Noise Technology Research – Briefing and Discussion

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Federal Aviation Administration

Noise Technology Recent Happenings – Domestic stage

• NASA – FAA Interagency Cooperative Agreements status

1. Sustainable and Scalable Advanced Air Mobility (AAM) Operations

- □ Research on relationship between AAM Noise and Annoyance
- □ Collaborate on Community Response Test Planning and Conduct
- □ Measure and Understand Community Response leading to FAA procedures

2. NASA FAA Technology and Data Exchange (in the works)

- Data generated by NASA Projects and NASA Contracts
- Data generated by FAA Research and FAA-sponsored research (e.g., ASCENT and CLEEN)

• FAA Participation in AIAA 2022 SciTech and NASA ATWG / UNWG

- 1. AIAA Environmental Impact of Supersonic Transport workshop (Jan 2022)
- 2. FAA SME presentations at NASA ATWG / UNWG meetings



Noise Technology Recent Happenings – International stage

- ICAO / CAEP-12 Meeting (Feb 2022) Future Work Items Noise
 - 1. Dual standard (CO2 and Noise) for subsonic aircraft more stringent standards
 - 2. Landing and Take Off Noise standard for Supersonic Aircraft
 - 3. Technical work towards development of En-route Noise standard for Supersonic Aircraft
 - 4. Coordination aimed at progressing dialogues regarding certification approaches for Emerging Technology Aircraft (e.g., UAM).



ASCENT Projects – Noise focus

- 003 Cardiovascular Disease and Aircraft Noise Exposure
- 010 Aircraft Technology Modeling and Assessment
- 038 Rotorcraft Noise Abatement Procedure Development
- 041 Identification of Noise Acceptance Onset for Noise Certification Standards of Supersonic Airplanes
- 047 Clean Sheet Supersonic Aircraft Engine Design and Performance
- 049 Urban Air Mobility Noise Reduction Modeling
- 050 Over-Wing Engine Placement Evaluation
- 053 Validation Of Low-Exposure Noise Modeling By Open-Source Data Management And Visualization Systems Integrated With AEDT
- 055 Noise Generation and Propagation from Advanced Combustors
- 057 Support for Supersonic Aircraft Noise Efforts in ICAO CAEP
- 059 Jet Noise Modeling to Support Low Noise Supersonic Aircraft Technology Development
- 061 Noise Certification Streamlining
- 063 Parametric Noise Modeling For Boundary Layer Ingesting Propulsors
- 072 Aircraft Noise Exposure and Market Outcomes in the US
- 075 Improved Engine Fan Broadband Noise Prediction Capabilities
- 076 Improved Open Rotor Noise Prediction Capabilities
- 077 Measurements to Support Noise Certification for UAS/UAM Vehicles and Identify Noise Reduction Opportunities
- 079 Novel Noise Liner Development Enabled by Advanced Manufacturing

Latest Update

- New ASCENT program (GT and MIT) being set up to support Dual Standard (CO2 / Noise) Development for CAEP 13
- In development additional work on UAS/AAM and noise impacts research including evaluating white noise as countermeasure for effects of noise



UAS Noise Modeling Update

• AEE is exploring best practices for evaluating UAS noise for Regulatory Review

- The immediate need to assess UAS noise is driven by requirements to inform Federal actions approving commercial package delivery operation under 14 CFR Part135
- FAA currently does not have available standardized tools to conduct UA noise analyses; therefore customized operator/vehicle specific methodologies are being developed based on the best available information
- Recent National Environmental Policy Act Environmental Assessments have relied on these streamlined conservative noise analysis frameworks, but assume single operator operations at low operational levels: <u>https://www.faa.gov/uas/advanced_operations/nepa_and_drones/</u>

Select Research Efforts

- Data collection and analysis to better understand UAS Acoustics
- ASCENT Project 9 with the Georgia Institute of Technology is exploring ways to leverage their development of geospatially driven noise estimation modules to inform UA noise modeling
- New work to develop stochastically driven UA modeling approaches to generate statistical representations
 of UA noise exposure are under consideration
- ASCENT Project 49 with Penn State on Urban Air Mobility Noise Reduction Modeling is develop a firstprinciples noise modeling system for future UAM aircraft with varied configurations



Aircraft Noise Heath and Economic Impacts Research

Cardiovascular Disease	Economic Impacts of Noise	National Sleep Study
Objective: Evaluate associations between aircraft noise and cardiovascular outcome	Objective : Conduct an empirical assessment of the economic impacts of aircraft noise on	Objective: Quantify the impact of aircraft noise exposure on sleep disturbance through a dose-
Methods: Use existing health cohorts to	businesses and on residential property values	response relationship
evaluate link between health outcomes and noise exposure while accounting for wide range of factors	Methods: Identify airport communities with a change in noise, then conduct economic	Methods: National study of individuals in communities around 77 U.S. Airports wherein sleep disturbance data is collected from individuals exposed to varied noise levels; 2- year data collection effort began in 2021
National longitudinal health cohorts:	results vary among communities and economic sectors	
Medicare database		
Women's Health Initiative	Team: Research being conducted by	Team: Research being conducted by
 Nurses' Health Study / Health Professional Follow-up Study 	Massachusetts Institute of Technology through ASCENT Project 3 and Project 72	University of Pennsylvania School of Medicine through ASCENT Project 17 and the FAA Technical Center
Team: Research being conducted by Boston University School of Public Health through ASCENT Project 3		
Reauthorization Connection: HR 302 § 189 – Study on Potential Health and Economic		
Impacts of Overflight Noise		

Additional work in development on noise impacts including evaluating white noise as countermeasure for effects of noise

