Federal Aviation Administration

Integrating Advanced Air Mobility in the NAS

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Advanced Air Mobility (AAM)

DELTA

Joby

UNITED

ARCHER

ups

BETA

American Airlines

VERTICAL

FedEx

ELROY AIR

BOEING

wisk

- First electric vertical takeoff and landing (eVTOL) aircraft expected to be FAA certified in 2025
- Predicted to be a $115B market by 2035
- New venture capital funded “disruptive” manufacturers backed by traditional operators
- Initial business cases
  - Air taxi (airport to city pair)
  - Cargo (small market to hubs)
  - Medical transport
- Initial operations look like traditional helicopter/GA piloted aircraft, but plan rapid shift to autonomous
- Unique, yet-to-be-built “ecosystem” needs to support vertiports, charging, routes, & automation

Balancing the Pace of Innovation and Safe Operations

Federal Aviation Administration

AAM ADVANCED AIR MOBILITY

FAA Integrated Team

Requirements Definition and
Portfolio / Program Management

Federal, State, Local, Tribal, and Territorial (FSLTT) Government
Ongoing since Jan. 2023

Industry and Local Community Engagement
Ongoing since Sep. 2022

Team Development
Innovation Teams (iTeams) also tie into DOT AAM IAWG sub-groups
Ongoing since Sep. 2022

Aircraft Certification	Airspace Management	Environment	People	Security
Airspace Infrastructure	Community Engagement	Operations Certification	Safety	Vertiports

Advanced Air Mobility Implementation Plan
Jul. 2023

FAA Ongoing Engagement

We work with partners across the federal government to implement the AAM Coordination and Leadership Act to coordinate policy for integrating AAM operations.

AAM Interagency Working Group

Office of Science and Technology Policy

Joint test team with Agility Prime and NASA leverages knowledge and resources to collect performance data to develop policy and standards.

Federal Government and Workforce Partners

We encourage state, local, and tribal communities to be informed about AAM technology and how these new operations will affect them. These meetings help us to better understand local sentiment about AAM operations.

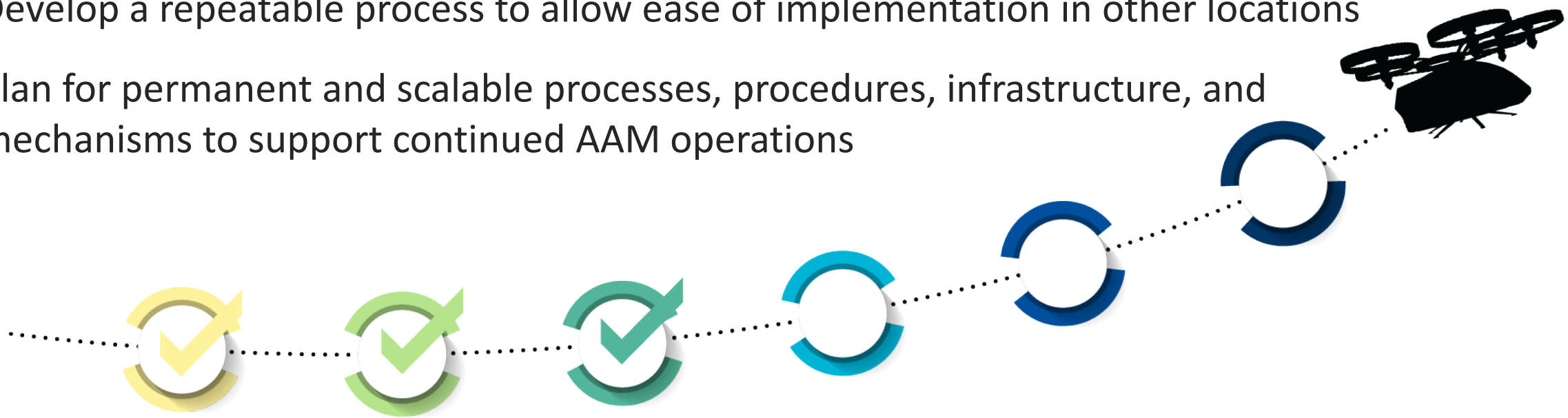
Local/State/Tribal Governments and Community Organizations

We engage with industry stakeholders, including aircraft manufacturers, operators, and airport/vertiport companies to understand their vision and implementation plans. Our current priority is U.S.-based eVTOL manufacturers undergoing FAA certification. Examples include the following stakeholders:

