

FAA Efforts to Understand and Address Aviation Noise Challenges

Presented to: UC Davis Aviation Noise & Emissions Symposium

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**Federal Aviation
Administration**

Economic Benefits of Aviation



5.1% ^{of} U.S. GDP



10.6 Million
U.S. jobs



\$1.6 Trillion
in U.S. economic
activity annually



\$59.9 Billion
of U.S. Trade Balance
(exports-imports)

SOURCE: FAA Air Traffic Organization

Aviation equipment (aircraft, spacecraft, and related equipment) is largest export sector in U.S. economy accounting for over 8% of total exports.

SOURCE: U.S. International Trade Commission



Environmental Protection that Allows Sustained Aviation Growth

ENVIRONMENT AND ENERGY GOALS



NOISE

Reduce the number of people exposed to significant noise around U.S. airports



AIR QUALITY

Reduce significant air quality impacts attributable to aviation

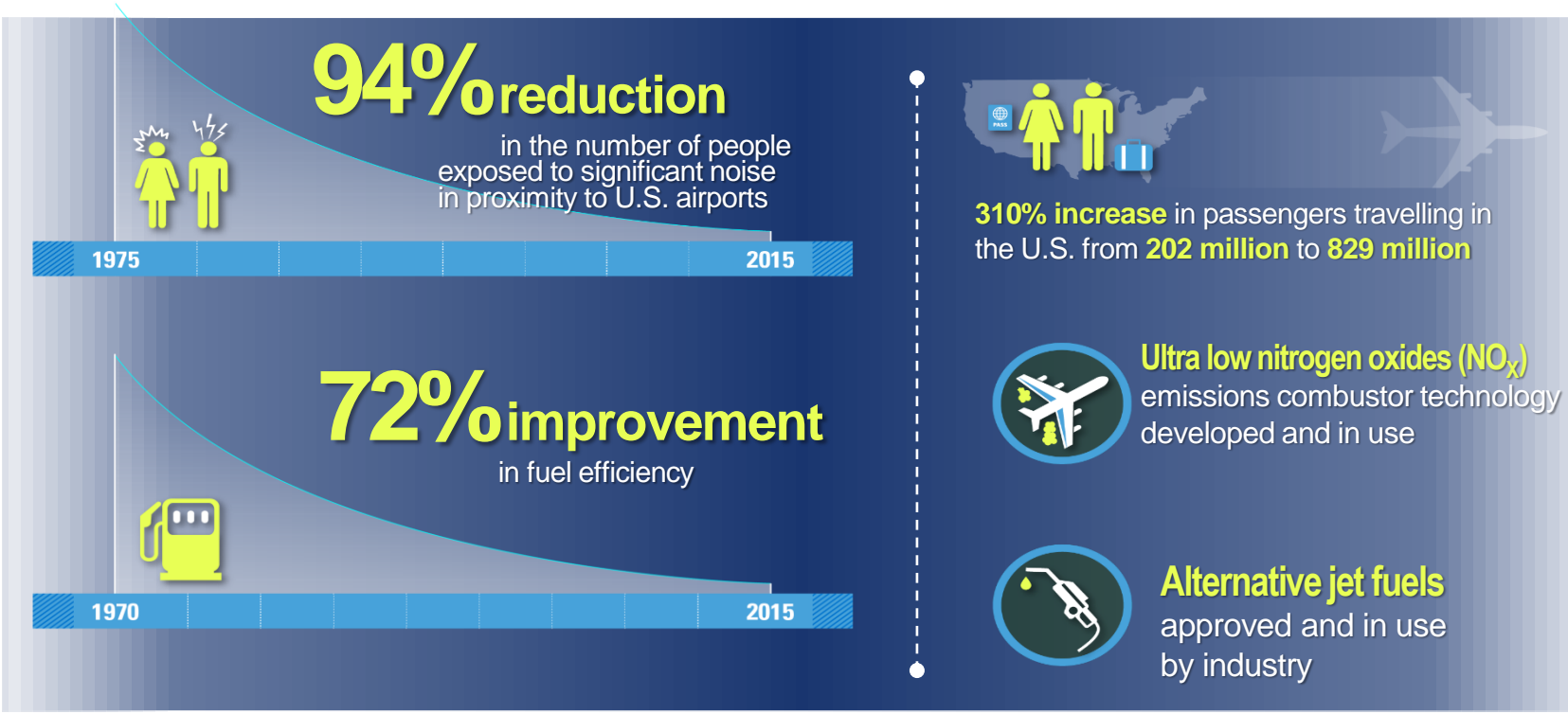


ENERGY

Achieve net fuel burn reduction by 2020 relative to a 2005 baseline and deploy sustainable aviation fuels.



