

Environment & Energy Operations Research Program

Research Roadmap

Presented to: EWG Operations Standing Committee

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Federal Aviation
Administration



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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



Background

A five pillar approach will be used to meet environmental goals and ultimately enhance mobility through NexGen

NOISE



AIR QUALITY



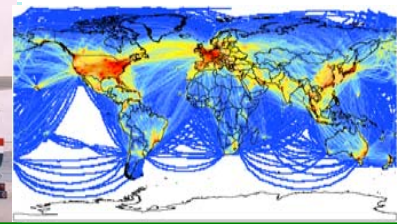
WATER QUALITY



ENERGY



GLOBAL CLIMATE



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

Types of Research

1. Foundational / Methods
2. Demos & Prototyping
3. Implementation Testing & System Integration



Examples of ongoing AEE sponsored E&E Ops Research

- Opportunities for Reducing Surface Emissions through Airport Surface Movement Optimization (ASMO)
- Continuous Descent Arrivals (CDA) in Low-Through High-Density Traffic
- En Route Traffic Optimization to Minimize Environmental Impact through Reduced Fuel Burn & Emissions
- Use of Near-Term Operational Changes to Mitigate Environmental Impact of Aviation

Going forward AEE plans a more systematic comprehensive E&E operations research program

Research Program Elements

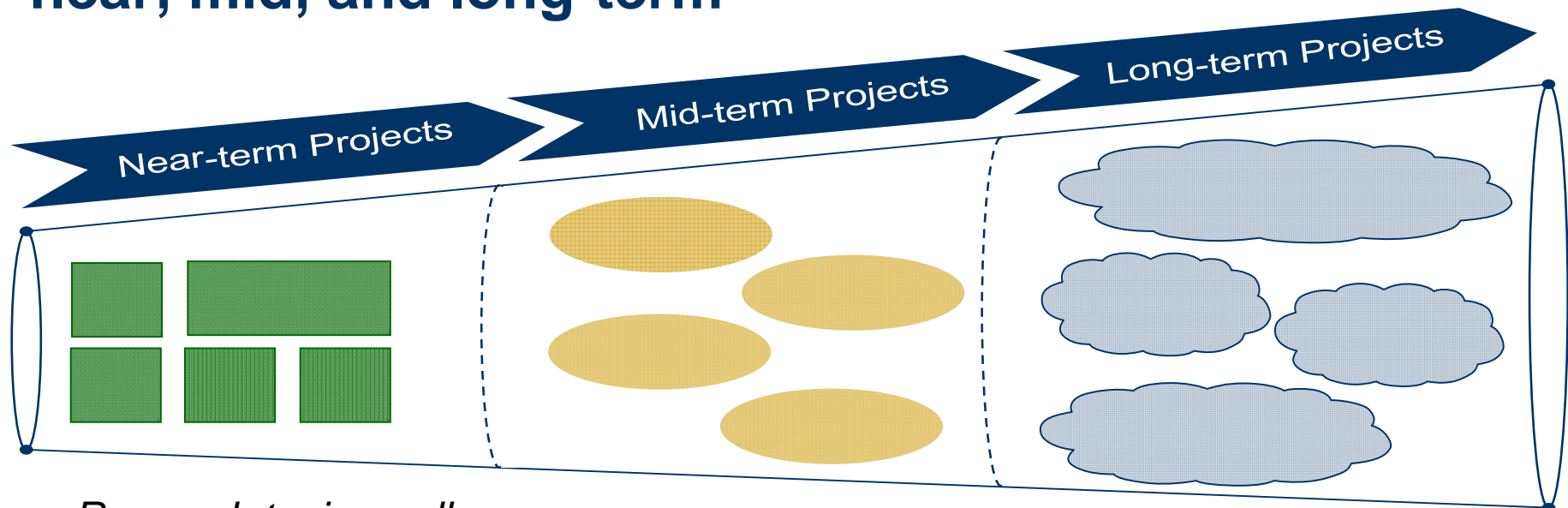
1. Roadmap describing areas for E&E Ops Research near, medium, and long term
2. Standard procedures to identify, conduct, evaluate and transition E&E Ops research for implementation
3. Standardized process to manage ongoing E&E Ops Research Portfolio



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 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