Industry

Goals for Near-term Operations

- Define and complete agency actions needed to enable AAM operations in locations determined by industry in the near-term leading up to 2028
- Provide an FAA focal point on AAM issues, and provide programmatic support that coordinates efforts across the agency on behalf of specific key projects
- Develop a repeatable process to allow ease of implementation in other locations
- Plan for permanent and scalable processes, procedures, infrastructure, and mechanisms to support continued AAM operations



Supporting the Future of Autonomous Operations

- The AAM industry is working toward autonomous flight by integrating new technology efficiently and safely
- In 2024, the FAA formed an autonomy working group to address challenges of managing pilotless AAM aircraft in the NAS
- The group collaborates across FAA departments to identify gaps and develop autonomy integration roadmaps, while defining levels of automation to maintain safety
- Engaging with industry and government agencies, the group aims to align on autonomy needs and ensure safe integration of autonomous operations into the NAS

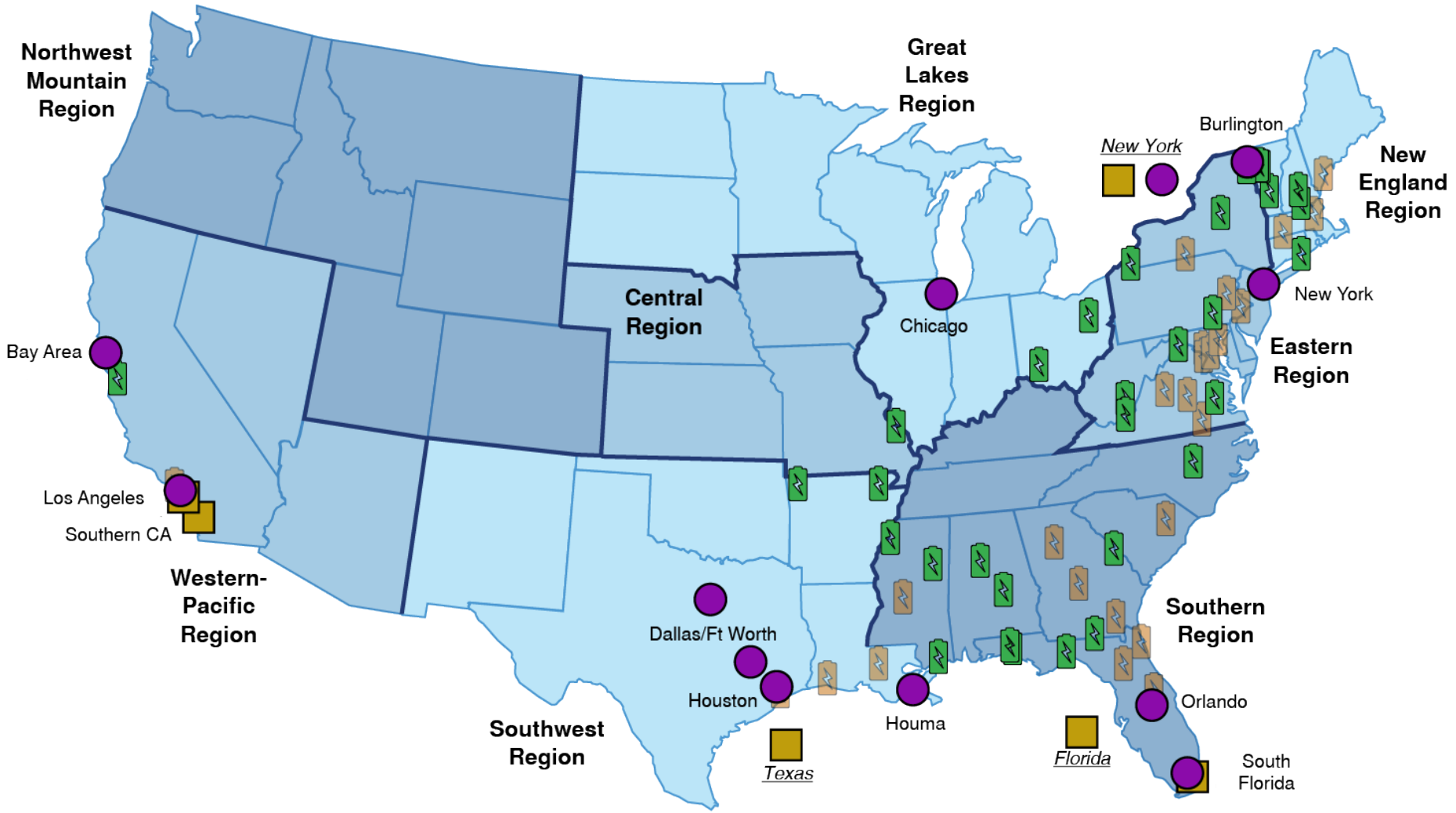
Safety Focused Approach

- Whole of government approach needed to support integration of new class of aircraft, flying in constrained airspace, needing new support infrastructure, and accelerating to autonomous operations environment
- Updating a regulatory framework to address the unique aspects of new hybrid, non-traditional aircraft
- The FAA created a programmatic portfolio approach called Innovate28 that integrates all cross-agency efforts toward user initial entry into service goals
- DOT-led AAM interagency working group developing national strategy for AAM, identifying key national issues for implementation; security, power/energy, infrastructure, community impacts, spectrum, and supply chain

