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FAA's Strategic Research Agenda

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Director, William J. Hughes Technical Center

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Purpose and Agenda

Federal Aviation Administration

Purpose:

Present FAA's Research & Development (R&D) program strategy

Agenda:

- Executive Summary
- R&D Drivers
- R&D Management Goals/Objectives
- REDAC's Role and Assistance

Nature of FAA Research & Development

(Executive Summary)

Statute: US Code Titles 42, 49

Applied Research

To analyze information and identify, develop, establish, improve, accelerate and/or enhance practicable methods, procedures and new technologies

Expected Outcome:

Provide scientific results that support the setting and enforcement of standards and regulations that **enable** the aviation industry's ability to predict and prevent Defects, Failures and Malfunctions

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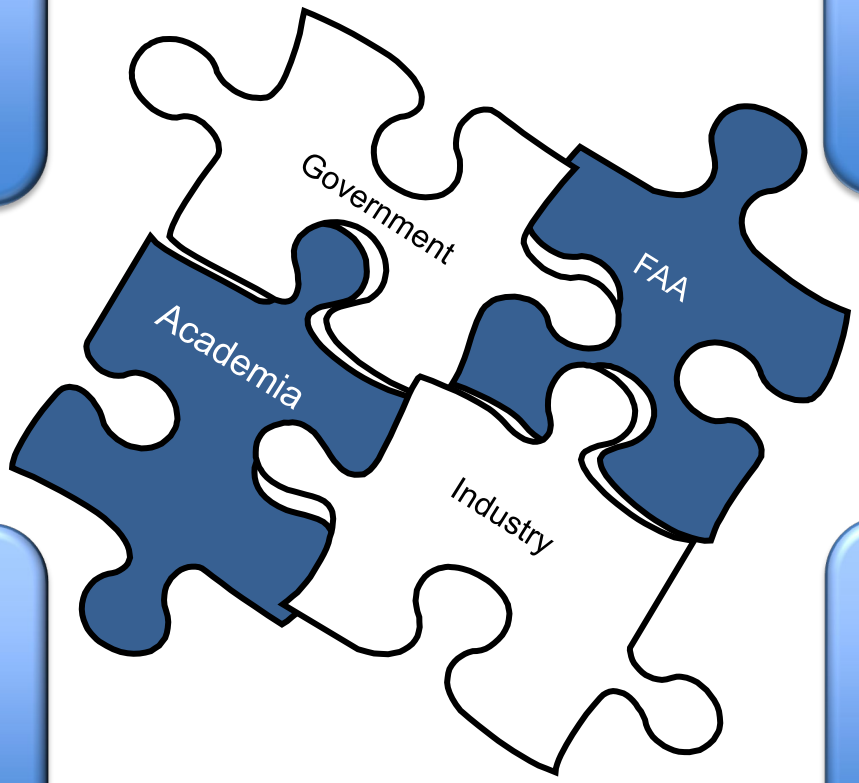
Strategic Emphasis on Partnerships

(Executive Summary)

Oversight

Collaboration



Technology Transfer

National/ International Leadership

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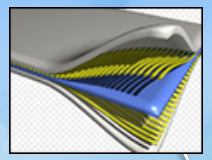
FAA Research & Development at a Glance

(Executive Summary)

Fire Safety



Aircraft Structures

Propulsion and Fuel systems

Aircraft Safety Assurance

Digital Systems

Digital Technologies

Cyber Security

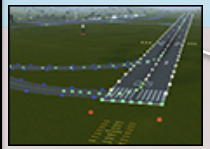
Digital Systems & Technologies

Weather

Icing

Environment & Energy/Fuels

Env. & Weather Impact Mitigation



Airport and Terminal

Pavement

Airport Technology

System Safety Management

Air Traffic Management

New Entrants

Aviation Performance & Planning

Human Performance & Aeromedical Factors

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Research Programs by Research Area

(Executive Summary)

