exposed residents. The results of published studies of aircraft noise on human health are unclear. *There is no scientific basis* [italics added] for concluding that aircraft noise has a negative non-auditory health impact"

We strongly disagree that there is no scientific basis connecting aircraft noise and non-auditory health impacts; there is sufficient information supporting non-auditory health effects from noise to disclose this potential health effect. A 2017 literature review by the International Civil Aviation Organization titled "Aviation Noise: State of the Science" which presents the consensus of experts who have considerable experience in noise effects research, compiled dozens of peer-reviewed articles and consulted an international expert panel, concluded that there is a "good biological plausibility by which noise may affect health in terms of impacts on the autonomic system, annoyance and sleep disturbance," and that "studies are suggestive of impacts on cardiovascular health especially hypertension." Mental health effects have also been suggested.[14] While there is uncertainty in non-

[11] https://www.nidcd.nih.gov/health/noise-induced-hearing-loss#

[12] Ibid, p. 3-75

[13] *Airspace Optimization for Readiness for Mountain Home Air Force Base Environmental Impact Statement,* p. 3-45

[14] [14] Goines, Lisa RN and Hagler, Louis MD. 2007. "Noise Pollution: A Modern Plague", *Southern Medical Journal*: Volume 100 - Issue 3 - pp 287-294.

auditory health studies, it is not sufficient to dismiss these findings or characterize them as having no scientific basis.

> ***Recommendation:*** Disclose the physical and mental health impacts that have been linked to the high project noise levels identified in the EIS. Include the unique impacts on health from the startle effect of sudden onset noise, including on individuals with pre-existing physical and mental health (i.e. post-traumatic stress disorder) conditions. Identify that all of the counties underlying the MOA's have service areas that are designated as "medically underserved areas"[15] and how this might affect the ability for affected individuals to receive care and thus exacerbate any potential health effects. Include this latter information in the environmental justice discussion.

Environmental justice/Ongoing communications

The DEIS notes that there exist communities of environmental justice concern in the MOAs (Section 3.9.2) but indicates that "the training within the MOAs is not expected to occur in any one location on a repetitive basis; therefore, no population would be exposed to a disproportionate number of overflights and the associated impacts from those overflights" (p. 3-122). We expressed our concerns with this assumption above, in light of exclusion areas and other constraints, and unless flight lines are tracked and monitored, it appears some areas may experience repetitive overflights, especially in the smaller MOAs. It is not clear what kinds of specific outreach to communities with EJ concerns has occurred, but it appears that ongoing communication is needed to understand the kinds of impacts these communities would be experiencing, especially to understand how these high and sudden noise impacts affect these specific communities. These mostly rural and tribal communities may have specific existing conditions where the addition of these impacts could prove more burdensome, such as the medically underserved status identified above. Without meaningful outreach, the Air Force cannot know what these specific conditions are, in order to assess environmental justice impacts.

> ***Recommendations:*** We recommend the Air Force develop or explain any ongoing means of communication with the public underlying these low-altitude flight areas. We strongly suggest having a clear communication strategy that also receives input from the public, particularly complaints and experiences of repetitive flyovers. This monitoring and communication/reporting system can be used to solicit the experiences of individuals, communities and schools in these areas, which can then be used to adaptively manage the flight elevations and routes to minimize noise impacts to those most affected. It can also be used to communicate information on DoD's new noise mitigation program to the public.[16] We recommend the Air Force develop a reporting/communication system, and that the FEIS identify this as an adaptive management/mitigation strategy in the Proposed Action.

Supersonic noise impacts

According to the DEIS, the proposal could cause substantial structural impacts from sonic booms (Table 3.10-1) but the impact assessment does not recognize these nor propose to mitigate them. First, the DEIS does not clearly define FL300 (flight level 300). The reader must go the appendices to learn that it is equal to 30,000 feet. Therefore, all of the tables showing changes in flight elevation from FL300 to

[15] https://data.hrsa.gov/tools/shortage-area/mua-find
[16] https://oldcc.gov/our-programs/community-noise-mitigation-program

5,000 feet or 10,000 feet, depending on the alternative, are unclear and risk concealing the magnitude of change being proposed regarding supersonic operations.

The Proposed Action and alternatives would substantially lower the supersonic floor, which would result in higher sonic boom exposure levels throughout much of the airspace, an impact that is additive to subsonic noise impacts but also has the potential to cause structural damage. The noise impact conclusions for sonic booms suffer from the same inadequate methodology described above for subsonic noise (use of DNL metric and land use compatibility guidelines) and is therefore equally ineffective to predict severity of noise impacts and annoyance. The following comments focus on structural impacts.

