# Airport Technology Research Overview

Presented to: REDAC Subcommittee on Environment and Energy

By: Michel Hovan

Date: March 19, 2019

Federal Aviation Administration

# William J. Hughes FAA Technical Center

- 3,000 Fed/Contractor
- 1,000 non-FAA Tenants
- Over 5,000 Acres

# Airport Technology Research

## 19 Research Program Areas (RPAs)

### Airport Safety R&D Section

### Airport Pavement R&D Section

***Research Sponsored by:***

- **FAA Office of Airport Safety and Standards**
  - Airport Engineering Division (AAS-100)
  - Airport Safety and Operations Division (AAS-300)
- **FAA Office of Planning and Programming**
  - Planning and Environmental Division (APP-400)
- **FAA Office of Environment and Energy**

**Provide support for development of FAA pavement and safety standards (Advisory Circulars).**

# Overall Branch Budget

- **ATR Budget stable around 33M for FY-18 to FY-20**
  - 90% of budget is contract dollars
  - 42% on Pavement Research
  - 50% on Safety Research
  - 8% on Aircraft Noise and Environmental Research

# Noise and Environmental
## Current Projects

| Noise | Environmental |
|---|---|
| National Noise Annoyance Survey | Geospatial Environmental Map Tool (AppMap) |
| National Sleep Disturbance Survey | Attainment Area Air Quality Screening Methods for Airport Operations |
| Noise Level Reduction Test Methods | Improve Accuracy of Dispersion Modeling for Aircraft Emissions |
| Noise Abatement Procedures | Sustainability Synthesis |
| Steeper Approach Ops Feasibility | Runway Length Considerations for Climate Scenarios (Planned) |

# Noise Program

## Noise Annoyance Survey

- Draft Report / Results remain under review FAA/DOT and other Federal Agencies
- Using phone data collected, analyze underlying reasons for annoyance to a range of factors.

## National Sleep Study

- Explore relationship between aircraft noise exposure and sleep disturbance
- 4-5 year effort through OMB
- **Sampling Methodology under review by FAA**

Penn Medicine Westat

# Noise Program
# Noise Level Reduction Test Methods

## *Investigation of ASTM E966 Adjustment Factors*

- Identify adjustment factors for measurements of noise reduction in sound insulation programs and validate factors through modeling and field measurements.
    - **Façade reflection using loudspeaker and <u>flush-mounted</u> microphone = 6bd (5db)**
    - **Façade reflection using loudspeaker and <u>near-facade</u> microphone = 3.5db (2db)**

## *Noise Level Reduction Review of Test Methods*

- Follow up to ASTM E966, same team, 18mo effort began in Nov 2017.
- Evaluated the 2 measurement methods used in RSIPs and help Airports develop industry standards.
- Modeling, field measurements and validation
- Outlined standard test procedure

## *<u>FY19</u>*

- Work with SAE A-21 Committee to develop new standard for "*Aircraft Noise Level Reduction Measurement of Building Facades*"

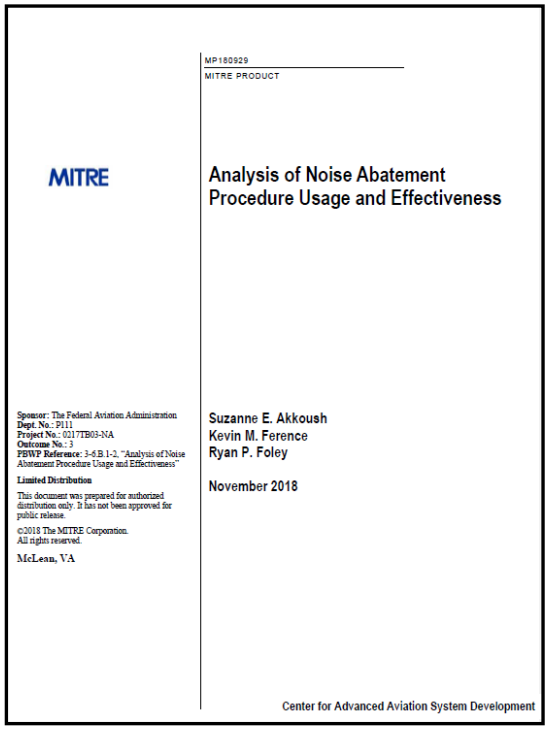
# Noise Program
# Noise Abatement Procedure Effectiveness