Approp.	Research Program
Airport Technologies	
AIP	Airports Cooperative Research
AIP	Airports Technology Research
Aircraft Safety Assurance	
RE&D	Fire Research and Safety
RE&D	Unmanned Aircraft Systems
RE&D	Advanced Materials/Structural Safety
RE&D	Aircraft Catastrophic Failure Prevention
RE&D	Continued Airworthiness
RE&D	Propulsion and Fuel Systems
RE&D	System Safety Management/**Terminal Area Safety**
Digital Systems and Technologies	
RE&D	Aircraft Icing/**Digital System Safety**
RE&D	NextGen – Information Security
RE&D	NextGen – Flight deck Data Exchange
Environment and Weather Impact Mitigations	
RE&D	Weather Program
RE&D	NextGen – Weather Technology in The Cockpit
RE&D	**Aircraft Icing**/Digital System Safety
RE&D	Environment and Energy
RE&D	NextGen – Environmental Research – Aircraft Technologies and Fuels

Approp.	Research Program
Human Performance and Aeromedical Factors	
RE&D	Flight deck/Maintenance/Systems Integration Human Factors
RE&D	Air Traffic Control/Technical Operations Human Factors
RE&D	NextGen – Air Ground Integration Human Factors
RE&D	Aeromedical Research
F&E	NextGen Transportation System – Enterprise, Concept Development, **Human Factors and Demonstrations** Portfolio
Aviation Performance and Planning	
RE&D	**System Safety Management**/Terminal Area Safety
RE&D	Commercial Space Transportation
RE&D	NextGen – Wake Turbulence
F&E	Advanced Technology Development and Prototyping
F&E	NextGen – Separation Management Portfolio
F&E	NextGen – Traffic Flow Management Portfolio
F&E	NextGen – On Demand NAS Portfolio
F&E	NextGen – NAS Infrastructure Portfolio
F&E	NextGen Support Portfolio
F&E	NextGen **– Enterprise, Concept Development**, Human Factors, and Demonstrations Portfolio
F&E	NextGen transportation System – Unmanned Airspace Systems (UAS)
RE&D	System Planning and Resource Management

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Emerging Technologies

(Executive Summary)

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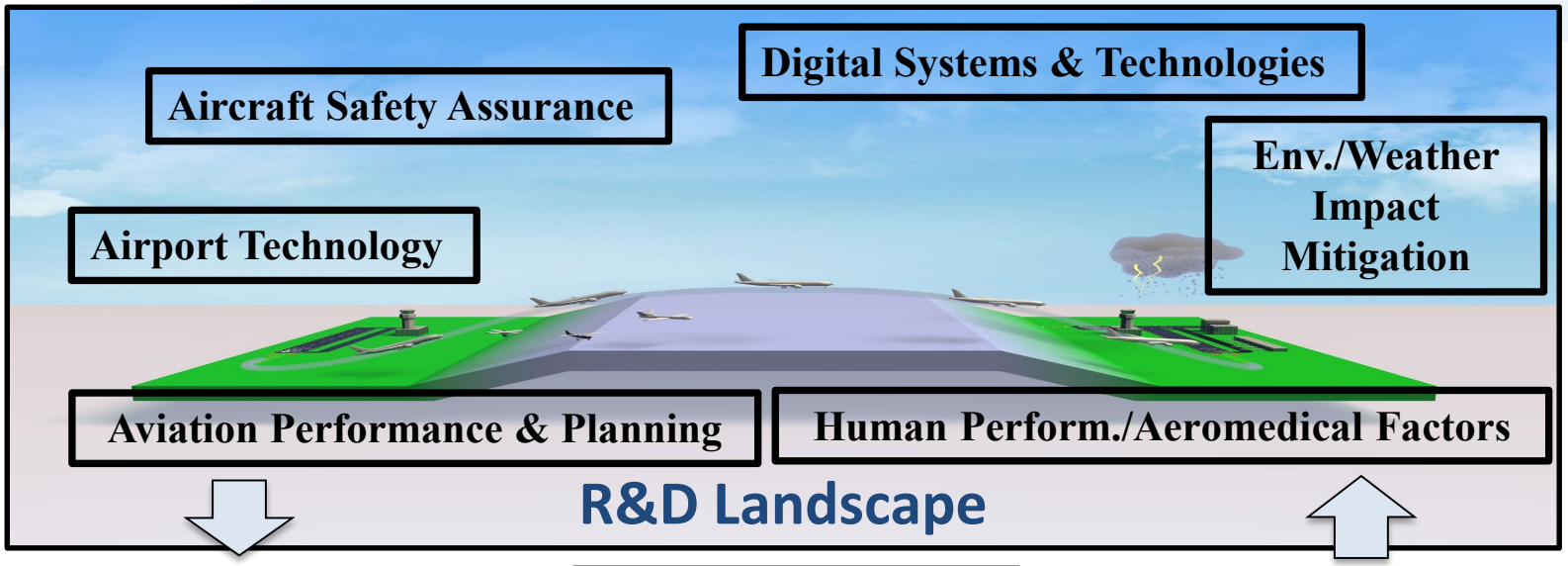
Research Program Strategy