Ecosystem Enablers

- Aircraft Safety Rulemaking
  - Recognition of pilot in command experience in military/air carrier operations (final rule Sep 2022)
  - Update to air carrier definitions (effective Sep 2023)
  - Airman certification standards (comment period closed Feb 2023)
  - Notice of proposed rulemaking (NPRM), which proposes special federal aviation regulations (SFAR) for integration of powered-lift operations and associated pilot certification (final rule expected fall 2024)
  - For type certification, the FAA is accepting established means of compliance as well as developing new means depending on unique design features/characteristics of aircraft
- Planning & Portfolio Management
  - Urban Air Mobility Concept of Operations v2.0 (May 2023)
  - AAM Implementation Plan (Jul 2023)
  - Planning integrated simulations/testing in partnership with DOD, NASA
- Vertiports
  - Interim guidance published September 2022 through Engineering Brief #105 (update expected by end of 2024)
  - Refined performance-based guidance planned through Advisory Circular in 2025

AAM Anticipated Operations and Infrastructure



Key

- Aircraft Operators
- Vertiport Developers
- Charging Stations
- Planned Charging Stations

Notional map; may not include some areas of AAM activity

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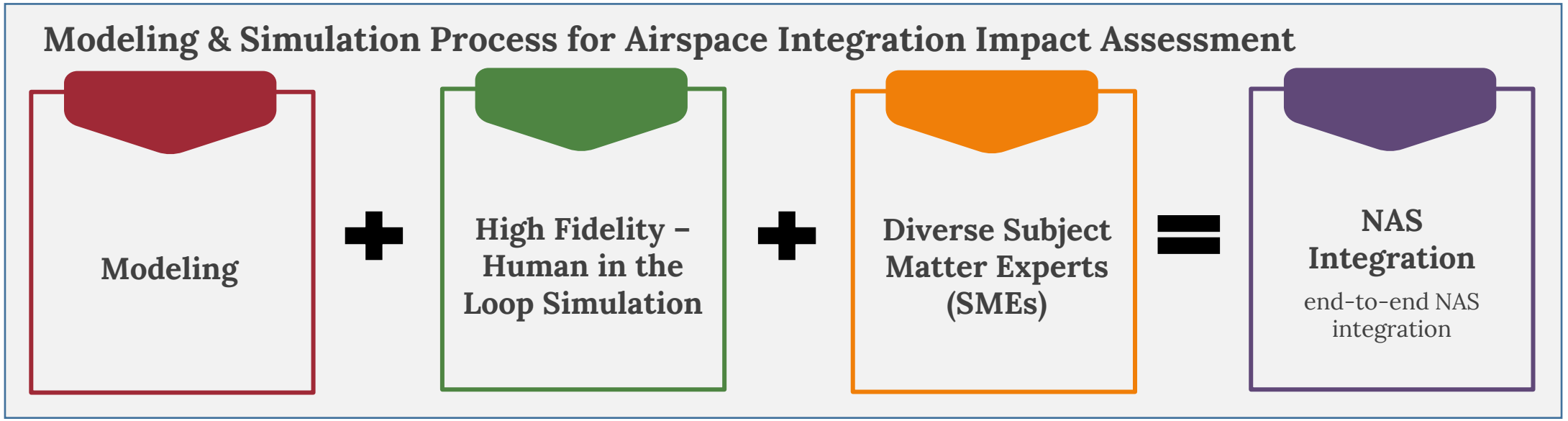
AAM Airspace Integration Assessments

- The majority of AAM operators are targeting use cases at major airports in complex operating environments
- The FAA is developing strategies to understand aircraft performance and how it will impact existing operations
- Complementary integration efforts support our overall process for getting to 'yes' safely as we develop an AAM ecosystem encompassing infrastructure, airspace considerations, energy management, etc.
  - Work with airport authority, operators, and Air Traffic Controllers to identify beneficial and safe use cases
  - Modeling and simulation
  - Operational and flight testing

