Highlights from the Technical Committee on Noise

Alexandra Loubeau, Noise TC Chair
NASA Langley Research Center

Logan T. Mathews, Noise TC Student Council Rep
Brigham Young University

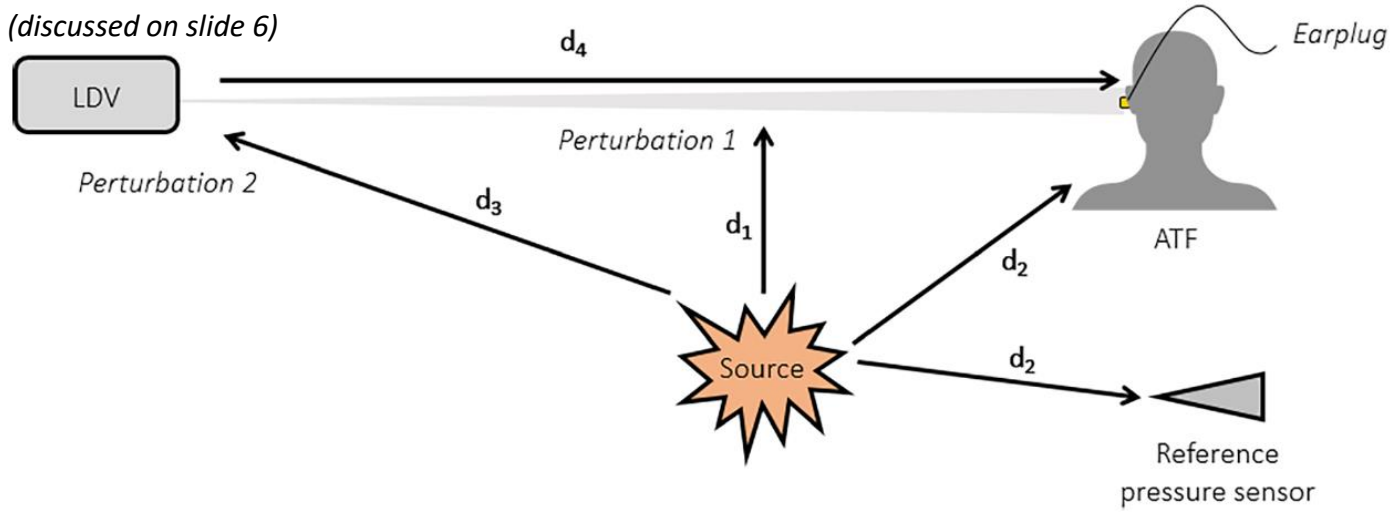
186th Meeting of the Acoustical Society of America
Ottawa, Canada
May 13, 2024
Paper 1aID8

Scope of Noise TC

- **Researchers and practitioners**

Goal: reduce impact of noise (unwanted sound)

- **Noise generation**
- **Propagation**
- **Impact**
  - Structures
  - Objects
  - People



Blondé-Weinmann et al., 2023

TC Activities

- Innovative model development
- Measurement techniques
- Mitigation strategies
- Input towards the establishment of standards and regulations



Kellison and Gee, 2023

Topics of Interest

- Community noise definition and abatement
- Community noise testing
- Transportation noise
- Hearing protection
- Jet and rocket noise
- Building systems noise and vibration
- Sound propagation
- Soundscapes
- Low-frequency sound