***Objectives:*** Explore existing operational procedures with the potential to reduce community noise exposure; Document best practices and wrap into guidance, leading to more effective and frequently-used noise abatement procedures

- **Completed as of Nov 2018**

***Recommendations***:

- Define procedures with sufficient detail so they can be implemented by ATC and flown by pilots
- Consider other operational factors that influence usage
- Consider use of instrument flight procedures (IFPs)
- Document and organize in a standardized manner
- Publicize and coordinate with relevant stakeholders
- Set realistic expectation of use and compliance
- Intended to provide lessons learned for guidance to future Part 150s



MP180929
MITRE PRODUCT

MITRE

Analysis of Noise Abatement Procedure Usage and Effectiveness

Sponsor: The Federal Aviation Administration
Dept. No.: P111
Project No.: 0217TB03-NA
Outcome No.: 3
PBWP Reference: 3-6.B.1-2, "Analysis of Noise Abatement Procedure Usage and Effectiveness"

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McLean, VA

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November 2018

Center for Advanced Aviation System Development

# Noise Program
# Steeper Approach Operational Feasibility

***Objectives:*** Evaluate feasibility of steeper approaches in terms of performance, terminal instrument procedures, and Flight Management System (FMS) dependencies; Identify, evaluate and document operational considerations

- **Completed as of October 2018.**

MP180820

MITRE PRODUCT

MITRE

Research on Steeper Approaches

Sponsor: The Federal Aviation Administration
Dept. No.: P111
Project No.: 0217TC03-5A
Outcome No.: 3
PBWP Reference: 3-6.B.1-1, "Research on Steeper Approaches"

For Release to all FAA

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October 2018

Center for Advanced Aviation System Development

***Conclusions***:

- Operationally feasible, but negligible noise benefits at 3.5 degrees or less.
- Not recommended for implementation at present.
- Noise benefits might be better at higher approach speeds, but limited data for evaluation and other operational considerations apply.

# Airport Environmental Research
# Geospatial Data Library/Tool

*Conduct a feasibility analysis including a roadmap to identify a scalable, easily accessible and centralized environmental/planning mapping tool*

**Need:**

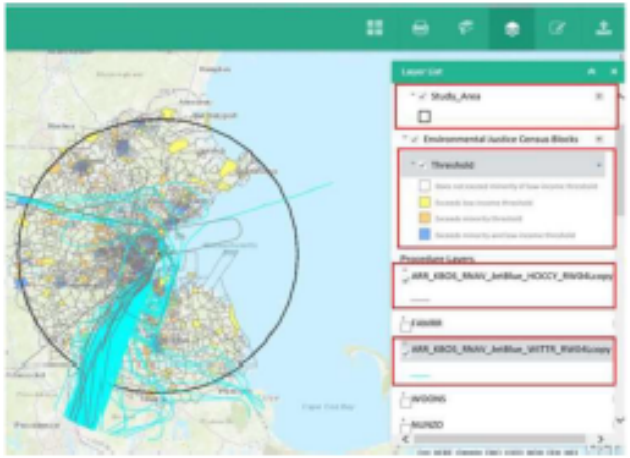
- Better and more easily accessible environmental and planning geospatial information to improve internal workflow, streamline the integration of planning and environmental processes, and support National Environmental Policy Act (NEPA) reviews.

**Solution:**

- The use of a geospatial solution towards developing a scalable, centralized geospatial tool can enhance the decision-making process through better management and analysis of spatial data.