(Executive Summary)



Planning

- Projects: allocate to Portfolio Areas
- Resources: optimize workforce, budget & capabilities

No Duplication

Execution

FAA
Partner
(industry/academia/gov't)
Private sector

Collaboration, Partnerships & Private

Output

NARP Goals
Annual Review

Communicate results

Evaluate R&D Outcomes

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Administration's R&D Vision

FY 2019 Administration Research and Development Budget Priorities (OMB memo M-17-30)

Accountability & Efficiency

- ❑ Public good
- ❑ **No duplication**
- ❑ **Evaluate R&D outcomes**

Innovative Early- Stage Research

- ❑ **Private sector** funding & innovation
- ❑ Strong **partnerships**

Interagency Coordination

- ❑ Avoid **duplicate** efforts
- ❑ **Maximize collaboration**

Future Focused Workforce

- ❑ STEM education
- ❑ STEM workforce

Research Infrastructure

- ❑ **Partnerships**
- ❑ Maintain
- ❑ Modernize

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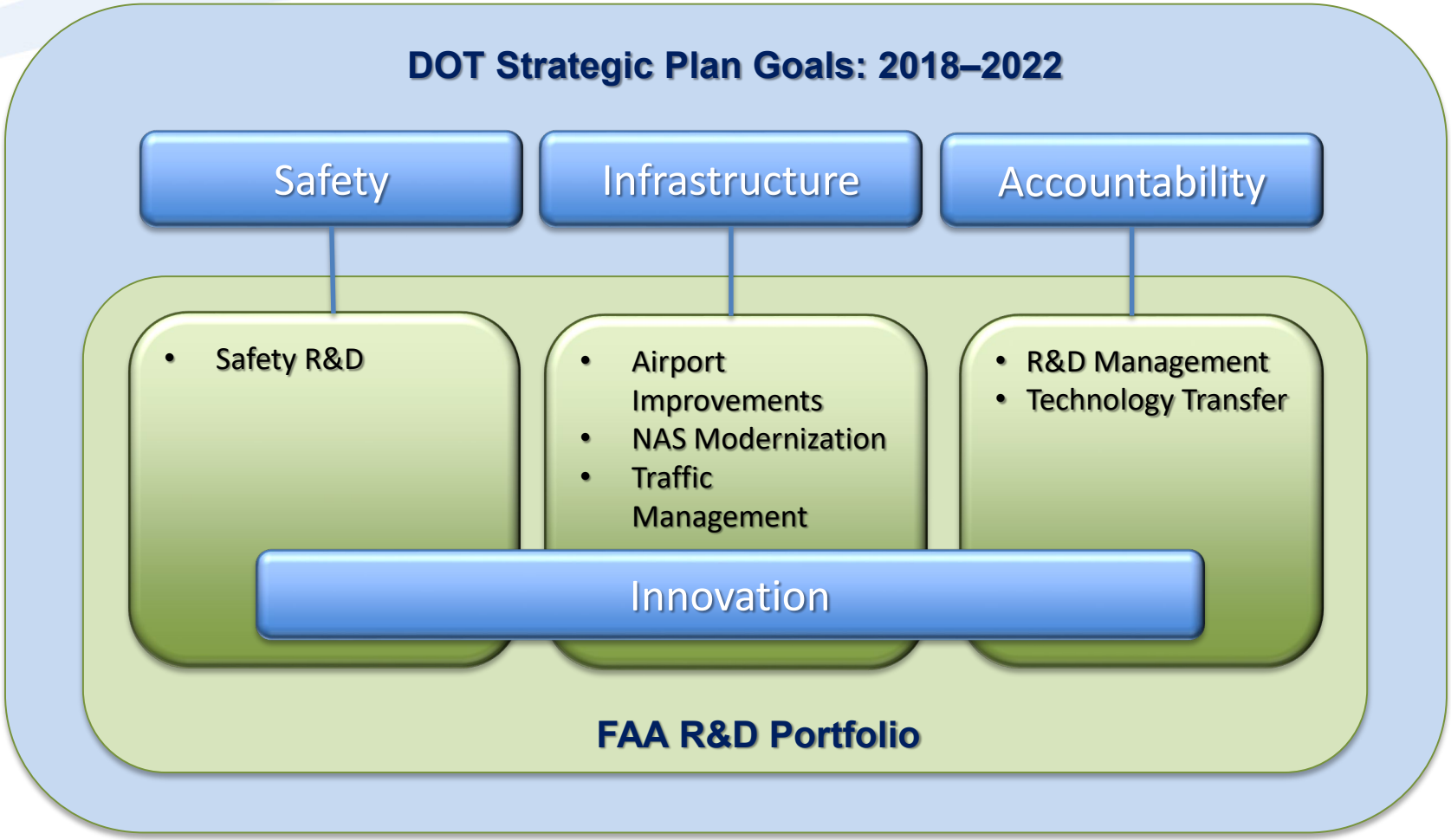
DOT Strategic Plan - FAA R&D Alignment