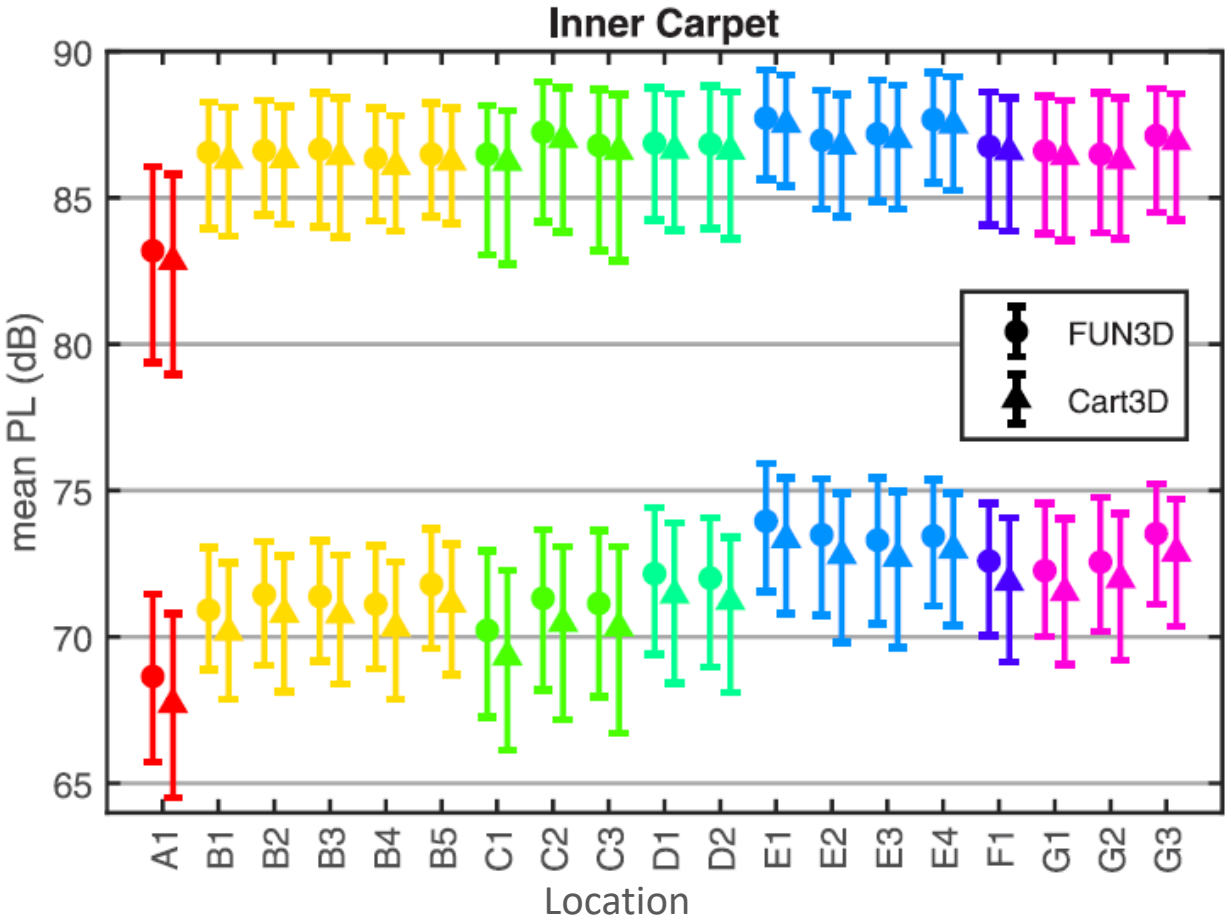
CDC/NIOSH



Transportation Noise

- **Noise from supersonic aircraft overflight**

X-59 Noise Range Across USA



Doebler and Loubeau, 2023

NASA X-59 Supersonic Aircraft