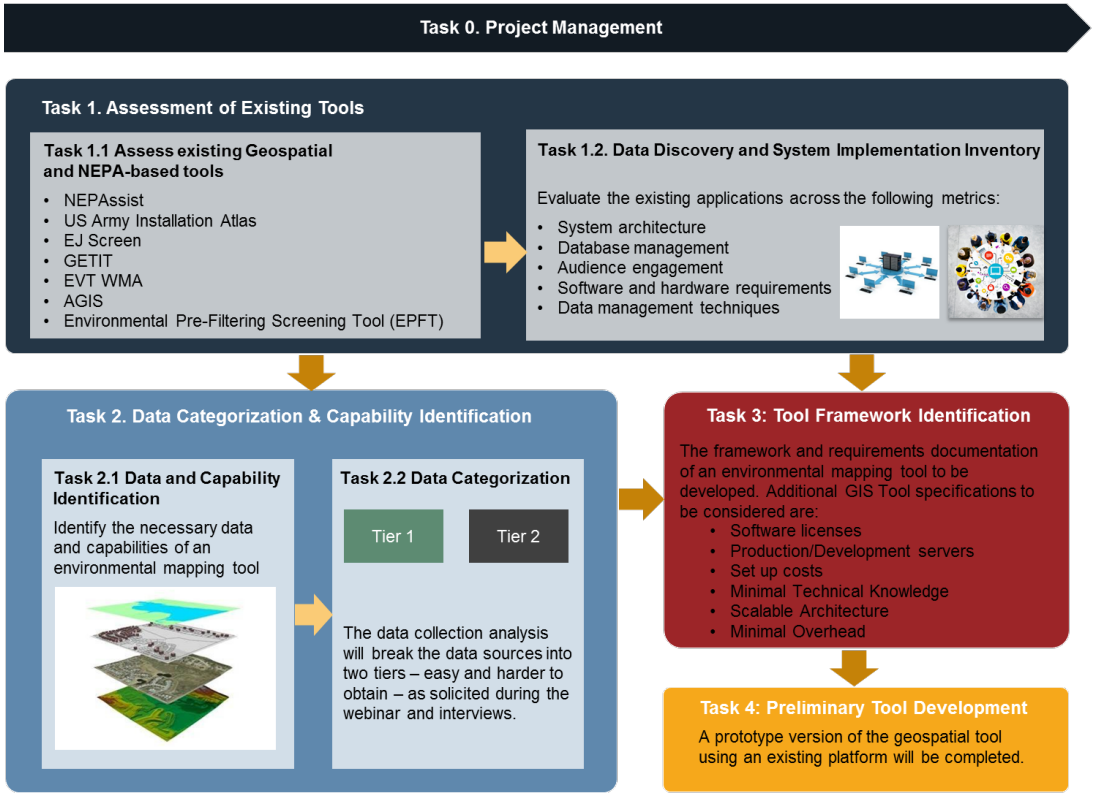
**Web Mapping Application (WMA):**

- Web mapping applications are web based maps that allow the user to interact with the data in various ways such as displaying or querying layers. It is an interactive display of geographic information that one can use to answer questions and is becoming an essential component of many GIS application solutions.*