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

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

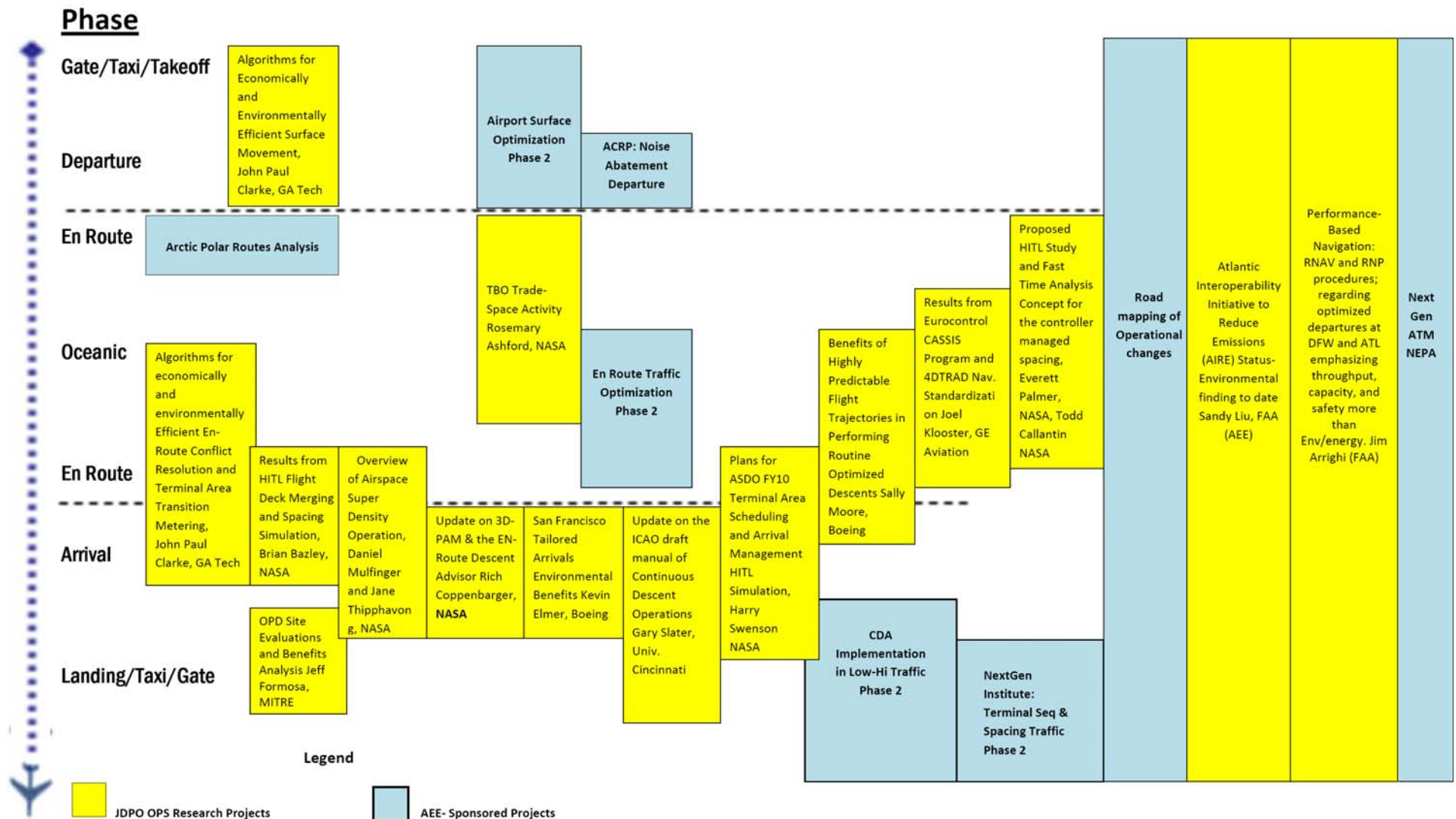
- General research areas outlined
- Anticipates NextGen implementation
- etc

Operational research is also conducted by a range of other organizations which may also have E&E benefits