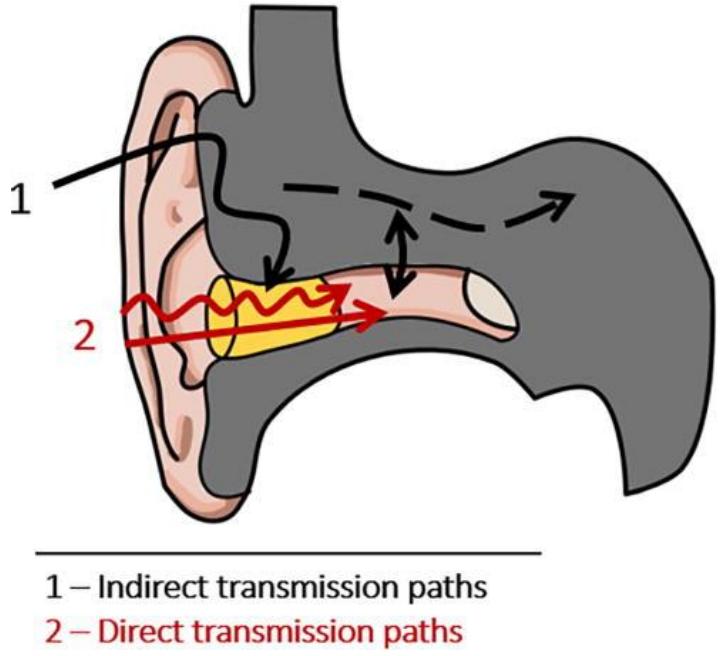


Lockheed Martin

Hearing Protection

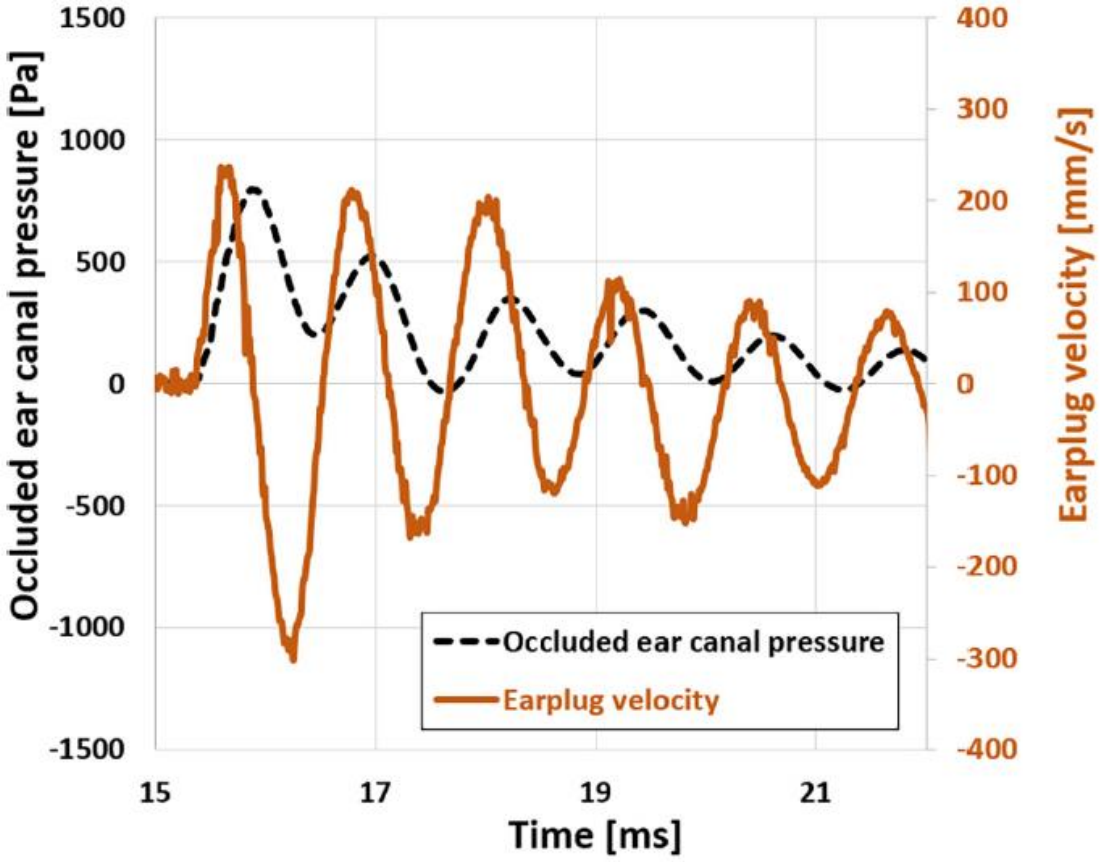
- **Experimental evaluation of earplug behavior in front of high-level impulse noise using laser Doppler vibrometer (LDV)**