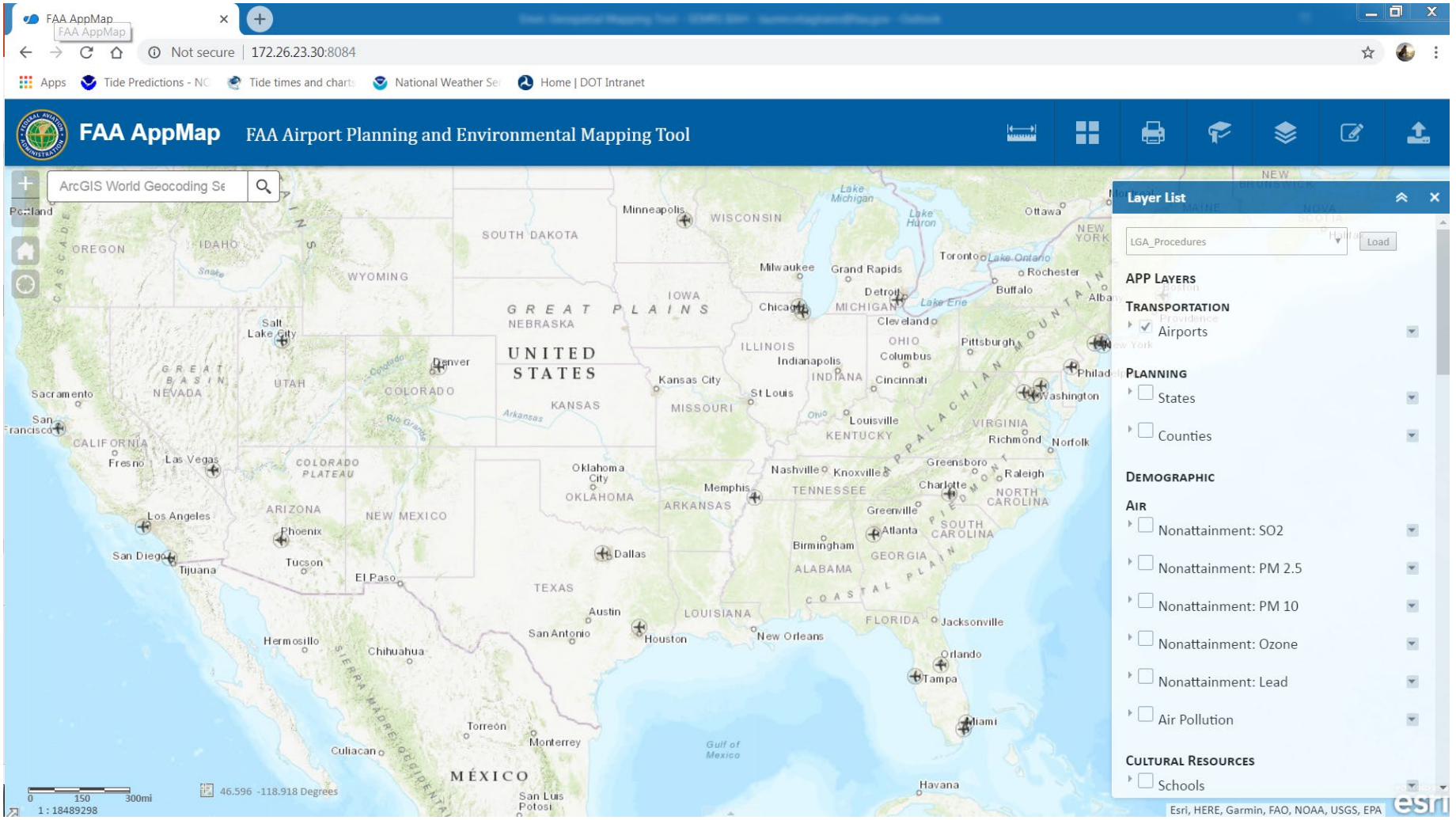
Environmental Visualization Tool (EVT) WMA depicting active layers that can be displayed in a printed map

# Airport Environmental Research
# Geospatial Data Library/Tool




- Conducted Webinars with internal/external stakeholders
- Categorized data
- Tool requirements refined
- Prototype development
- Roadmap for future capabilities

# FAA AppMap


FAA AppMap
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Apps
Tide Predictions - NC
Tide times and charts
National Weather Ser
Home | DOT Intranet
FAA AppMap
FAA Airport Planning and Environmental Mapping Tool
ArcGIS World Geocoding Se
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TRANSPORTATION
Airports
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Counties
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Culiacan
Torreón
Monterrey
San Luis Potosi
Havana
Gulf of Mexico
MÉXICO
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA
esri

# Airport Environmental Research
# Airport Air Quality Screening Methodology in Attainment Areas

***Background***: *Airports must normally conduct an air quality analysis for NEPA purposes to determine whether project emissions would cause significant air quality impacts (exceeding NAAQS) for the air pollutants that aviation operations and construction emissions contribute to.*

