Noise Research Roadmap Update

Presented to: E&E REDAC

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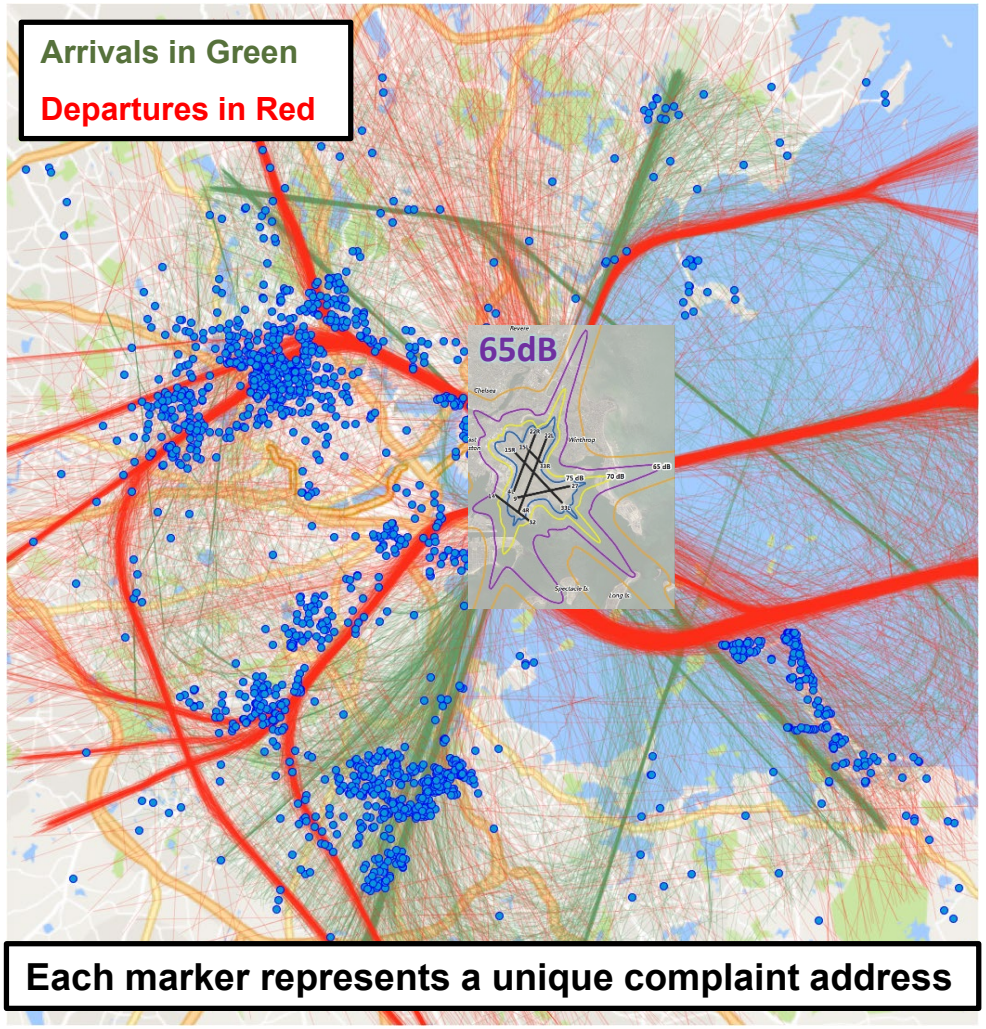
Today's Situation

- 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:

Brenner, M., Hansman, R. J., "Comparison of Methods for Evaluating Impacts of Aviation Noise on Communities," 2017

Current Noise Challenge

- Public interest in reducing noise from the existing fleet and increased stakeholder interest in community noise overall
- Addressing noise provisions in Reauthorization
- Reintroduction of civil supersonic flight
- Expansion of the use of Unmanned Aerial Systems
- Helicopter noise concerns
- Public interest in noise associated with new projects
- New vehicles emerging with little understanding of potential noise impact (Urban Air Mobility, auto-gyros, electric aircraft, commercial space vehicles, and whatever else is coming over the horizon)