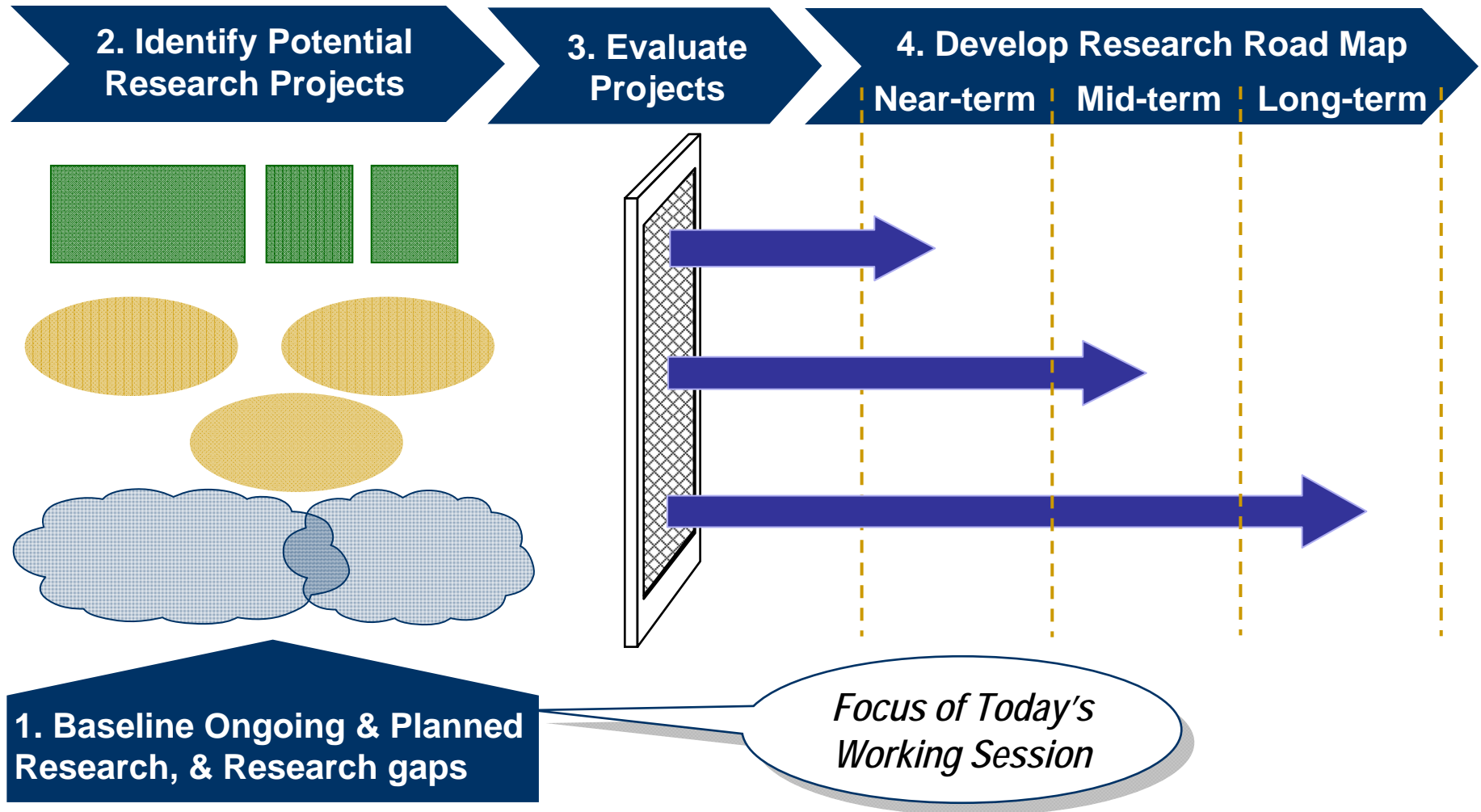
Organizations	Ops Research
FAA ATO	▶ Conduct a broad range of ATM and Operations research focused on safety, efficiency and capacity
NASA	▶ Conducts foundational research focused on the need to transform the US air transportation system
Industry	▶ Conducts a range of research to investigate to improve efficiencies and meet national and international requirements
Academic Institutions	▶ Conducts a broad range of ATM and Operations research sponsored by government and the private sector

Present collaboration opportunities to study the environment and energy effects as part of other research efforts

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



Next Steps

- **General Feedback and Thoughts**
- **Brainstorm potential E&E Ops Research**
 - Research Gaps
 - Ongoing Research
 - Who else we should talk to