Currently, sonic booms generated at existing flight elevations of 30,000 feet would not be as audible when reaching the ground due to the longer distance shock waves would need to travel (p. 3-25). The alternatives would lower the supersonic floor from 30,000 feet to 5,000 feet above ground level (Alternative 2 and 3) or 10,000 feet AGL (Alternative 4) for Tombstone, Outlaw, Jackal, Morenci, and Reserve MOAs, which would substantially increase the likelihood of the booms hitting the ground and intensify the impact to a smaller area with higher boom intensity. Focus booms, which the DEIS states are rare since they occur when a jet turns during supersonic flight and are usually avoided because of the stresses placed on the aircraft (p. 3-34), would increase overpressures to 2 to 5 times the magnitude of the steady-state sonic boom predictions. The DEIS does not indicate the training requirements that necessitate turning during supersonic flight; this information is needed to understand the possibility of this much larger sonic boom effect.

Focus booms aside, the DEIS indicates that "Some degree of damage to glass and plaster" should be expected whenever there are sonic booms (p. 3-134). Table 3.10-1 provides general descriptions of the type of damage that is possible with the predicted maximum overpressures of 8.3 and 9.4 pounds per square foot (psf).[17] For between 4-10 psf, substantial damage is predicted, including regular failures of glass and roofs, and substantial increases in wall and ceiling plaster cracking. The DEIS notes that structures in good condition will fare better, but does not consider the disadvantaged communities and low-income residents in a number of counties under the MOAs. The Air Force uses a 10 psf threshold for significance without explanation and, in contradiction to the information in Table 3.10-1, concludes that "In general, structural damage from sonic booms should be expected only for overpressures over 10 psf" (p. 3-34). No mitigation measures are proposed or deemed necessary by the Air Force (p. 3-56, p. 3-118). We strongly disagree.

> ***Recommendation:*** Replace all 28 instances referring to FL300 in all tables and text to 30,000 feet in the FEIS. Identify the training requirement that necessitates turning during supersonic flight to substantiate and estimate the rarity of this activity.
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> Reassess the significance of potential impacts to underlying structures from maximum overpressures of 8.3 and 9.4 psf. Discuss how these risks could affect the homes of disadvantaged and low-income individuals and communities.

[17] At the proposed minimum altitude (5,000 feet AGL), an F-16C could produce a maximum overpressure of 8.3 psf (an increase of 6.7 psf), and an F-35A could produce a maximum overpressure of 9.4 psf (increase of 7.6 psf over existing conditions) (p. 3-48).

Commit to mitigating sonic boom overpressure impacts by disclosing a way for those affected to report to the USAF their damages and compensating them in equal measure. Ensure aircraft maneuvers that could generate focus booms do not occur around known structures, including historically significant structures or structures associated with traditional cultural properties identified by local tribes. Provide additional information in the FEIS regarding the damage claim process, the level of difficulty attributing damage to Air Force actions, and the percentage of claims that have been granted in the past, per CEQ guidance.[18] Describe how claim procedures will be communicated to the public.

Natural Resources / Biological Resources

The assessment of noise impacts to wildlife is flawed because it uses the conclusions of less than significant noise impacts based on an impact assessment methodology using DNL (p. 3-79), which, as we describe above, does not represent impacts unique to this project noise setting. To then apply a noise metric that averages noise over a year to animals is erroneous, as it does not account for species-specific hearing capabilities.

We appreciate the literature review of some noise studies on different animals but note that many of the studies are quite old. The National Park Service (NPS) prepared a synthesis of studies of the effect of noise; the resource report representing a summary of their results from their systematic annual query of the literature is here: https://www.nps.gov/articles/effectsofnoise.htm. The graph in Figure 2 on that website shows the number of peer-reviewed studies published each year from 1978-2023 documenting the effects of noise and clearly shows wildlife studies occurring since 2000. The NPS also has a searchable spreadsheet of the literature on noise which may be available for the Air Force's use. In general, the presentation of noise impacts to animals could benefit from a different structure in the FEIS. We provide our recommendations below.

Recommendations: Remove conclusions of wildlife impacts from noise that rely on DNL, which was designed for humans.

We recommend the FEIS include a table that lists the animal receptors in a column on the left, with other columns detailing (1) the studies on that particular species for loud intermittent and impulse noise relevant to the project, (2) information known about hearing sensitivities (frequencies) and ranges, and (3) time periods where noise could be more impactful, such as during breeding and nesting.

We recommend consulting with the NPS to obtain the most recent wildlife noise studies. We also recommend consultation with the New Mexico Game and Fish and Department and Arizona Fish and Game Department to gain their expertise. We note that where studies are lacking, strong consideration should be given to conducting studies of impacts, in consultation with the State Fish and Game agencies. For example, the Navy at Naval Air Station Fallon

[18] CEQ's 40 Most Asked Questions, # 19b indicates that to ensure that environmental effects of a proposed action are fairly assessed, the probability of the mitigation measures being implemented must also be discussed. The EIS and the Record of Decision should indicate the likelihood that such measures will be adopted or enforced by the responsible agencies. If there is a history of nonenforcement or opposition to such measures, the EIS and Record of Decision should acknowledge such opposition or nonenforcement.

funded a study to assess greater sage grouse reactions to aircraft overflights to support their partnership with the State of Nevada Department of Wildlife.[19]

[19] See 2020 Record of Decision at https://www.frtcmodernization.com/Documents.