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R&D Portfolio: Objective & Goals

To ensure understanding of the broader R&D landscape and develop an effective and holistic FAA R&D portfolio

Goals

1. Effective communication of R&D plans, work efforts and accomplishments within the context of DOT/FAA strategic goals and broader aviation R&D landscape
2. Effective planning and prioritization strategy for R&D investments within a broader landscape

FAA National Aviation Research Plan

Provides 5 year R&D planning outlook across safety, efficiency and environmental principles

Goals

1. Improve airport operations, air traffic and air space management capabilities
2. Accelerate use of new technologies for aerospace vehicles, airports and spaceports
3. Increase infrastructure durability and resiliency
4. Improve the operation of the human component of the system
5. Improve integrated modeling capabilities and system-wide analysis

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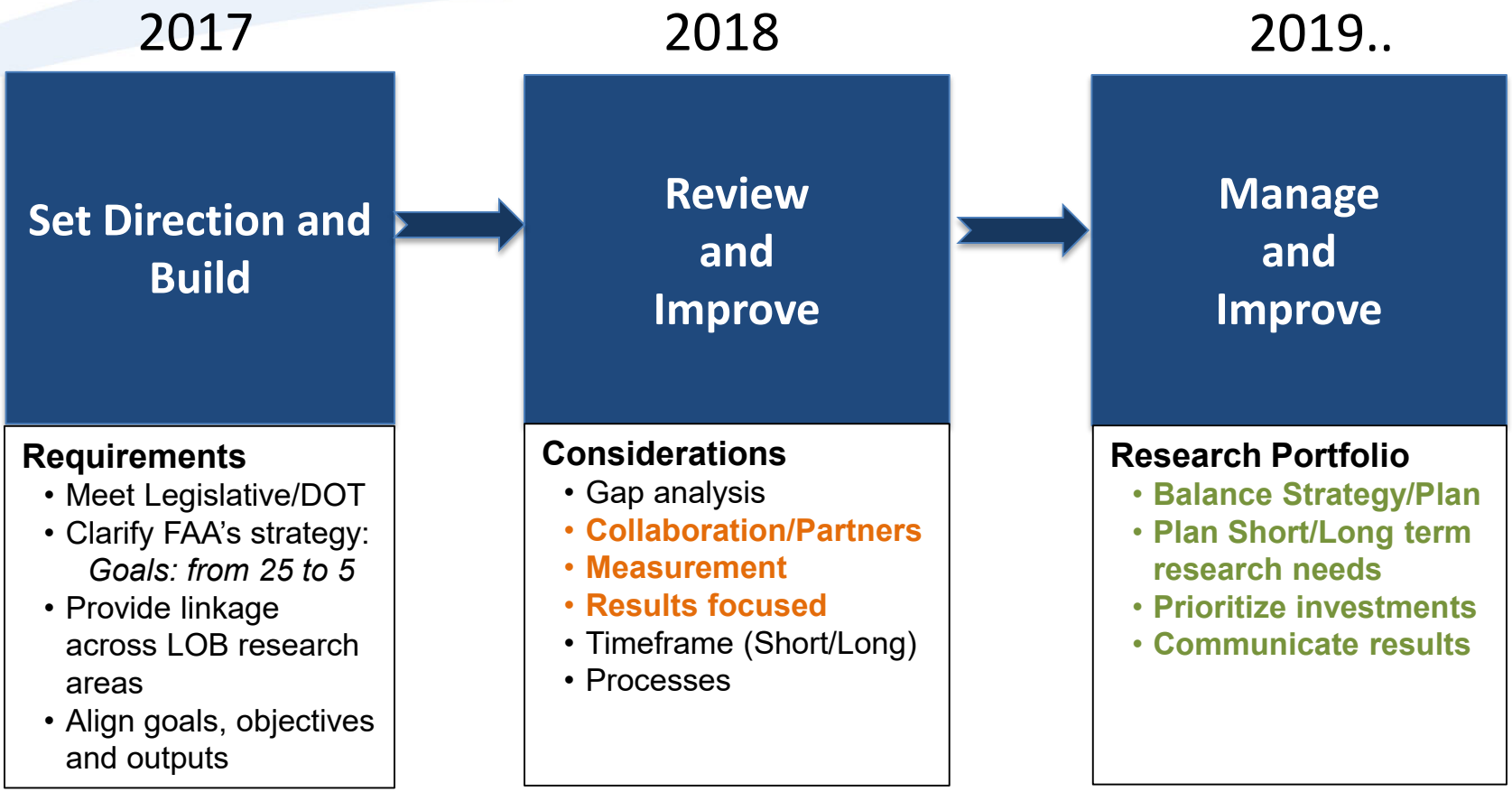
NARP Redesign Roadmap



Challenge: *Communicating a coherent long-range research strategy while meeting highly prescriptive statutory requirement*

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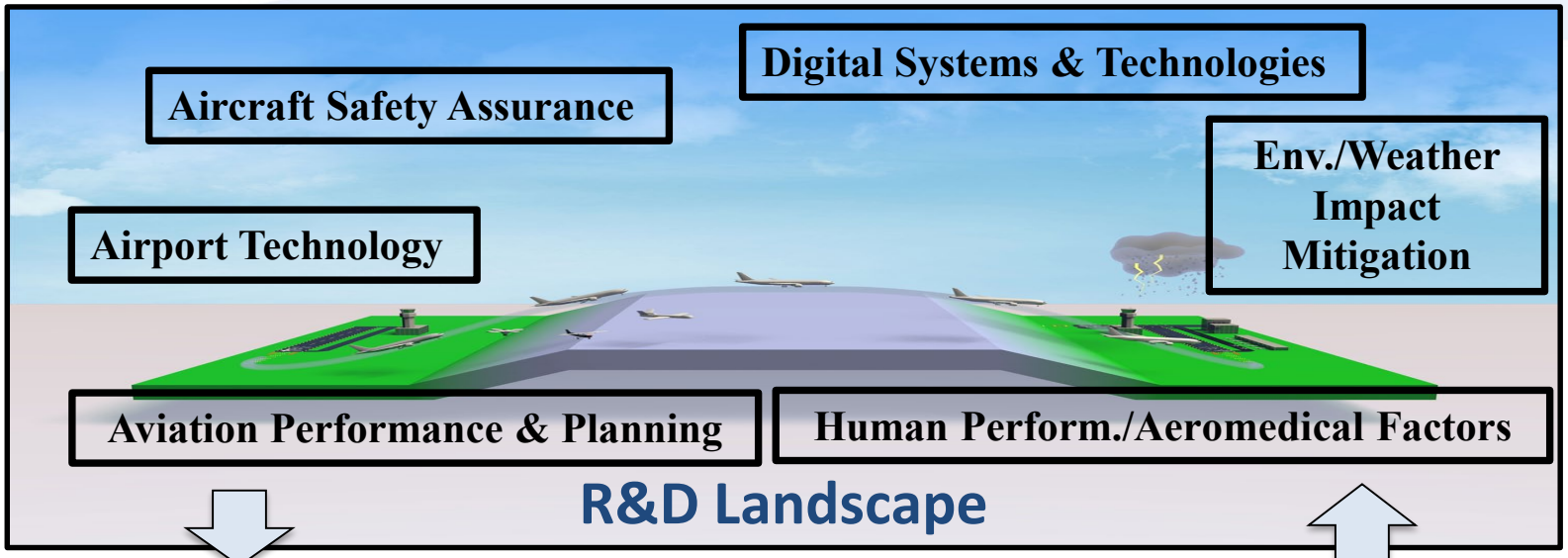
Research Program Strategy