What we have achieved



SOURCE: Office of Environment and Energy; Lee, J., et al. 2001, and Bureau of Transportation Statistics (BTS)

Environmental & Energy Strategy



NextGEN
<http://www.faa.gov/go/clean>

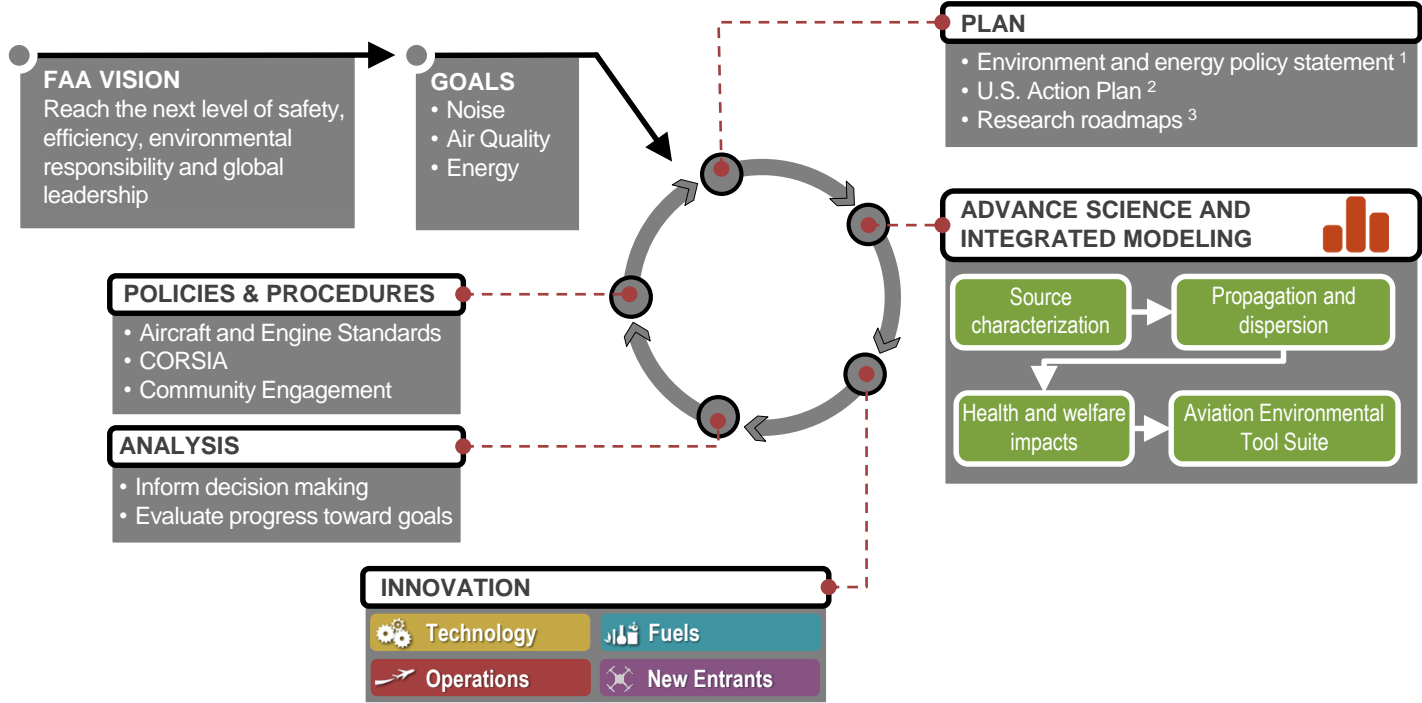


<http://www.caafi.org>



<http://ascent.aero>

NextGEN
<http://www.faa.gov/nextgen>

Notes:

1. Aviation E&E Policy Statement (Federal Register 77-141, 2012): http://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/media/FAA_EE_Policy_Statement.pdf
2. U.S. Aviation GHG Emissions Reduction Plan: http://www.icao.int/environmental-protection/Pages/ClimateChange_ActionPlan.aspx
3. Environment and Energy Website: <http://www.faa.gov/go/environment>

A Focus on Noise

What we have **ACHIEVED**

\$ 10.6 Billion since 1982 for sound insulation of homes and schools around U.S. airports

Developed a Balanced Approach using Source Reduction, Land Use Planning, and Operational Procedures and Restrictions



NEW TECHNOLOGY



OPERATIONS



SOUND INSULATION



LAND USE PLANNING



POLICY

MITIGATION



ANNOYANCE

Nationwide survey to understand community reaction to aircraft noise



HUMAN HEALTH

Explore the incremental effects of aviation noise on human health



SLEEP DISTURBANCE

National Study to determine physiological impacts of aviation noise



MODELING

Improve modeling of noise effects and impacts

SCIENCE & INTEGRATED MODELING



FAA's CLEEN Program + Pratt & Whitney



Aurora Flight Sciences

Research Areas on Noise Impacts

- **Annoyance**

- In 2014, FAA initiated a national survey to measure public annoyance to aircraft noise, as part of FAA's broader research portfolio related to aircraft noise
- Responses from over 10,000 people living near 20 U.S. airports were collected
- The survey results and a draft report are being reviewed by the FAA in coordination with the Department of Transportation and other federal agencies

- **Sleep Disturbance**

- Conducted field studies to test different equipment viability
- Have begun preparations for a national study
- Determine what, if any, impact aviation noise has on sleep

