Environment & Energy Operations Research Program

Research Roadmap

Presented to: EWG Operations Standing Committee

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Effective solutions to environmental challenges are critical to achieving NextGen mobility goals (i.e., efficiency and capacity)

- Anticipated increases in demand will place significant environmental pressures on the air transportation system.

- Operational trends show that environmental issues have the potential to constrain aviation growth and reduce efficiency unless they are proactively identified and managed as part of NextGen.
A five pillar approach will be used to meet environmental goals and ultimately enhance mobility through NexGen

**NextGen environmental goals**

- Absolute reduction of significant *community noise* and *air quality* emissions impacts
- Improve NAS *energy* efficiency and, supply of and access to, alternative fuel sources
- Limit or reduce the impact of aviation GHG emissions on the *global climate*
- Reduce significant aviation impacts associated with *water quality*

**5-Pillar approach to develop solutions**

- **P1** Improved science and modeling
- **P2** Accelerated maturation of new aircraft technologies
- **P3** Renewable fuels
- **P4** Accelerated ATM Improvements and Efficiencies
- **P5** Policies, Environmental Standards, Market Based Measures and Environmental Management System
AEE sponsors research to advance operational solutions with environment and energy (E&E) benefits

**Current Research**

Examples of ongoing AEE sponsored E&E Ops Research

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<th>Types of Research</th>
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<td>1. Foundational / Methods</td>
<td>• Opportunities for Reducing Surface Emissions through Airport Surface Movement Optimization (ASMO)</td>
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<td>2. Demos &amp; Prototyping</td>
<td>• Continuous Descent Arrivals (CDA) in Low-Through High-Density Traffic</td>
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<td>3. Implementation Testing &amp; System Integration</td>
<td>• En Route Traffic Optimization to Minimize Environmental Impact through Reduced Fuel Burn &amp; Emissions</td>
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<td>• Use of Near-Term Operational Changes to Mitigate Environmental Impact of Aviation</td>
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AEE E&E Ops Research
February 18, 2009
Going forward AEE plans a more systematic comprehensive E&E operations research program

**Research Program Elements**

1. **Roadmap describing areas for E&E Ops Research**
   - near, medium, and long term
2. **Standard procedures to identify, conduct, evaluate and transition E&E Ops research for implementation**
3. **Standardized process to manage ongoing E&E Ops Research Portfolio**

**Goal: Guide Future AEE Research**

- Support critical near, medium, and long-term environmental goals and NextGen requirements
- Identify areas where E&E Ops Research is needed and where opportunities to collaborate ongoing research exist
- Complement and add knowledge to ongoing and planned research (e.g., research conducted by ATO, NASA, industry and academia)
- Align with NextGen implementation plans and goals
- Evaluate E&E Ops Research on an ongoing basis to ensure research focus on the evolving needs of NextGen (e.g., where it should be conducted, expanded, discontinued, or recommended for implementation)
As a first step an E&E Ops Research Roadmap will be developed to guide AEE’s Ops Research program near, mid, and long-term.

- **Near-term Projects**
  - Research topics well defined
  - Focus on immediate challenges
  - Aligned to near-term NextGen solutions

- **Mid-term Projects**
  - Broader research areas defined
  - Focus mid-term challenges
  - Accounts for modernizations

- **Long-term Projects**
  - General research areas outlined
  - Anticipates NextGen implementation
  - etc
Operational research is also conducted by a range of other organizations which may also have E&E benefits.

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<th>Organizations</th>
<th>Ops Research</th>
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<td>FAA ATO</td>
<td>Conduct a broad range of ATM and Operations research focused on safety, efficiency and capacity</td>
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<tr>
<td>NASA</td>
<td>Conducts foundational research focused on the need to transform the US air transportation system</td>
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<tr>
<td>Industry</td>
<td>Conducts a range of research to investigate to improve efficiencies and meet national and international requirements</td>
</tr>
<tr>
<td>Academic Institutions</td>
<td>Conducts a broad range of ATM and Operations research sponsored by government and the private sector</td>
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Present collaboration opportunities to study the environment and energy effects as part of other research efforts.

Current Research
The roadmap will build upon existing work e.g., AEE and EWG projects.
The Initial E&E Research Road Map will be developed in four Steps

1. Baseline Ongoing & Planned Research, & Research gaps

2. Identify Potential Research Projects

3. Evaluate Projects

4. Develop Research Road Map
   - Near-term
   - Mid-term
   - Long-term

Focus of Today’s Working Session
Next Steps

• General Feedback and Thoughts

• Brainstorm potential E&E Ops Research
  – Research Gaps
  – Ongoing Research
  – Who else we should talk to