

Environment - Aircraft Noise and Impacts

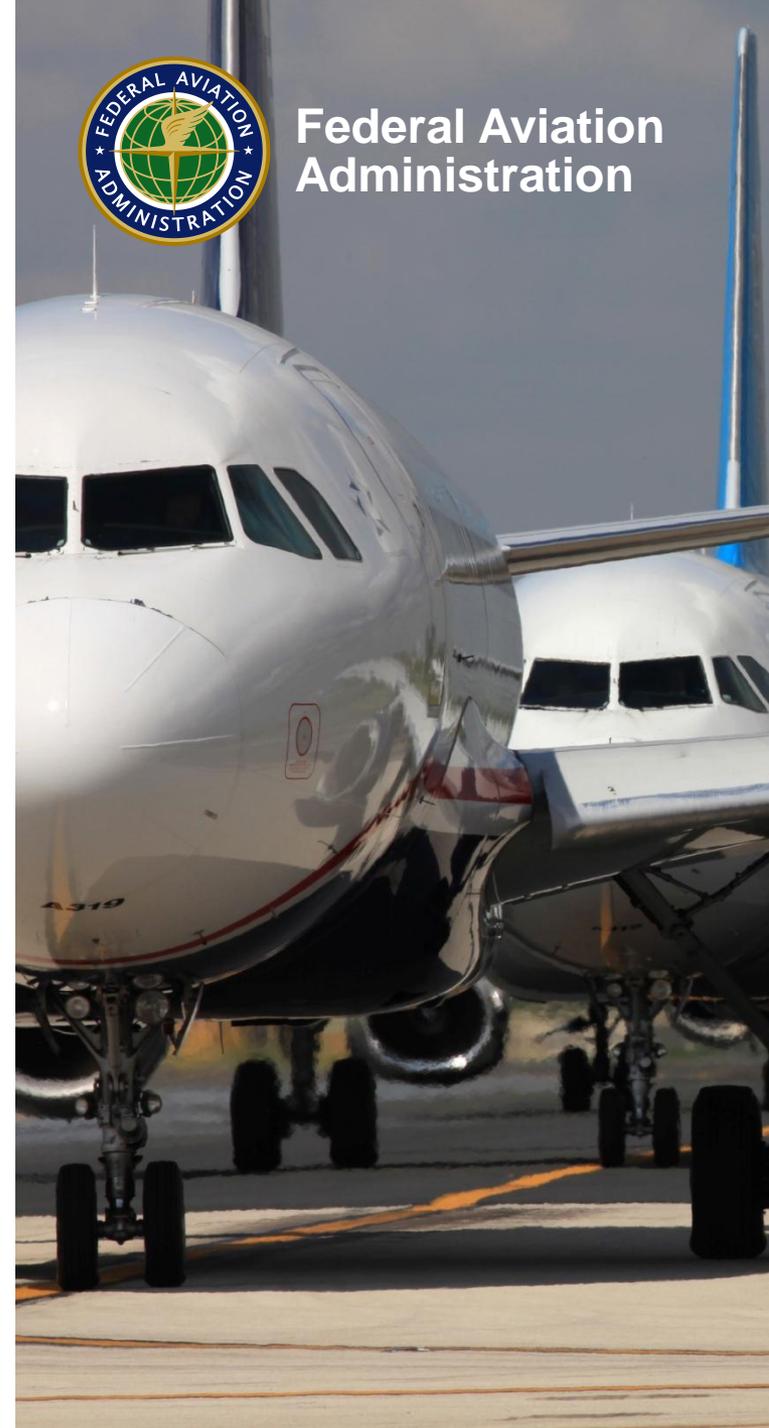
Presented to: Public Meeting for Center of Excellence
for Alternative Jet Fuels and Environment

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Date: November 15, 2012



Federal Aviation
Administration



Important Drivers of Research

- **Destination 2025 goal**
 - Community noise concerns are not a significant constraint on growth
 - Reduce the U.S. population exposed to significant aircraft noise around airports
- **Even though aviation noise has decreased over last 30 years, opposition and challenges regarding aviation noise have not**