- **Cardiovascular Health**

- Associating historic, modeled noise levels with existing epidemiological studies
- Determine what, if any, correlation exists between cardiovascular disease and aviation noise

Mitigation and Abatement

• Sound Insulation Research

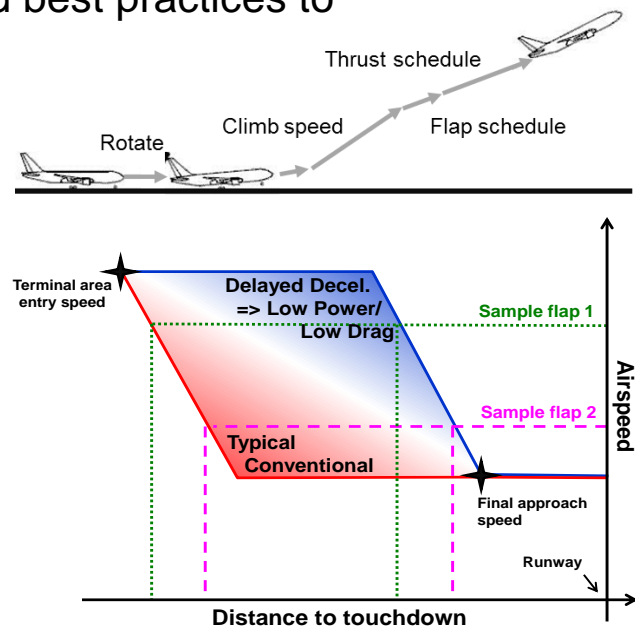
- AEE and FAA Office of Airports joint effort to addresses inconsistencies in the use of ASTM E966A standard and develop recommended best practices to support acoustic testing

• Operations Research

- Precision navigation determines where aircraft fly
- Airlines determine what aircraft fly and when
- There might be opportunities to change how aircraft are flown to reduce noise

Concepts Being Evaluated*

- Route changes
- Thrust / speed management
- Vertical profile
- Introduction of systematic dispersion



*More Information Available at ASCENT Project 023 website:

<https://ascent.aero/project/analytical-approach-for-quantifying-noise-from-advanced-operational-procedures/>

Emerging Aircraft Types

- **Unmanned Aircraft Systems (UAS)**
 - Research has started to understand the potential noise impacts of UAS and to develop appropriate noise certification process for UAS
 - Working to leverage the UAS Integration Pilot Program (IPP)
- **Supersonic Aircraft**
 - Much interest by manufacturers to begin producing aircraft capable of flying over Mach 1
 - FAA announced two rulemakings regarding supersonics
 - Clarification of the process to apply for a special flight authorization to fly over Mach 1 in the U.S.
 - Development of landing and take off noise certification process
- **Commercial Space**
 - Focus is on providing information on appropriate methodologies to use for noise modeling for the National Environmental Policy Act (NEPA)



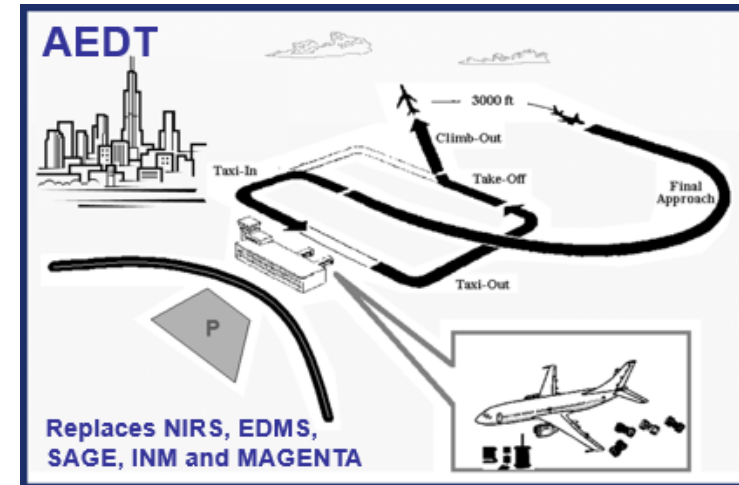
Modeling Aircraft Noise

Aviation Environmental Design Tool (AEDT)

- Computes noise, fuel burn and emissions simultaneously
- Can analyze airport, regional, national, and global scales
- Required for all regulatory actions

AEDT Development Plan

- **Current version of tool, AEDT2d**
- **Developing AEDT3 with release planned in 2019**
 - Seeking to improve abilities at lower DNL
 - Improving takeoff weight and thrust modeling
 - Improving aircraft performance module
- **Laying ground work to incorporate airframe noise more explicitly in AEDT4 with a post 2020 release**



Our Direction

- Utilizing a comprehensive approach to address environmental challenges
- Working with a broad range of stakeholders to understand issues and develop solutions
- Placing **more focus on innovation** to overcome noise and emissions challenges
- Currently have an open solicitation for ideas for the ASCENT Center of Excellence
- Continue to seek international partnerships for our R&D efforts
- Continue to be responsive to priorities outlined in the FAA Reauthorization Act of 2018