Transmission Paths Causing Earplug Limitations



Blondé-Weinmann et al., 2023

LDV Measurements for 176 dB Peak Impulse

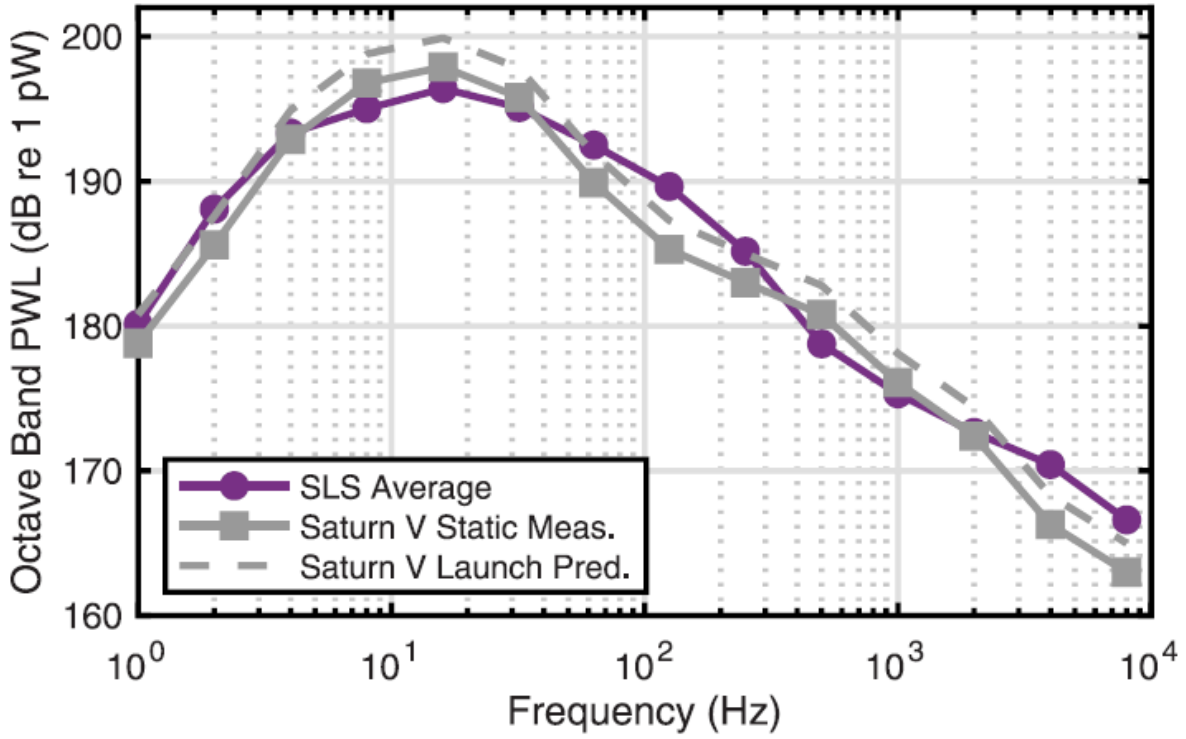


Blondé-Weinmann et al., 2023

Jet and Rocket Noise

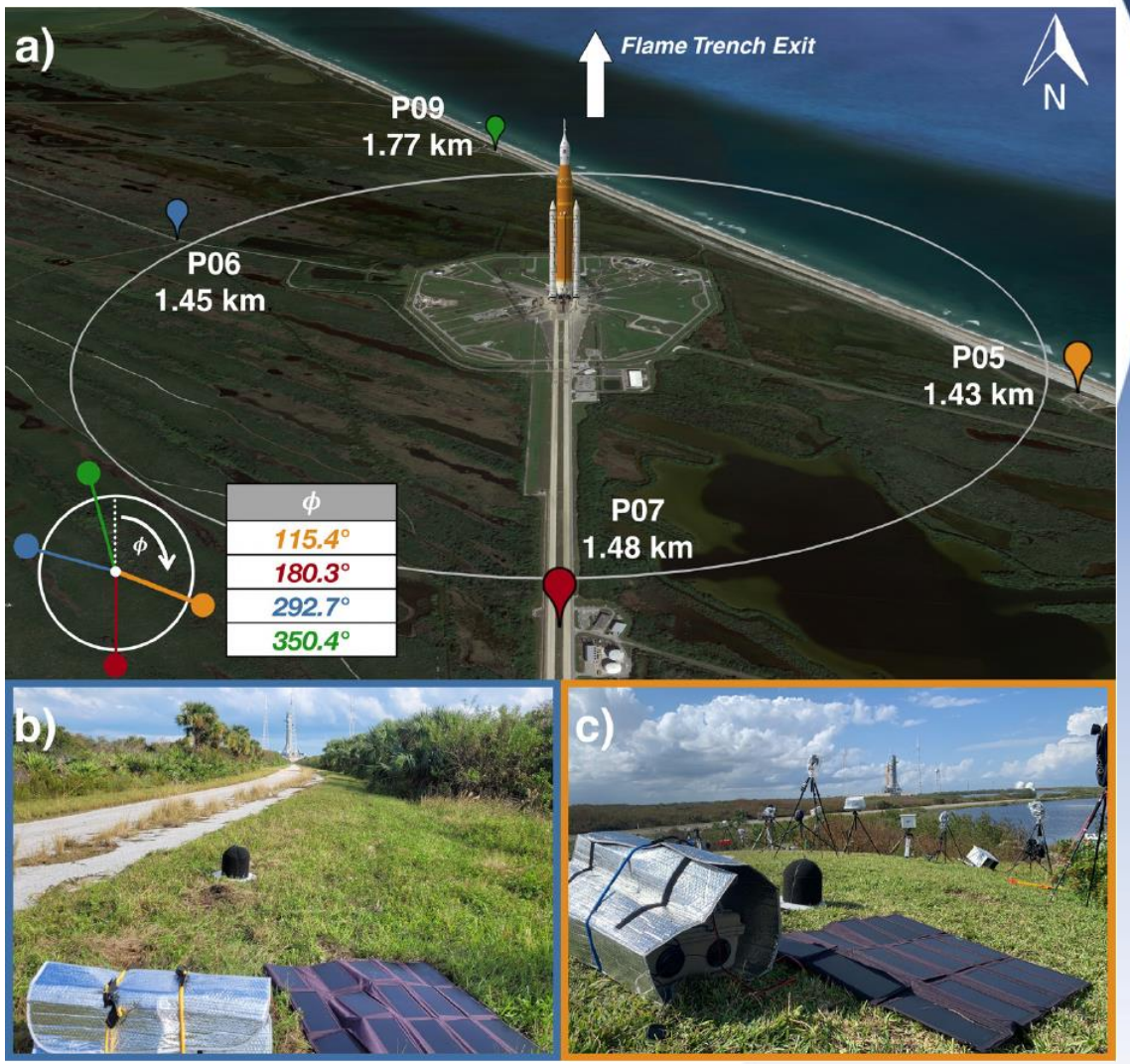
- **Measuring the sounds of rockets**

Noise Levels of SLS and Saturn V



Kellison and Gee, 2023

SLS Rocket Launch Measurement Stations

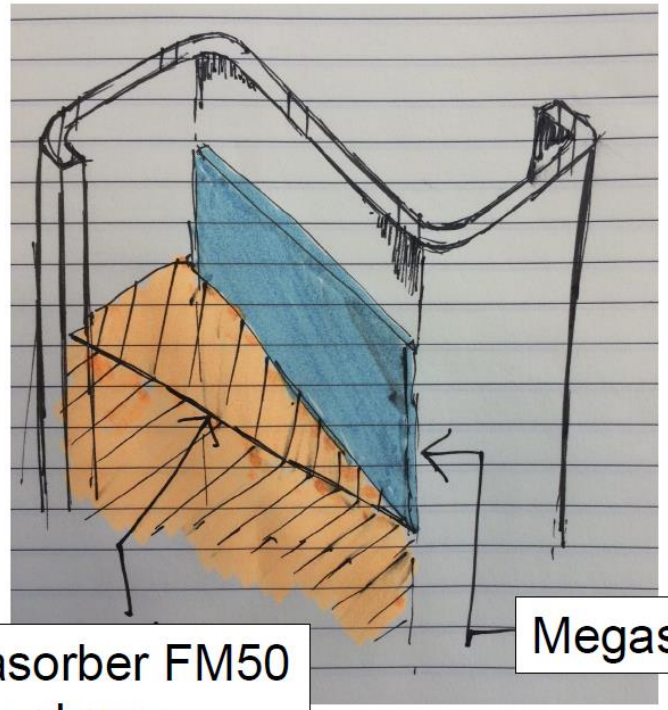


Kellison and Gee, 2023

Building Noise

- **Mitigating wind noise on building**

