Aviation Noise Abatement Research & Development: Partner Overview

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Introductory Remarks

"Clearly, aviation noise has been and remains a controversial issue affecting communities that are located near airports. Likewise, trying to limit and mitigate the noise exposure of those communities has been and remains a challenging task."

-House Transportation and Infrastructure Aviation Subcommittee Chairman Congressman Thomas Petri (R-WI)

PARTNER History

- The Omnibus Budget Reconciliation Act of 1990 (PL 110-508) gave the Administrator of the FAA the power to establish Centers of Excellence to conduct aviation research on a continuous basis. The areas of research are:
  - Noise and emissions impacts on the environment and people
  - Noise and emissions abatement flight procedures and technology
  - Compatible land use management
  - Airport operational controls
  - Noise and emissions measurements and health impacts
  - Aviation atmospheric effects
  - Interrelationships between noise and emissions

PARTNER History

- Former Congressman **Martin Sabo** (D-MN 5th CD), who at the time was the Chair of the House Appropriations Committee, was able to secure $20 million for NASA/FAA research of quiet aircraft technology in the FY2002 Transportation Appropriations bill.

- This was a result of direct advocacy efforts put forth by NOISE. The efforts were led by current NOISE President & Minneapolis Councilwoman **Sandy Colvin-Roy**.

PARTNER Vision

- **A world-class research organization…**

  …aligned with national and international needs

  …leveraging a broad range of stakeholder capabilities

  …fostering breakthrough technological, operational, policy, and workforce advances

  …for the betterment of mobility, economy, national security, and the environment

PARTNER universities: 9 schools, 100s of students

- **Georgia Institute of Technology**
- **Harvard**
- **MIT**
- **Penn State**
- **Purdue**
- **Stanford**
- **University of North Carolina**
- **York University**
- **Missouri U. of Science and Technology**

Research is also funded at Reading University and the University of Illinois at Urbana-Champaign. Research sub-awards have been awarded to the University of Houston, the University of Cambridge (UK), and the University of California, San Diego.

Advisory Board: 49 organizations of Industry/professional/community (39), FAA (6), NASA (2), USAF-AFRL (1), and Transport Canada (1)

National Organization to Insure a Sound-Controlled Environment

- Aerodyne Research Inc.
- Aerospace Industries Association
- Airbus
- Air Line Pilots Association, Intl
- Air Transport Association of America
- Airports Council International – North America
- American Institute of Aeronautics and Astronautics
- Bay Area Air Quality Management District
- The Boeing Co.
- Bombardier
- Cessna Aircraft, A Textron Company
- Commercial Aviation Alternative Fuels Initiative
- CSSI Incorporated
- Delta Airlines
- FAA Airports and Environmental Law Division (FAA AGC)
- FAA Air Traffic Environmental Programs Division (FAA ATO-R)
- FAA Centers of Excellence (FAA AAR-400)
- FAA Office of Airports (FAA APP-400)
- FAA Flight Standards (FAA AFS)
- FAA Office of Environment and Energy (FAA AEE)
- Federal Interagency Committee on Aviation Noise
- Finegold & So Consultants
- General Electric Aircraft Engines
- Gulfstream Aerospace Corp.
- Harris, Miller, Miller & Hanson, Inc.
- International Airline Passengers Association
- Lockheed Martin Aeronautics Co.
- Massachusetts Port Authority
- Metron Aviation
- Metropolitan Washington Airport Authority
- MITRE-CAASD

NASA Science Mission Directorate
NASA Aeronautics Research Mission Directorate
National Air Traffic Controllers Association
O'Hare Noise Compatibility Commission
OMEGA
Palisades Citizens Association
Pratt & Whitney
Regional Airport Authority of Louisville and Jefferson County
Rolls Royce
San Francisco International Airport/Community Roundtable
Snecma
Transport Canada
United Parcel Service Airlines
United States Air Force – Air Force Research Laboratory
United States Dept. of Transportation Volpe National Transportation Systems Center
United States Environmental Protection Agency National Risk Management Research Laboratory
Wyle Laboratories

52 Advisory Board representatives

Dennis McGrann (N.O.I.S.E.), chair

- Rich Altman (CAAFI)
- Don Anderson (NASA Science)
- Steve Baughcum (Boeing)
- Anuj Bhargava (P&W)
- Ray Brown (Delta)
- Carl Burleson (FAA AEE)
- Dave Carbone (SFO Roundtable)
- Ambrose Clay
- Dominique Collin (Snecma)
- Robbie Cowart (Gulfstream)
- Klaus Dannenberg (AIAA)
- Mel Davis (NATCA)
- Phil DeVita (HMMH)
- Will Dodds (GEAE)
- Jay Dryer (NASA Aeronautics)
- Larry Finegold (Finegold & So)
- Gregg Fleming (Volpe)
- Daphne Fuller (FAA AGC)
- Roger Gardner (Omega)
- Tina Gatewood (FAA ATO)
- Kate Harback (MITRE-CAASD)
- Bill Harrison(USAF-AFRL)
- Mark Huising (Bombardier)
- Kathi Hurst (ALPA)
- Mahendra Joshi (Boeing)
- Christian Kast (UPS)
- John Kinsey (EPA)
- Flavio Leo (MassPort)
- Paul Madden (RR)
- Muni Majjigi (GEAE)
- Renee Martin-Nagle (Airbus)
- Mary McMillan (CSSI, Inc.)
- Rick Miake-Lye (ARI)
- Nick Miller (HMMH)
- Skip Miller (Louisville RAA)
- John Morgenstern (LMCO)
- Arlene Mulder (O'Hare NCC)
- Neal Phillips (MWAA)
- Jake Plante (FAA APP)
- Ken Plotkin (Wyle)
- Daniel Rutenburg (IAPA)
- Kevin Shepherd (FICAN)
- Alec Simpson (Transport Canada)
- Jessica Steinhilber (ACI-NA)
- Kent Stephens (FAA AFS)
- Michael Thacker (Cessna)
- Terry Thompson (Metron)
- Mat Thorp (Palisades Citizens Assoc.)
- Marland Townsend (BAAQMD)
- Pat Watts (FAA AAR)
- Bob Young (AIA)
- Nancy Young (ATA)

PARTNER Completed Noise-specific Projects:

LOW FREQUENCY NOISE STUDY (Project 1)

- The purpose of this study was to research the impacts of low-frequency noise on humans. Some areas of focus were the impact on homes; rattle and vibration, the perceptible annoyance to humans, and the ability of researchers to predict the perceived and physical impacts.