Efforts Relating to Aircraft Noise

Understanding Noise

- Improving modeling capabilities
- Examining relationship between noise and annoyance, sleep, cardiovascular health and children's learning
- Evaluating current aircraft, helicopters, commercial supersonic aircraft, unmanned aerial systems, and commercial space vehicles

Outreach

- Enhanced community involvement
- Increase public understanding

Reducing Noise at the Source

- Aircraft technologies and architecture
- Vehicle operations
- Noise standards

Mitigation

- Noise compatibility planning (Part 150)
- Noise-based access restrictions (Part 161)

MITRE

ASCENT Aviation Sustainability Center

Continuous Lower Energy, Emissions & Noise CLEEN Federal Aviation Administration

the VOLPE center

NextGEN

R&D Support to FAA Reauthorization Noise Provisions

Sec. 173 – Alternative airplane noise metric evaluation Sec. 188 – Study regarding day-night average sound levels	Contractor effort
Sec. 175 – Addressing community noise concerns (“dispersal headings or other lateral track variations…”) Sec. 179 – Airport noise mitigation and safety study (“approach and takeoff speeds…”)	ASCENT COE
Sec. 181 – FAA Leadership on Supersonic Aircraft	ASCENT COE & Volpe Center
Sec. 187 – Aircraft noise exposure	Contractor effort
Sec. 189 – Study on potential health and economic impacts of overflight noise	ASCENT COE
Sec. 742 – Technology Review	ASCENT COE
Sec. 743 – CLEEN Aircraft and Engine Program	CLEEN Program

Sleep-Disturbance Research & Implication

Objective: Inform future considerations regarding aviation noise in the U.S. by obtaining dose-response relationships between aircraft noise exposure and sleep disturbance

Research Plan: Develop and use a scientifically sound, yet inexpensive, study methodology to obtain objective measures of sleep disturbance

Goal: National field study: acquire current objective sleep disturbance data relative to varying degrees of exposure at many airports; 4-5 year effort

Current Status: Currently working through USG data collection processes (e.g. Paperwork Reduction Act, OMB).

Team: Research being conducted by UPenn with support of FAA Office of Airports' Airport Technology Research (ATR) Program

NOTE: This project will be reviewed at the REDAC Airport Subcommittee

Future work:

- **Partner with other organizations and experts who have expertise on the subject matter**
- **Depending on the results, develop improved noise exposure metrics and policies**

Cardiovascular Disease & Aircraft Noise

Objective: Evaluate associations between aircraft noise and cardiovascular outcome

Methods: Use existing health cohorts to evaluate link between health outcomes and noise exposure while accounting for wide range of factors

National longitudinal health cohorts:

- Medicare database
- Women's Health Initiative
- Nurses' Health Study /Health Professional Follow-up Study

Team: Research being conducted by Boston University

Reauthorization Connection: HR 302 § 189 – Study on Potential Health and Economic Impacts of Overflight Noise

Future work:

- **Utilize existing cohorts to determine if an association exists. The current cohort work will take 3 years.**
- **Seek additional cohorts that could be used to further examine association.**
- **Depending on the results, develop improved noise exposure metrics and policies**

Commercial Space

Challenges: Launch and Re-entry Noise metrics and modeling

Recent ACRP Research

- **02-66** Commercial Space Operations Noise and Sonic Boom Modeling and Analysis – **Completed**
- **02-81** Commercial Space Operations Noise and Sonic Boom Measurements – **On-going**

Current Status

- Recent ACRP project ideas were not supported
- Working with FAA Office of Commercial Space to develop a roadmap for future Commercial Space Noise research

AEE Noise Research Roadmap

- Development continues…
- Draft currently being reviewed within AEE
- Currently organized by the following broad topics
  - AEDT/Tools
  - Health/Sleep
  - Helicopters/UAS/UAM
  - Operations
  - Supersonics