Treatment Plan



Law, 2024

Commercial Building with Noise Issue

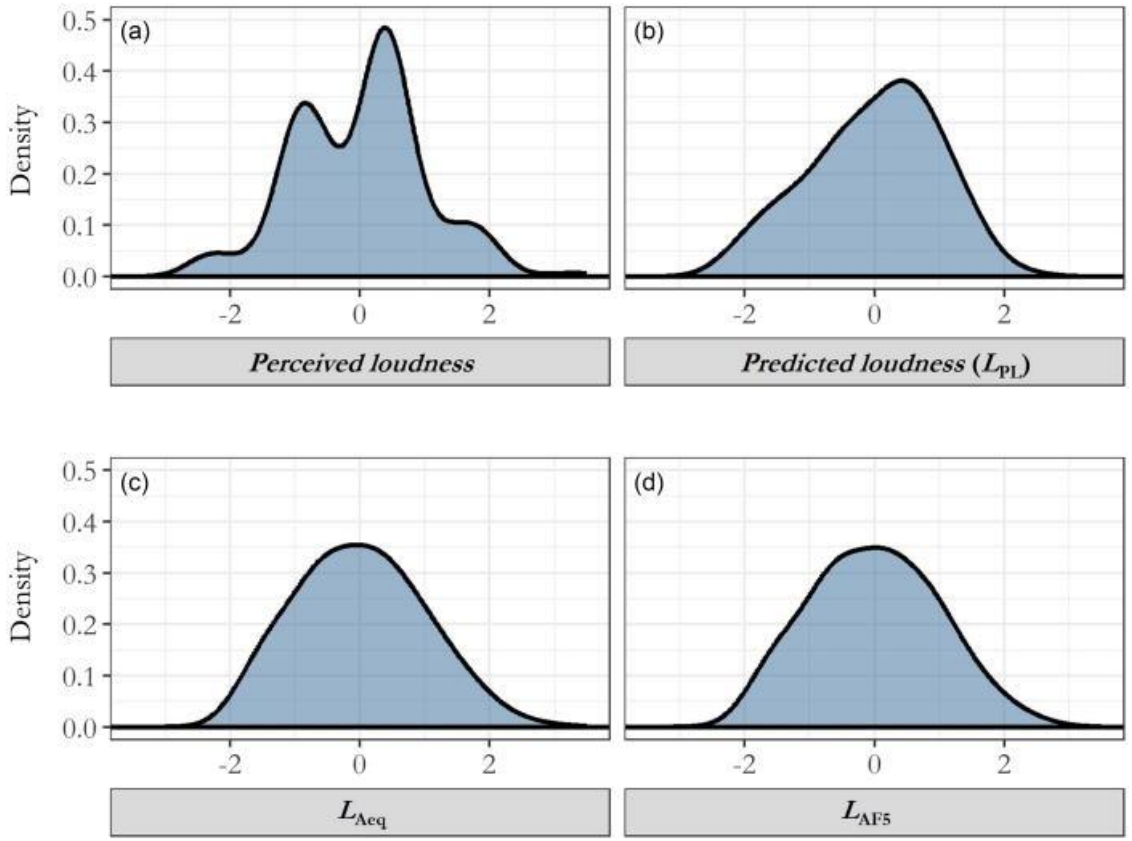


Law, 2024

Soundscapes

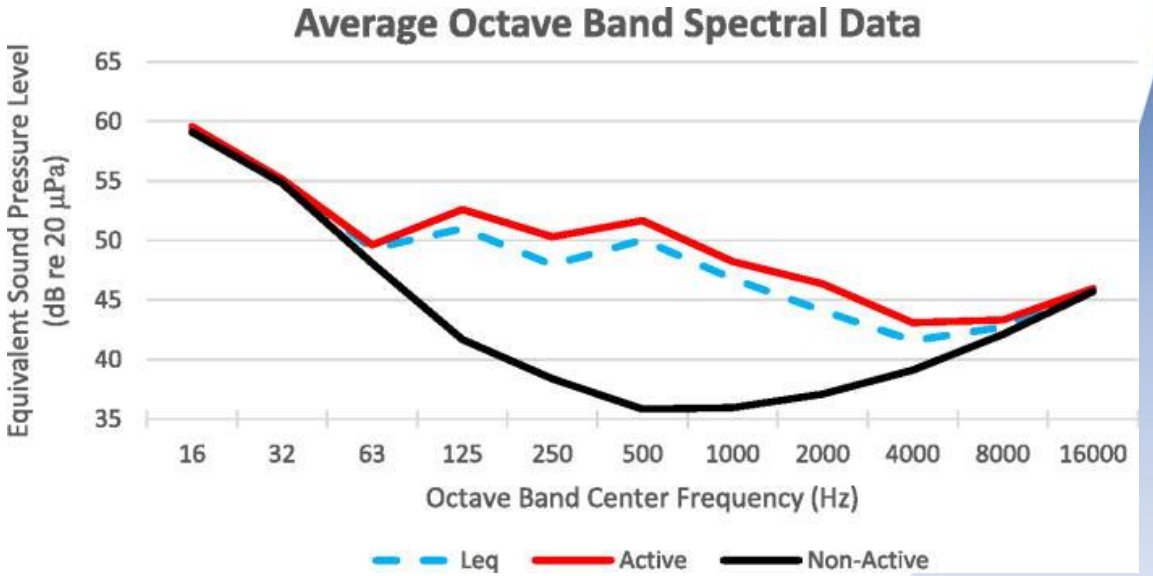
Controlled and variable environments

Indoor Loudness Perception and Predictors



Versümer et al., 2023

Hospital Room Noise



Hummel et al., 2023

Interdisciplinary Nature of this Research



Special TCNS Sessions This Week

- **Monday**
  - Jet & Rocket Noise
  - Evaluation of Hearing Protection Devices with Impulse Noise and Acoustic Test Fixtures
- **Tuesday**
  - Soundscape – Focus on Applications
  - Advanced Air Mobility Noise: Noise from New Air Transportation in Urban and Underserved Communities
  - Honoring the Life and Legacy of Tony F. W. Embleton
- **Thursday**
  - Methods for Community Noise Testing and Analysis
- **Friday**
  - Pickleball Noise

New Special Issue on AAM Noise

Advanced Air Mobility Noise: Predictions, Measurements, and Perception

- **Call for papers for joint issue with the Journal of the Acoustical Society of America (JASA) and JASA Express Letters**
  - https://pubs.aip.org/asa/jasa/pages/cfp050224
  - Papers due 2/28/2025



- **Emerging aviation market of AAM for passengers, cargo, and public services**
  - Electric vertical takeoff and landing (eVTOL) aircraft
  - Air taxis
  - Urban air mobility (UAM) vehicles
  - Unmanned aerial vehicles (UAVs)





- **Tools, technologies, ground/flight testing, human response and metrics, and regulation and policy**

Image Credits: NASA

Noise TC Open Meeting
Thursday, May 16 at 5:30 PM
Room 205

Come join us!