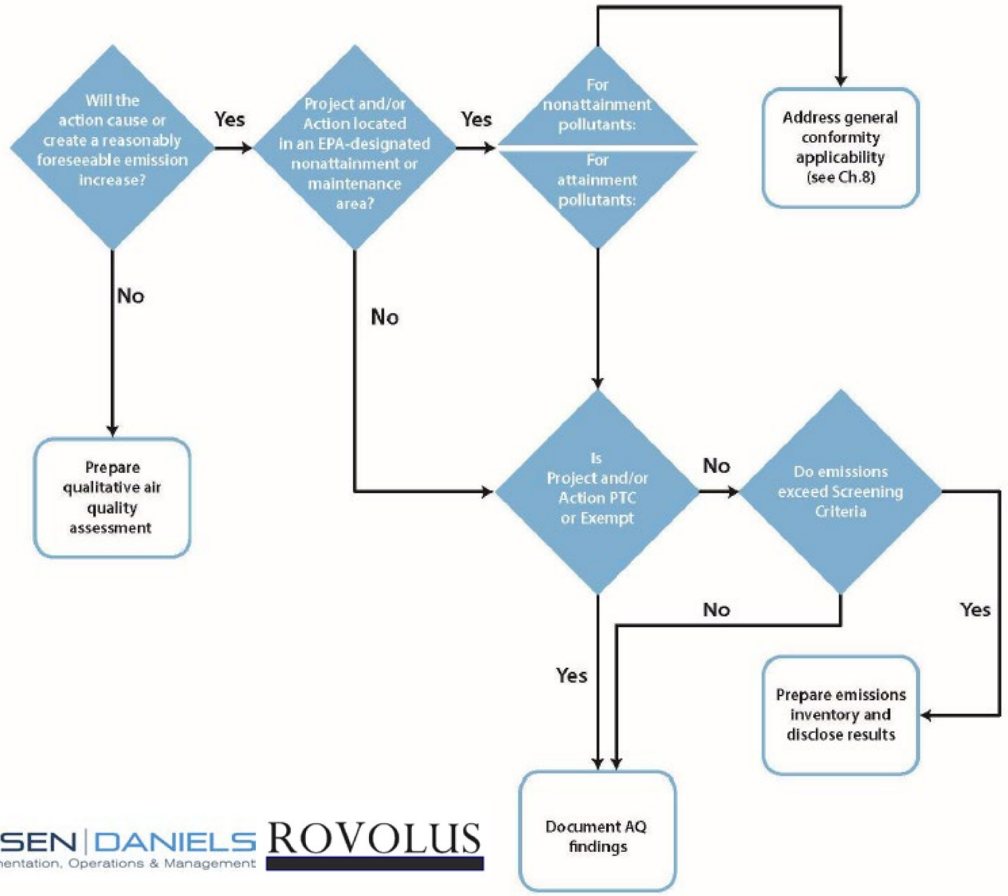
**Objective**: Develop new air quality screening process to assist FAA staff quickly identify analysis requirements for a proposed Federal action in an attainment area.

- Validate current NEPA flow chart and operational screening methods – Feb 2019
- Develop screening methodology for attainment area projects – Feb 2019
- Updates to AQ handbook and presume to conform (PTC) list for nonattainment areas.

# Airport Environmental Research
# Airport Air Quality Screening Methodology for Attainment Areas

## Revised Flowchart for Airport Air Quality Handbook

1. Determine if there are likely to be Air Quality Impacts
2. Determine categorization of ambient air quality for each pollutant.
3. Determine if action is PTC or Exempt
4. Apply the Screening Criteria
5. Prepare Emissions Inventory

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## Airport Environmental Research

# Improve Accuracy of Dispersion Modeling for Aircraft Emissions

***Background***: *Certain airport projects require emission dispersion modelling to demonstrate the project will not violate or worsen NAAQS.*

- *Requires the use of EPA's tool AERMOD, in FAA's AEDT.*
- *February 2010 EPA promulgated the 1-hour standard for Nitrogen Dioxide ($NO_2$).*

**Airports have had trouble/delays in demonstrating their compliance due to modelling challenges.**

**Objective**: Recommend best spatial and temporal assignments for aircraft emissions and best practices to metrological data processing approaches for dispersion modeling.

