Noise Research Roadmap & Strategy

Presented to: AEE

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Today's Aircraft Noise Situation – Our Efforts

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
- Noise standards

Mitigation

- Optimized operations and procedures
- Sound insulation program

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

Outline

- Health
- Rotorcraft ✓
- Tools ✓
- Supersonics ✓
- Operations ✓
- NCI
- Commercial Space
- UAM/UAS ✓

✓ = covered during other discussion items

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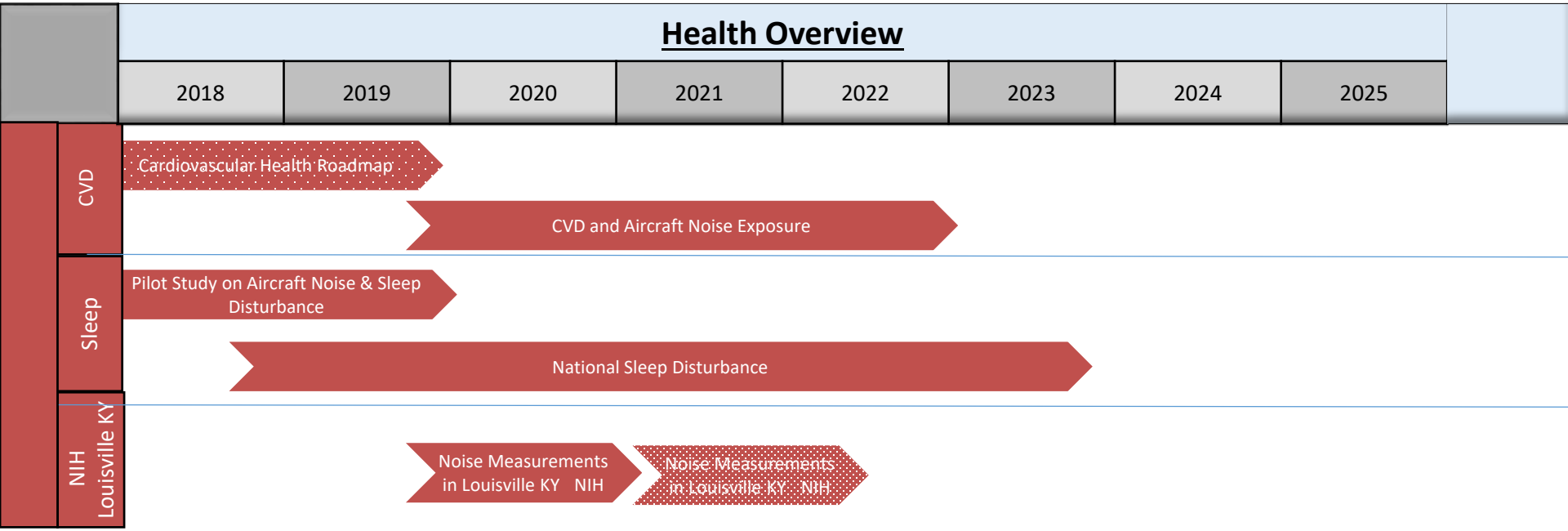
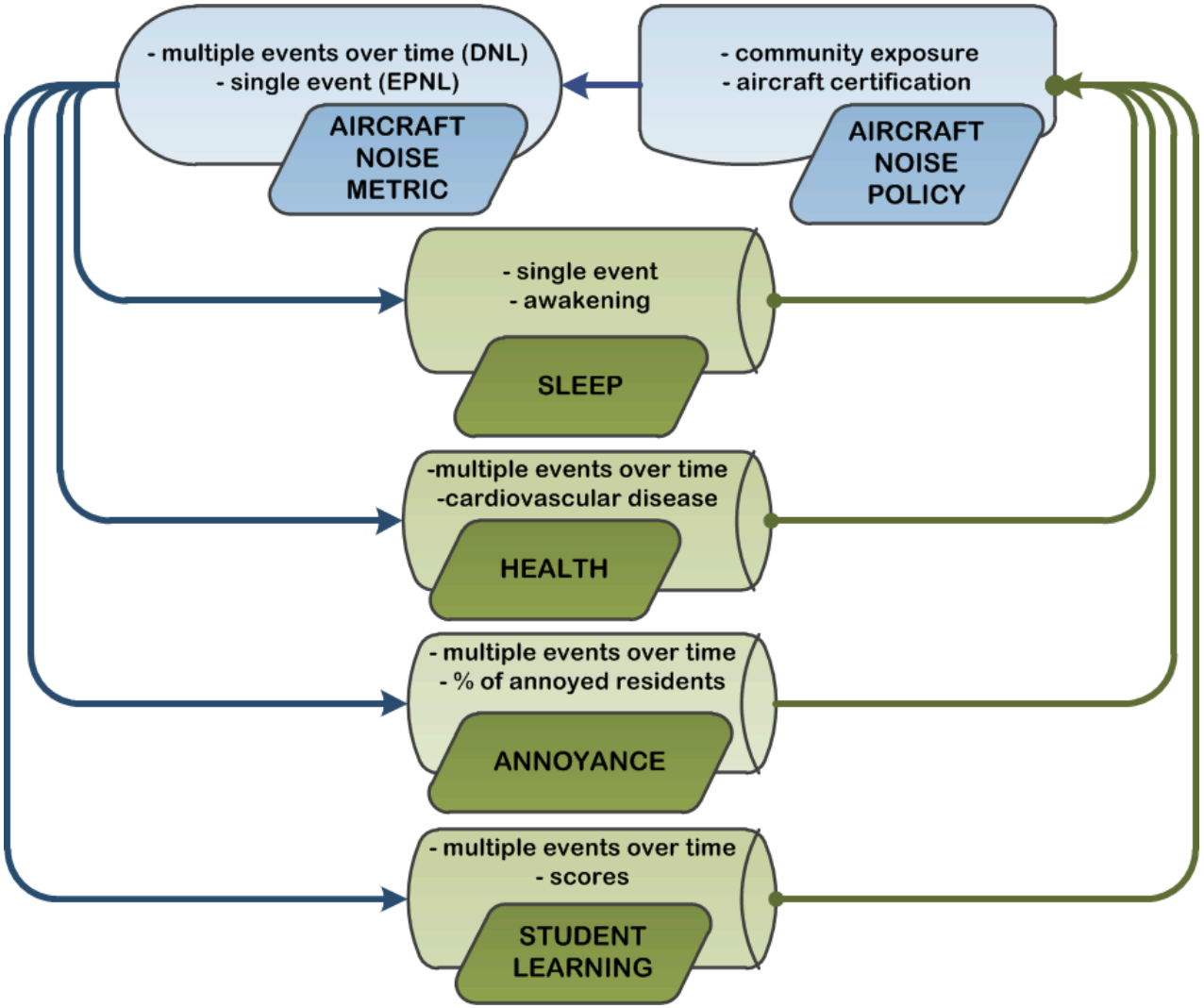
✓ = covered during other program review sessions

