Noise Research

Research Update with Focus on Out Year Planning

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Federal Aviation Administration

Community Noise from Aircraft

Aircraft Noise





Today's Situation

- Aircraft noise from 1970s is different than aircraft noise today. Aircraft from 1970s produced the same acoustic energy as 10 to 30 aircraft operations today.
- A few, but relatively loud, events in 1970s would result in DNL 65 dB. Many, relatively quiet events today would also result in DNL 65 dB. However, noise experience would be very different.
- Precision navigation is being implemented to increase the safety and efficiency of the NAS. It also leads to a reduction in the overall number of people exposed to noise from aircraft operations.

Source





Current Noise Challenge

- Interest by the Public and Congress in re-evaluating NEPA Significance Levels
- Potential increase in noise provisions in Reauthorization
- Interest to accelerate the reintroduction of civil supersonic flight
- Expansion of the use of UAS
- Helicopter noise concerns
- Public interest in noise associated with new projects
- Public interest in reducing existing noise
- Interest in mitigation and abatement
- New vehicles emerging with little understanding of potential noise impact (Urban Air Transport, auto-gyros, electric aircraft, ???)



Addressing the Aircraft Noise Challenge

Understanding the Impact of Noise

- Noise impacts: annoyance, sleep, cardiovascular health and children's learning
- Improving modeling capabilities
- Evaluating current aircraft, helicopters, commercial supersonic aircraft, unmanned aerial systems, and commercial space vehicles

Outreach

- Increase public understanding
- Community outreach

Mitigation

- Land use planning
- Vehicle operations
- Airframe and engine technology
- Aircraft architecture



http://www.faa.gov/go/aviationnoise

FICAN: Research Review of Selected Aviation Noise Issues https://fican1.files.wordpress.com/2018/04/fican_research_review_2018.pdf ICAO CAEP Environmental Report: Aviation Noise Impacts: State of the Science: http://www.icao.int/environmental-protection/Pages/env2016.aspx



Research Areas on Noise Impacts

Annoyance

- Conducted a community survey to provide scientific data to quantify the relationship between annoyance and DNL for communities around airports
- Will be used to re-analyze the noise significance threshold criteria under the National Environmental Policy Act and federal land use guidelines

Sleep Disturbance

- Finalizing last field study report
- Began developing Information Collection Request paperwork to conduct a national sleep study
- Determine what, if any, impact aviation noise has on sleep

Cardiovascular Health

- Associating historic, modeled noise levels with existing epidemiological studies
- Determine what, if any, correlation exists between cardiovascular disease and aviation noise

Children's Learning

Determining next steps in the research



Research on New Entrants

• UAS/UAT

- Certification considerations
- If/how consider potential impacts
- Ensure public has an understanding of noise levels
 - How best to disclose
 - National Environmental Policy Act considerations

Commercial Space

- Validation of models using measured data*
- Working with Office of Commercial Space
 - Identify gaps in NEPA guidance
 - Refining a research roadmap
 - Develop guidance on elements such as recommended impact criteria and supplemental noise analysis

Supersonics

- Will be covered later in the meeting



Certification Challenges

- Many new vehicles being introduced
 - Decisions on whether and how to set noise standards
 - Separate from airworthiness requirements?
 - Current regulations are stove piped for specific aircraft and not flexible enough to account for emerging ideas
- Increased coordination needed for Implementing Procedures for Airworthiness
 - Demonstration of capabilities by other authorities needed
 - Ability for equivalencies for noise increases complexity
- Agency move towards risk based certification and organizational delegation
 - Can we translate risk based meaningfully for noise?
 - How to ensure consistency and mutual acceptance with other national authorities given delegation?



2025 Goals for Noise (1 of 2)

Certification

- Create Flexibility to account for emerging types
- Ensure harmonization on implementation with international partners
- Expansion of organizational delegation authority

Modeling

- Refine inputs to AEDT to allow for streamlined analysis
 - Review use of annual average day and need for guidance
 - Standardize radar input
 - Expand fleet coverage and expand/enhance NPDs
 - Review of weather assumptions
- Ensure capabilities to model UAS, UAT, and commercial space operations appropriately exists



2025 Goals for Noise (2 of 2)

Impacts

- Research has matured to identify needs for policy and guidance considerations
 - Annoyance (helicopter and fixed wing)
 - Sleep
 - Cardiovascular health
 - Children's Learning

Mitigation

- Expand the "Toolbox"
 - Operational Improvements
 - Fleet Considerations
 - Local Authority Expansion
- Provide FAA information needed to inform, educate and collaborate with communities across the nation regarding aviation and the environment



FY2020 and FY2021 Goals (1 of 2)

Certification

- Reach mutual agreement with EASA regarding on the Environmental Approvals Team for the certification
- Develop draft certification requirements for civil supersonic aircraft, UAS, and Urban Air Transport (UAT)

Modeling

- Complete LTO modeling needs for supersonic aircraft to incorporate into AEDT
- Complete takeoff/climb analysis for AEDT APM enhancement
- Analyze and implement methods to account for noise effects of hard ground surfaces such as water
- Update AEDT Helicopter Fleet with data from 2017/2018 data collection
- Evaluate the ACRP Noise models for commercial space and develop additional requirements if needed



FY2020 and FY2021 Goals (2 of 2)

Impacts

- Complete cardiovascular health noise impact research
- Continue sleep research data collection
- Complete data collection for the helicopter annoyance study
- Complete review of DNL and continue review of other appropriate metrics

Mitigation

- Complete Helicopter Fly Neighborly Community Engagement Pilot Program
- Develop Helicopter Noise Abatement procedures for light and medium helicopters
- Expand understanding of mitigation strategies beyond sound insulation



Summary

- Noise continues to be a concern
- Many initiatives underway to address noise from multiple aircraft types
- Many areas of research are emerging or are being identified as a priority with steady (or reduced) resources, which is challenging





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