Aviation R&D Landscapes

Presented to: NAS Operations Subcommittee

By: Maureen Molz and Team

Date: March 26-27, 2019

Federal Aviation Administration

What is a Landscape?

- **A Landscape is a collection of research drivers that provides information about their potential impacts to the industry.**
  - Research Drivers
    - A force or motivation that stimulates R&D investment
  - Impacts
    - Industry Objectives
    - Emerging Technologies
    - Envisioned Operations

Federal Aviation Administration

Objectives

FAA R&D Landscaping is an aviation industry-focused view of research drivers that may result in impacts to industry objectives, emerging technologies and envisioned operations.

Research Beneficiaries

Research Impacts

Research Drivers

Stakeholder Input
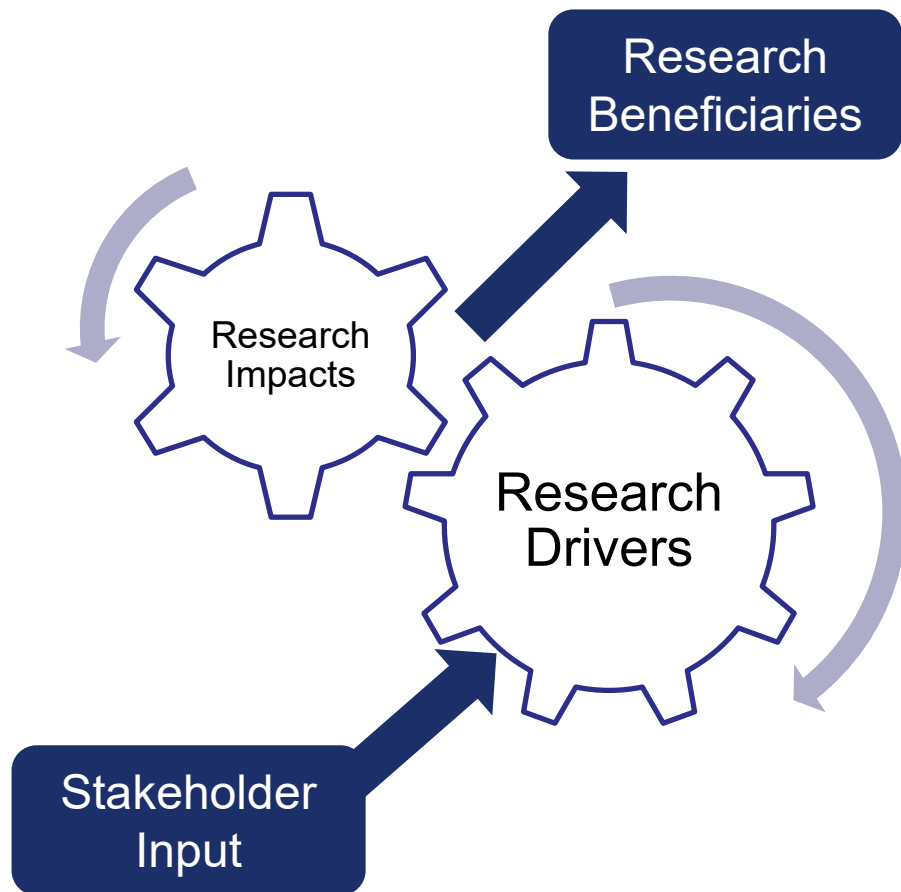
Developing the R&D Landscapes

- **A document will be produced to effectively communicate the Aviation Industry Landscape.**

- **Research drivers and their impacts must be understood and will be described within the context of each of the 6 research domain areas.**
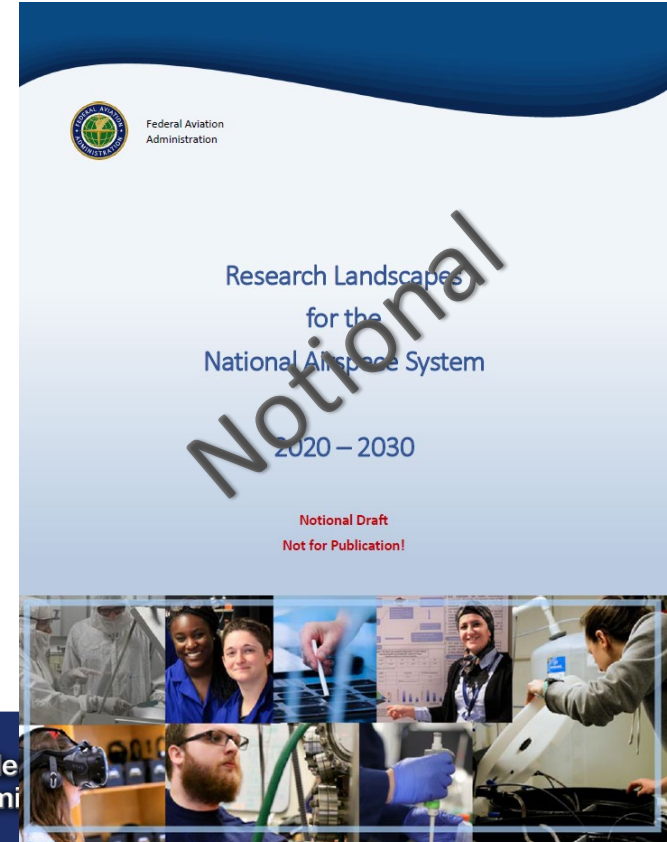
Derivation of Drivers