Health

Health | Rotorcraft | Tools
Supersonics | Operations | NCI
Commercial Space | UAM/UAS



Relationship between Impacts & Policy



- blue boxes- current policy

- green- on-going research

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**

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

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

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

Next Steps: Address comments received during Federal Register notice period and Complete U.S. Government data collection requirements (e.g. OMB and PRA)

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**

Noise Measurement in Louisville, KY

Objective: Improve our understanding of how trees reduce sound exposure in communities by leveraging ongoing NIH-funded university work in the Louisville KY area. U Louisville researchers are planting trees in proximity of the airport to understand public benefits of additional trees.

Research Plan: Noise data will be collected in proximity of Louisville KY airport (SDF) before and after trees are planted. This data will be compared to modeled prediction of aircraft noise in the area surrounding airport. The effect of the ground impedance on model accuracy will be studied.

Goal: Improved AEDT modeling of sound impedance to improve its accuracy in predicting noise. Also better understanding of the efficacy of trees as a cost-effective means of reducing community noise exposure.

Team: Volpe Center supporting University of Louisville with measurements

Next Steps:

- **Looking for additional funding for UPenn / Sleep**
- **Meeting with NIH**

Commercial Space

Past

- FAA Order review: 1050.1F Desk Reference Chapter 11. Guidance on Commercial Space Launch Noise and Sonic Boom Modeling and Assessment, July 2019
- Launch noise model review, June 2015
- ACRP 02-66: Commercial Space Operations Noise and Sonic Boom Modeling & Analysis, $600K, November 2017
- ACRP 02-81 Commercial Space Operations Noise and Sonic Boom Measurements, $600K, July 2019
- Commercial Space Launch Noise and Sonic Boom roadmap, March 2018, $70K
- Periodically review applications for launches and sites

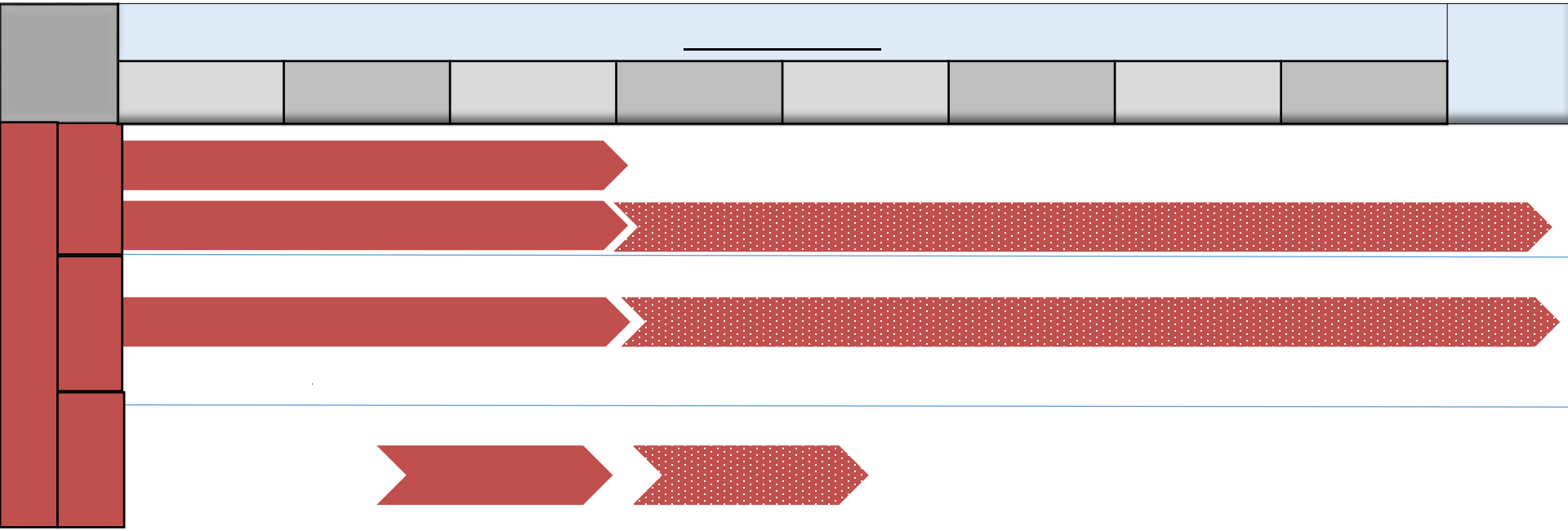
Present

- Periodically review applications for launches and sites
- Stakeholder road-mapping effort to identify and prioritize research

Future

- Aiming to have special session @ AIAA Science and Technology Forum (2021 AIAA SciTech Forum), 11–15 January 2021, Nashville, TN

NCI



NCI Purpose and Goals

Purpose: *to identify how the FAA can more efficiently and effectively respond to and address noise complaints in a clear, consistent and repeatable manner that is responsive to the public and applies the best use of FAA resources.*

Part 1

Identify and implement improved and consistent agency-wide policy and procedures for the FAA's process to respond to noise complaints / inquiries, and

Part 2

Identify and evaluate potential actions that the FAA might take to better address the underlying issue raised by complaints, particularly regarding the implementation of NextGen procedures.

Next Steps for Public Implementation

1) FAA collaboration with airport sponsors:

- to develop a common understanding on addressing noise impacts and community concerns
- to avoid duplication of efforts in responding to aircraft noise complaints

3) Conduct internal and external outreach

4) Phase Noise Portal roll-out to public

(one FAA region at a time)

Discussion

Health

Rotorcraft

Tools

Supersonics

Operations

NCI

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UAM/UAS

Discussion

- **Are there any gaps in our Noise program?**
- **Are we focused on the right things?**
- **Are our priorities appropriately aligned?**

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