Planning

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Execution

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Evaluate R&D Outcomes

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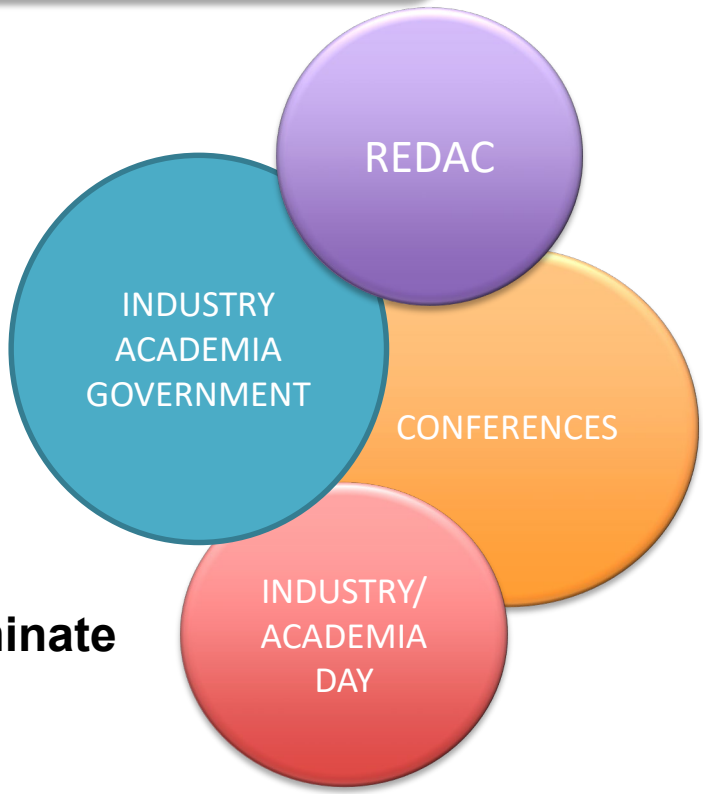
Research & Development Landscape

To leverage and frame FAA's R&D portfolio

1. **How do we understand the aviation community's R&D**
   - Drivers?
   - Needs?
   - Activities?
   - Investment levels?
   - Valuation of FAA's R&D?
   - Partners?
   - Etc.

2. **How do we apply our understanding to better drive FAA's investments and eliminate duplication?**



Understanding

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REDAC's Role

Legislation:

"Provide advice and recommendations regarding needs, objectives, plans, approaches, content, and accomplishments with respect to the aviation research program.

AND

Assist in assuring that such research is coordinated with similar research being conducted outside of the FAA"

Identifying aviation community's Drivers/Needs/Activities/Investments

R&D Landscape

Planning

- Identifying short, medium or long term R&D
- Identifying
  - Collaboration
  - Asset sharing
- Eliminating duplication

Execution

Monitoring Progress

Output

Reviewing Effectiveness and Value

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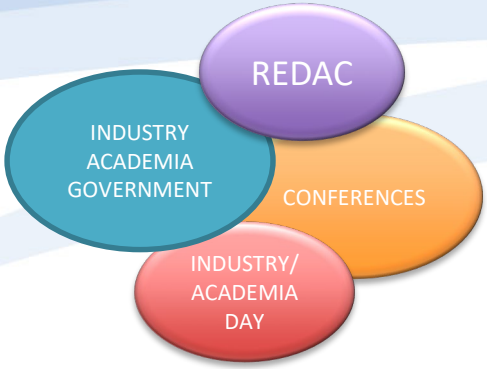
Discussion