FAA's Strategic Initiatives

a) Make aviation safer and smarter
b) Deliver benefits through technology and infrastructure
c) Enhance global leadership
d) Empower and innovate with the FAA's people

Future of the NAS - 2030

Goals

a) NextGen Evolution
b) Benefits of the Future NAS
c) Delivering Improved Services
d) Seamless Integration
e) Meeting New Challenges

Strategic Interest

a) NAS Infrastructure
b) Smart Systems
c) Certification & Regulation
d) NAS Operational Information Exchange
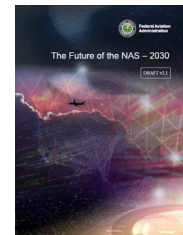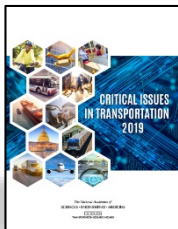e) Cybersecurity
f) Space Operations
g) Workforce

FAA NAS Horizons

DoT Strategic Plan

a) Safety
b) Infrastructure
c) Innovation
d) Accountability

REDAC Emerging Issues

Example Research Drivers

Supersonic Flight

Urban Air Mobility

Non-Traditional NAS Access Points

Space Operations

Electric Propulsion

Future Fuel Technologies

Artificial Intelligence

Remote/Virtual Technologies

TRB Critical Issues in Transportation

Issues

a) Transformational Technologies and Services
b) Serving a Growing and Shifting Population
c) Energy and Sustainability
d) Resilience and Security
e) Safety and Public Health
f) etc.
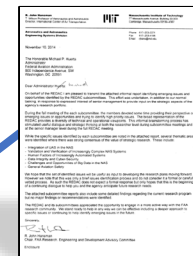
ACARE – Strategic Research & Innovation Agenda

Challenges

a) Meeting societal and market needs
b) Industrial leadership
c) Environment and energy supply
d) Ensuring safety and security
e) Prioritizing research, testing, and education

R&D Landscape Process

- **Team composed of FAA research domain leads, MITRE, ANG-E4 and senior management**
  - R&D Landscape team formed and initiated on October 31, 2018.
  - Bi-weekly team meetings, with additional research domain specific meetings as needed.
- **Tasks involved:**
  - Develop structure for data collection
  - Ensure traceability of research drivers to source documentation

Research Domain Leads

R&D Research Domain Areas	Research Domain Leads
Airport Technology	Michel Hovan, ANG-E2 Ryan King, ANG-E2
Aircraft Safety Assurance	Eric Neiderman, ANG-E2 Ken Knopp, ANG-E2
Digital Systems & Technologies	Eric Neiderman, ANG-E2 Hossein Eghbali, ANG-E2
Human and Aeromedical Factors	Kenneth Allendoerfer, ANG-E2 Carla Hackworth, AAM (CAMI) Stacey Zinke, AAM (CAMI) Dan Herschler, ANG-C1
Environment & Weather Impact Mitigation	Jim Hileman, AEE Randy Bass, ANG-C6 Warren Fellner, ANG-C6
Aviation Performance & Planning	Francisco Bermudez, ANG-C5

Federal Aviation Administration

Research Landscapes and Planning

Landscapes

Aviation Industry

Research Drivers

A force or motivation that stimulates R&D investment.

Impact Analysis

What is the driver impact on industry objectives, emerging technologies or envisioned operations?

FAA

Planning

FAA Research Portfolio

By research domain: prioritized research projects w/FAA's role (Lead, Watch, Participate)

National Aviation Research Plan (NARP)