https://tcnsasa.org/

Backup Slides

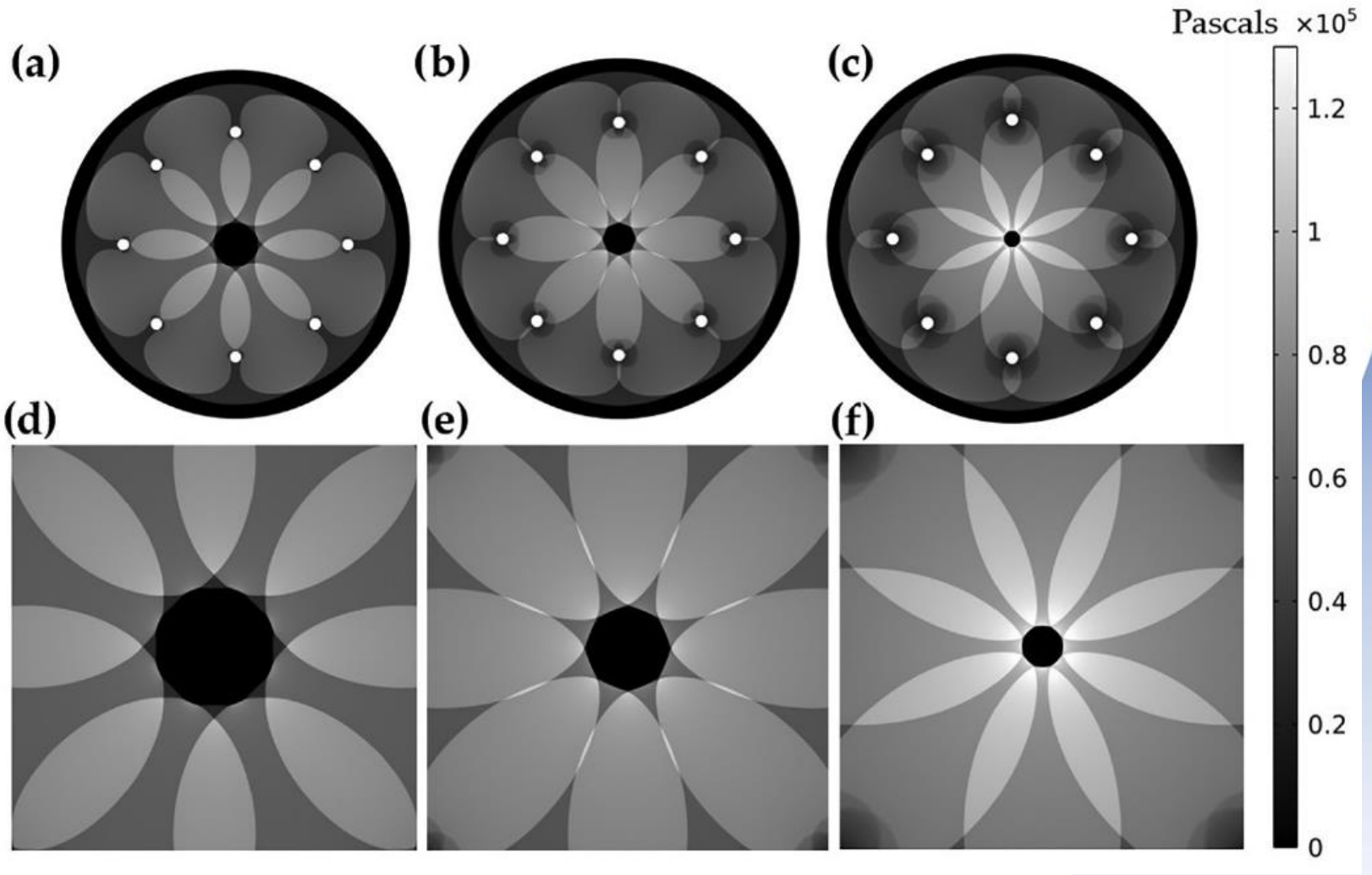
References

1. Estimating the noise dose range of the NASA X-59 aircraft in supersonic cruise using PCBoom propagation simulations. https://doi.org/10.1121/10.0019501
2. Experimental evaluation of earplug behavior in front of high-level impulse noise using laser Doppler vibrometer. Reprinted with permission from [https://doi.org/10.1121/10.0020585]. Copyright 2023, Acoustical Society of America.
3. Sound power of NASA's lunar rockets: Space Launch System versus Saturn V. https://doi.org/10.1121/10.0022538 Licensed under a Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).
4. Tackling the strange wind noise on a commercial building - A Case Study. Reprinted with permission from [https://doi.org/10.1121/2.0001815]. Copyright 2024, Acoustical Society of America.
5. Day-to-day loudness assessments of indoor soundscapes: Exploring the impact of loudness indicators, person, and situation https://doi.org/10.1121/10.0019413 Licensed under a Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).
6. Relating clustered noise data to hospital patient satisfaction. Reprinted with permission from [https://doi.org/10.1121/10.0020760]. Copyright 2023, Acoustical Society of America.
7. Numerical modeling of Mach-stem formation in high-amplitude time-reversal focusing. Reprinted with permission from [https://doi.org/10.1121/10.0017974]. Copyright 2023, Acoustical Society of America.

Sound Propagation

- Time-reversal signal processing technique to focus sound

Modeling of Nonlinear Waves Propagating From 8 Sources



Patchett et al.