Modeling and Simulation Activities

- AAM will be introduced in places that already have a constrained environment
- Access must remain equitable and the impact to ongoing operations must be limited
- Perform modeling and simulation of potential takeoff/landing locations to determine impact to existing operations

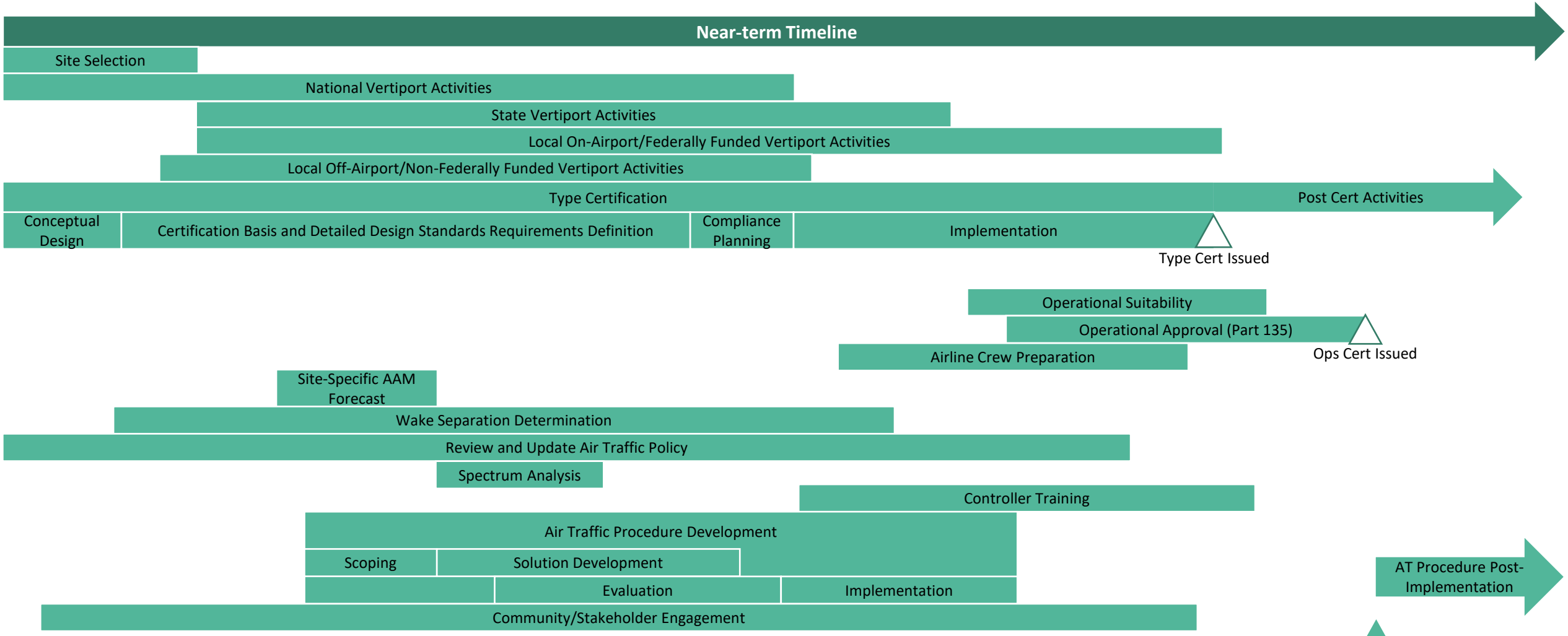


Key Activities

- Aircraft Type Certification
- Air Traffic Policy Review and Updates
- Concept of Use (general and local)
- Wake Separation Requirements
- Hazardous Materials
  - Fire/smoke procedures
  - Cabin safety
  - Emergency training
  - Cargo requirements
- Procedure Development
  - Scoping
  - Solution development
  - Environmental review
  - Safety Risk Management (SRM) process
- Community Engagement
- Cybersecurity
- Site-Specific AAM Forecasting
- Operational Certification
  - Part 135 Operational Approval
  - Operational Suitability (to establish aircraft type ratings, pilot training programs, maintenance programs, master equipment lists)
- Local Vertiport Activities
  - Vertiport locations
  - Local zoning
  - Construction
  - Charging infrastructure
- Physical and Operational Security
- Site Selection
- Crew Preparation
  - Rulemaking for pilot training
  - Crew training and certification
- National Vertiport Activities
  - Flight testing
  - National guidance
  - Rulemaking
- Local ATC Activities
  - Controller training
  - Standard Operating Procedures (SOP) and Letters of Agreement (LOA)

➢ The list includes the FAA, other federal government agencies, FSLTT government, industry, and other stakeholder activities.