**Currently conducting a deeper dive into the meteorological data and how to process that data in AERMOD.**

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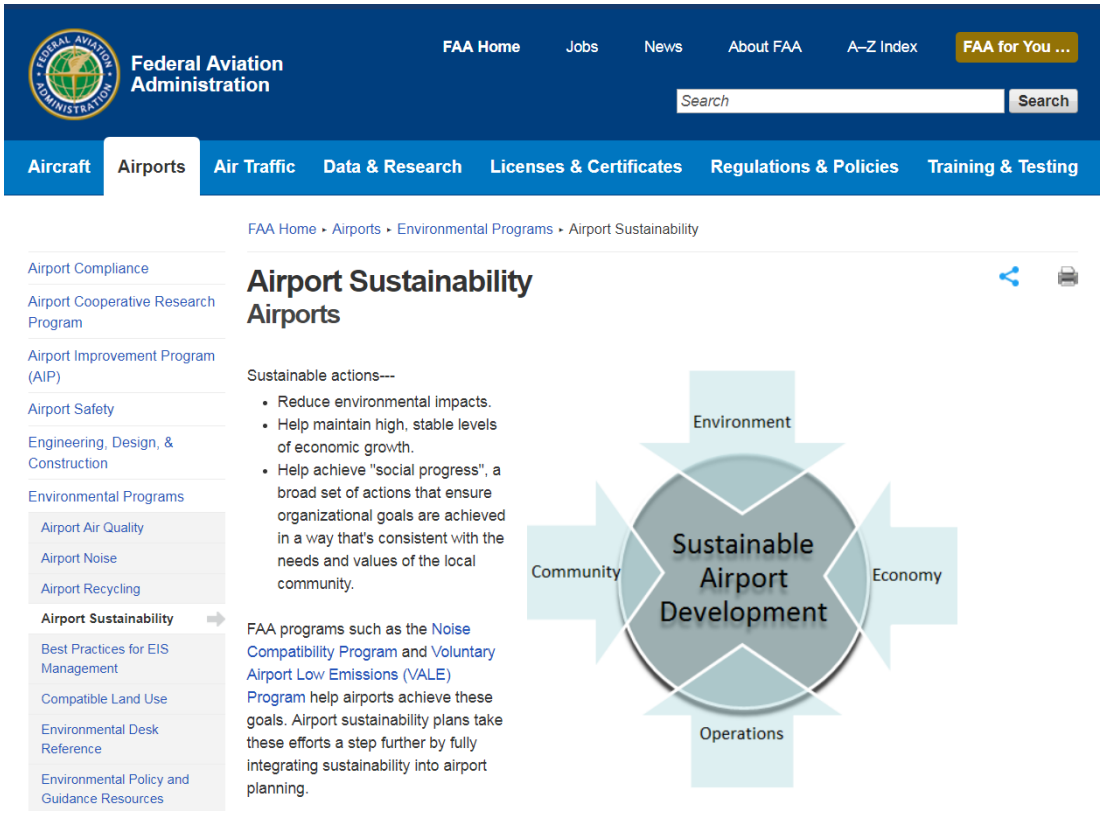
# Airport Environmental Research
# Sustainability Analysis

## Sustainability Analysis

*Background: In 2010 APP began Sustainability Master Plan Pilot Program, provided grants to airports; 47 grants awarded*

Objective: Develop a synthesis of best practices and lessons learned from the Sustainability Master Plan Pilot Program.




**Currently interviewing FAA field personnel, then airport sponsors.**

# FY19 Research

**Continuation of:**

- **Aircraft Noise Annoyance Support**
- **National Sleep Disturbance**
- **NLR Test Method Standard Implementation**
- **AppMap**
- **Air Quality Screening / Improve Accuracy of Dispersion Modeling for Aircraft Emissions**
- **Sustainability Synthesis**

**New:**

- **Runway Length Considerations for Climate Scenarios**

# Questions?

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