Critical Research Considerations

Our Concerns

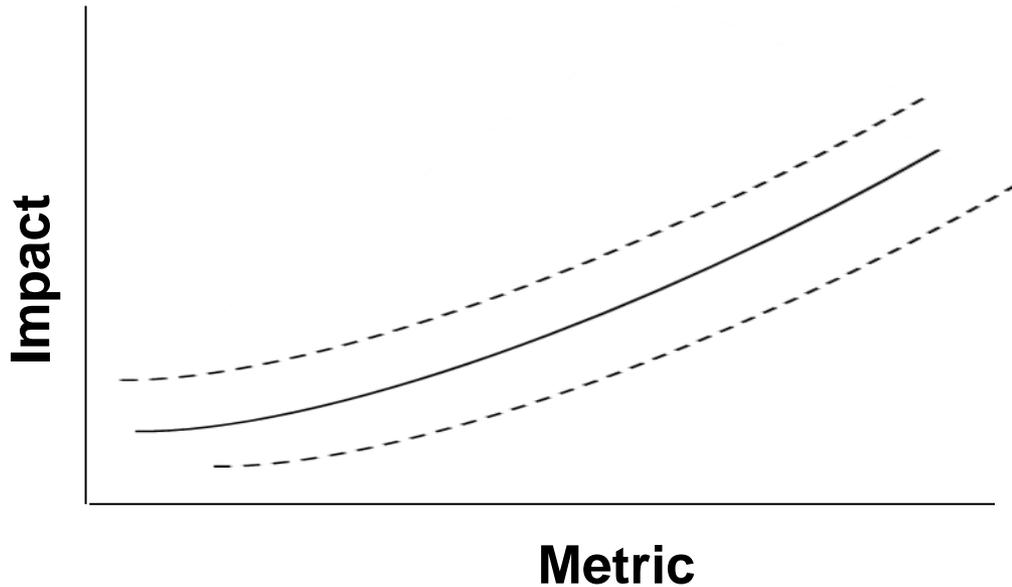
- Community Noise from Subsonic Fixed Wing Aircraft
- Community Noise from Helicopters and Tiltrotors
- Overflights over National Parks
- Overflights of Supersonic Aircraft over Land
- Unmanned Aerial Systems

Key Drivers

- Annoyance
- Certification (for all aircraft types)
- Health impacts
- National Environmental Policy Act (NEPA) compliance



Goals of Research Roadmap



Timeframe	Metric	Impact	Work
Current	DNL	% Highly Annoyed	
Near-Term	DNL	% Highly Annoyed	ACRP 02-35 and Aircraft Noise and Annoyance Study
Far-Term	?	?	Additional Research



Research by Impact Pathway

- **Source**
 - Subsonic Aircraft
 - Supersonic Aircraft
 - Helicopter/Tiltrotor
 - Unmanned Aircraft Systems
- **Propagation**
 - 0 to 10,000 feet
 - 10,000 feet to 30,000 feet
 - Above 30,000 feet
- **Population Exposure**
- **Structural Transmission**
- **Land Use Planning**
- **Dose and Metric**
 - Health
 - Children's learning
 - Sleep
 - Impact on Wildlife
 - Community Annoyance
 - National Park annoyance
 - National Park audibility
 - Sonic boom
 - Low Frequency Noise



AEE Efforts to Meet Noise Goals

- **Research:** explore methodologies, concepts, and ideas
- **Data:** collect data to support research
- **Tools:** implement methodology or necessary metrics in tools to support data and research
- **Policy:** create necessary policy to support data
- **Mitigation:** determine if mitigation is needed, if so, foster development of technology, operation, and/or policy



Technical Areas of Interest (Slide 1 of 5)

- Characterize the noise from a variety of subsonic aircraft, including but not limited to helicopters, tilt-rotor aircraft, unmanned aerial systems, and advanced vehicle concepts, as well as supersonic aircraft such that the impact of aviation noise on the community, including the impact of en-route noise and low noise sonic boom, can be better understood and measured.
- Explore sound propagation from surface to cruise altitudes including weather effects, turbulence, and impacts due to varying operational procedures and vehicle types.



Technical Areas of Interest (Slide 2 of 5)

- Explore metrics, approaches to their computation and define threshold levels that can characterize the impact of aviation noise, including en-route noise and low noise sonic boom, on the community.
- Examine the relationship between community annoyance and aviation noise.
- Examine the relationship between human health and noise, including impacts of aviation noise on sleep, differing impacts of noise in different communities and settings (e.g., urban/rural), and other human impacts.



Technical Areas of Interest (Slide 3 of 5)

- Investigate the effects of aircraft noise on children's ability to learn.
- Conduct studies of low frequency noise impacts and potential mitigation approaches.
- Quantify the explicit and implicit economic costs of aviation noise on the social welfare and human health to aid cost-benefit analysis.
- Perform research to aid the development of policies on the impact of aviation noise.



Technical Areas of Interest (Slide 4 of 5)

- Investigate the interdependency between actions to reduce aircraft noise and the implication for fuel burn as well as emissions that affect surface air quality and climate change.
- Explore and recommend approaches for community noise outreach.
- Examine noise stringency options and their potential implications.
- Examine correlation in spatial trends in sound insulation investment, its impact on noise reduction and spread of threshold contour levels



Technical Areas of Interest (Slide 5 of 5)

- Explore techniques, tools and instruments that measure the difference in aviation noise levels outside and inside residences or schools.
- Examine the occurrence and prevention of population encroachment into compatible land use areas.
- Perform research to aid improvements in the guidelines on compatible land use and noise sensitive area identification.
- Conduct studies to identify practices, tools and techniques for long-term compatible land use protection around airports.