LAND USE MANAGEMENT AND AIRPORT CONTROLS (Project 6)

- This project researched population encroachment on airport operating areas, specifically assessing the dynamics of how airports become encroached upon and how this potentially fuels noise concerns and complaints.

LATERAL ALIGNMENT IN COMPLEX SYSTEMS (Project 13)

- This study focused on understanding the challenges facing multiple stakeholder federal agencies as they work to address aviation noise and emissions issues when preparing for the anticipated tripling of air travel by the year 2025.

More information can be found at PARTNER's website:http://mit.edu/aeroastro/partner/index.html

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE

- Potentially serious health outcomes have been identified in studies involving transportation noise exposure in a population. (PARTNER Project 19)

- These include heart disease and hypertension and the observed effects seem to be related especially to nighttime noise exposure although similar daytime exposure effects have also been identified.

- However – the majority of these have been conducted in Europe, or conducted on other modes of transportation here in the United States.

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE: EUROPE

Study: Airport Noise Increases Risk of Strokes

By **TRISTANA MOORE / TIME MAGAZINE / BERLIN** Tuesday, Dec. 15, 2009

"Living under a flight path can seriously damage your health. German researchers have discovered that people who are exposed to jet noise have a substantially increased risk of stroke, high blood pressure and heart disease. The findings are bound to provide further ammunition to anti-airport campaigners and make uncomfortable reading for world leaders at this week's climate summit in Copenhagen."

- Men who are exposed to jet noise have a 69% higher risk of being hospitalized for cardiovascular disease.

- Women living under flight paths fare even worse, logging a 93% higher rate of hospitalization with cardiovascular problems, compared with their counterparts in quiet residential areas.

- The study found that women who are exposed to jet noise (of about 60 decibels) during the day are 172% more likely to suffer a stroke.

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE: UNITED STATES

- Studies in the United States that develop metrics will be used to evaluate the impact of airport and other noise sources on a community and understand the relationship between noise annoyance, physiological responses, cognitive performance, and sleep quality.

- In turn, these studies will facilitate generation of a sound time history database that can be used by researchers to develop and improve community noise metrics. In he long term, this will facilitate the study of airport noise's long-term impacts.

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE: UNITED STATES

"QUANTIFYING AND MITIGATING THE IMPACT OF AVIATION NOISE ON PEOPLE"

- **Project 24: Noise Exposure Response: Annoyance**

Goal of Project 24: Develop a deeper understanding of how noise affects annoyance in communities in proximity to airports & construct models that can be coupled with sound prediction models to predict annoyance that would result from future airport developments or changes in air traffic patterns.

- **Project 25: Noise Exposure Response: Sleep Disturbance**

Goal of Project 25: Understand how much aircraft noise impacts sleep in communities around airports, and how impacts due to aircraft noise compare with those due to other things (other noise sources, weight, age, stress, etc.) that are known to affect sleep.

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE: UNITED STATES

- Few studies to date have characterized the influence of aviation-related noise on health outcomes relevant to benefit-cost analyses, such as mortality or health care utilization, and very little work has been done in the US.

- No major US study has estimated the association between long-term exposure to noise and cardiovascular outcomes while accounting for the potential confounding from air pollution and socioeconomic determinants of health.

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE: UNITED STATES

Project 44: Noise Related Effects on the Elderly
How?

- In Project 44, PARTNER will employ national data on Medicare enrollees and noise contours surrounding each of 95 airports to evaluate the linkage between aviation-related noise and hospital admissions for cardiovascular disease.

- PARTNER will construct models to estimate health risks associated with noise in the vicinity of each airport, capturing health impacts in aggregate and by location.

- These models will then be used to consider the health effects of noise exposure on hospital admissions for cardiovascular disease in total, and to explore interactions between air pollution and airport-related noise for cardiovascular effects.

STUDYING THE HEALTH IMPACTS OF AVIATION NOISE ON PEOPLE: UNITED STATES

Project 44: Noise Related Effects on the Elderly

- **This will be the first national-scale investigation of health impacts of airport noise in the US.**
- Conclusions regarding airports where health impacts appear more significant and where future investigations may be warranted.
- Medicare overlay study is just the tip of the iceberg – more studies to come!
- This is all possible with community emphasis & support in FAA reauthorization on aviation-noise research and technological developments.

Conclusion / Questions

"The second important element to addressing [aviation noise] issues and a key to the future is full funding of research and development efforts. There are numerous programs and technologies being explored today that hold great potential for a future with quieter skies."

"One specific example **is the PARTNER led research** and testing in the development of the continuous descent approach, (CDA) which allows for quieter landing procedures. I can't stress enough the value of investment into CDA and other technologies, which many not only aid in reduction of noise pollution but also decrease the adverse environmental impacts of aviation on our land, air, and water."

- Partner Chair Dennis McGrann, before House Subcommittee on Aviation (2007)