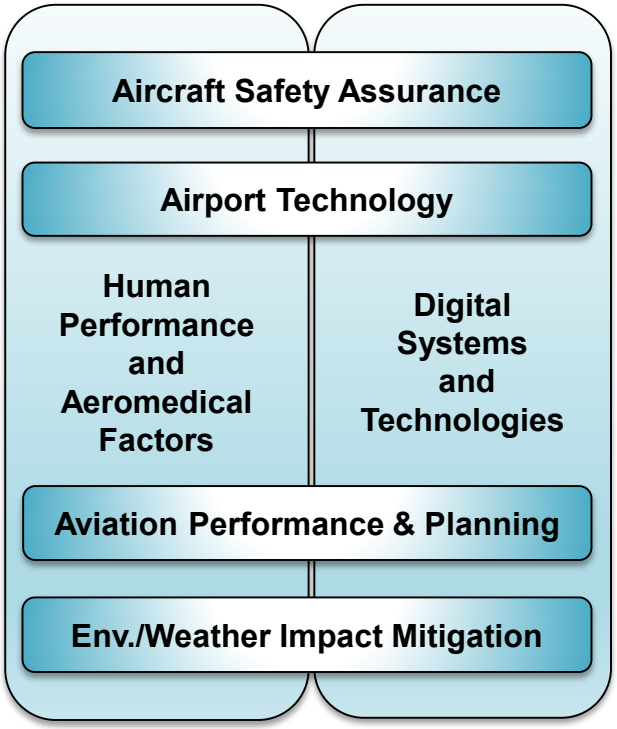


How may we use the upcoming 2019 REDAC meetings to develop Aviation Community R&D Landscapes?

REDAC Subs

- Aircraft Safety
- Airports
- Human Factors
- NASOps
- Environment /Energy

R&D Landscapes



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REDAC: Comments to date

1. **FAA Drafts Landscapes**
   - Performers/Chief Scientists/Sponsors
2. **Landscapes:**
   - Current state/core capabilities
   - **Aviation Drivers:**
     - Issues
     - Requirements (legislative, technical)
     - the “Why” for current regulations
     - Community environmental factors – “What is happening or occurring in the aviation community”
     - REDAC Enabling Technologies
3. **REDAC Reviews**
   - Identifies gaps and expands
   - Assists in identifying industry research investments (or sources)

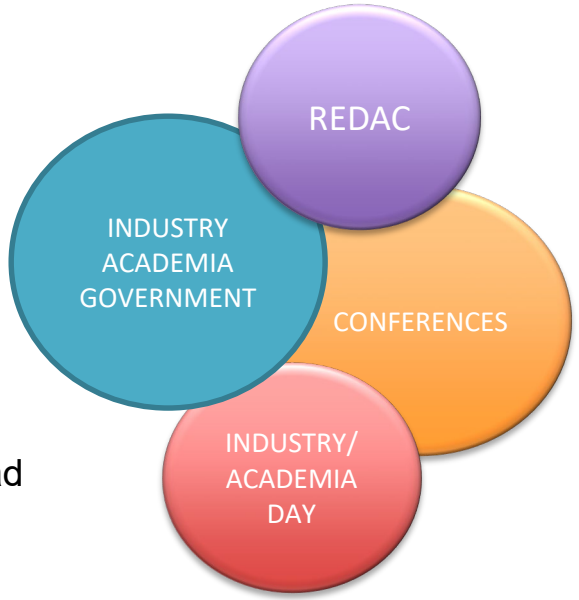
BACKUP

How may REDAC assist?

FAA in developing a comprehensive view of R&D required to support vibrant aviation sector

Identifying:

- Drivers/Needs/Activities/Investments;
- Estimated impact and valuation of FAA R&D;
- Short, medium or long term R&D;
- Duplicate R&D;
- Opportunities to build off of efforts currently underway;
- Potential industry, academia & government partnerships
- Opportunities to share assets;



Outcomes:

- Identify the minimum, if any, research that the FAA **must** lead
- Identify the level of research investment the aviation community is making or is willing to make
- Identify opportunities to leverage FAA's R&D infrastructure
- Other?