Documented approach for achieving FAA's research goals/objectives

Execution

Research

FAA's research serving to meet FAA NARP objectives
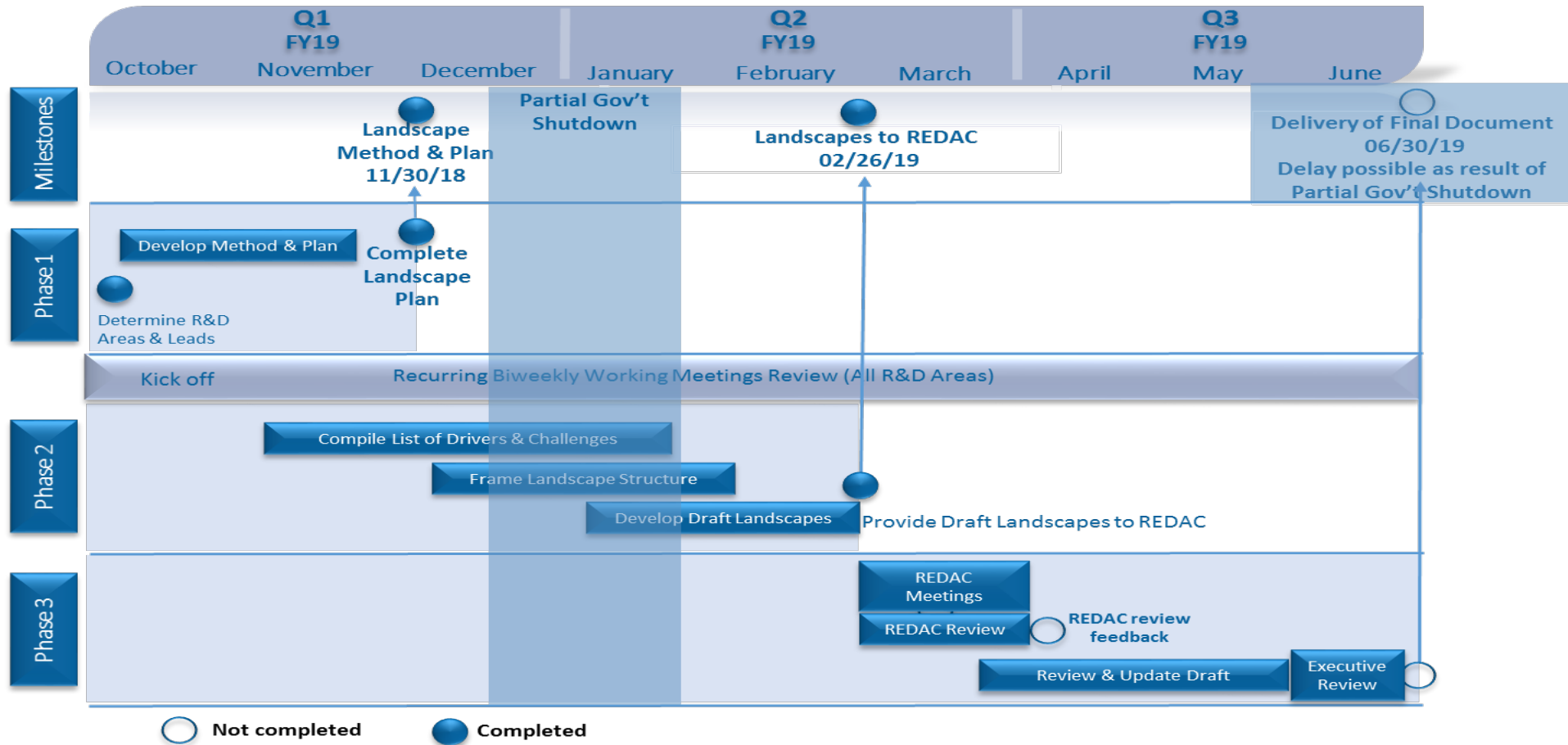
Results

Research Outputs

Results of FAA's research and Technology Transfer

Federal Aviation Administration

Landscape Schedule

	Q1 FY19			Q2 FY19			Q3 FY19		
	October	November	December	January	February	March	April	May	June

Milestones

Landscape Method & Plan 11/30/18

Partial Gov't Shutdown

Landscapes to REDAC 02/26/19

Delivery of Final Document 06/30/19
Delay possible as result of Partial Gov't Shutdown

Phase 1

Develop Method & Plan

Complete Landscape Plan

Determine R&D Areas & Leads

Kick off — Recurring Biweekly Working Meetings Review (All R&D Areas)

Phase 2

Compile List of Drivers & Challenges

Frame Landscape Structure

Develop Draft Landscapes

Provide Draft Landscapes to REDAC

Phase 3

REDAC Meetings

REDAC Review

REDAC review feedback

Review & Update Draft

Executive Review

◯ Not completed   ● Completed

Subcommittee Scope

Objective/Purpose

- Help FAA understand the aviation industry's strategic focus (drivers).

Aviation Industry Landscape

- The R&D Landscapes Workbook (provided under separate cover) contains:
  - A list of 25 research drivers related to industry-based emerging technologies
  - Worksheets related to each driver containing a set of questions

Federal Aviation Administration
Research & Development Landscapes
2020 - 2030

Research, Engineering and Development
Advisory Committee (REDAC)

Sub-Committee Workbook for:

_____

Federal Aviation
Administration

Subcommittee Task

- **Review the driver list and identify any missing items.**
- **For drivers pertaining to your subcommittee provide the following within the workbook:**
  - Identify the characteristics or individual components of each driver and the timeframe to maturity.
  - Identify if the driver presents challenges that the FAA should pay attention to.
  - Identify entities (academia, government, or industry) that are currently conducting work related to this driver.
- **Separate from F&Rs, provide subcommittee Workbook input to the DFO's prior to the full REDAC meeting on 4/11.**
- **Be prepared to summarize during the full REDAC meeting on 4/11.**

Federal Aviation
Administration