Portfolio Management for AAM Projects



AAM Workstreams

Cross Cutting Major Risk Areas: Wake Separation, Vertiports, Power, Security, Noise, and Community Impacts

Near-term

- Engage with industry to determine operational needs and desired operations
- Research impacts to Air Traffic Services
- Tailor implementation plan to initial entries into service
- Perform research and engineering activities to support UAM ConOps maturity
- Establish workstreams for mid- and far-term, to include Autonomy Working Group

Mid-term

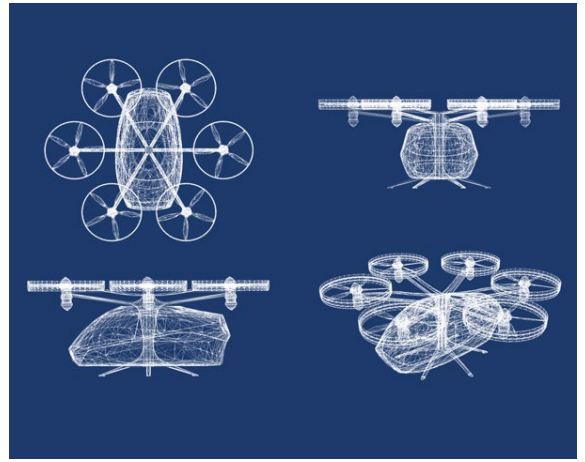
- Explore operational efficiency through strategic employment of modeling and simulation to effectively manage large-scale operations
- Develop policies and standards based on learned performance
- Establish standards and requirements for enablers such as information exchanges, Communications / Navigation / Surveillance, etc.
- Support industry development of supplemental services

Mature Stage

- Perform research and engineering to validate technological and procedural enhancements to separation management
- Refine policies and standards based on advanced aircraft capabilities
- Derive requirements for infrastructure and automation capabilities
- Refining the mature state of UAM ConOps, and incorporate findings from Autonomy Working Group to integrate autonomous operations

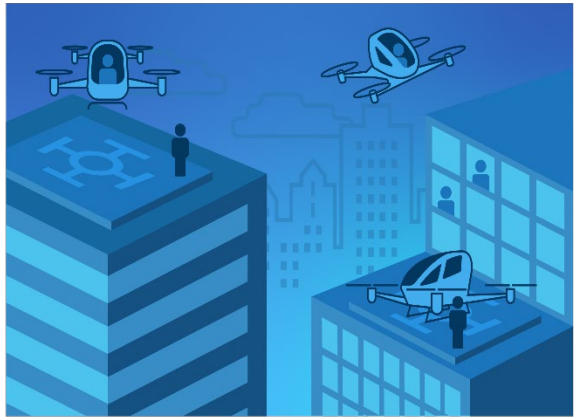
FAA's Role in Advanced Air Mobility

- Ensure this new generation of aircraft maintains the highest level of operational safety that defines commercial aviation today.
  - Certify AAM aircraft designs and production
  - Finalize the Operating Framework for pilots and companies
- Integrate these new aircraft into the existing aviation system safely.
- Develop safety standards for AAM infrastructure, i.e. "Vertiports".
- Engage with State, Local, and Tribal governments and communities.
- Environmental Review, depending on the type of project and whether FAA approval is required.
- International harmonization with our partners, to adopt common certification and integration standards.



Significant AAM Activities & Milestones

- **September 2022** – FAA issues interim design guidelines for Vertiports (Engineering Brief No. 105)
- **October 2022** – AAM Coordination and Leadership Act signed into law (P.L. 117-203)
- **May 2023** – FAA announces an updated blueprint for long-term AAM Concept of Operations
- **June 2023** – FAA publishes comprehensive proposed rule on training and certifying "Powered-Lift" aircraft pilots
- **July 2023** – FAA publishes the AAM Implementation Plan, focused on Near-Term AAM Operations
- **October 2023** – FAA / U.S. Air Force sign Memorandum of Understanding on AAM research and data sharing
- **March 2024** – FAA finalizes airworthiness criteria for the first AAM aircraft (Joby Aviation)



Significant AAM Activities & Milestones

- **July 30 to Aug. 1, 2024**, FAA Drone and AAM Symposium, Baltimore, MD Convention Center
- **July 2024,** FAA authorized multiple commercial drone operations in the same airspace
- **September 2024,** Draft Engineering Brief 105A for Vertiport Design published on the Federal Register Notice

Upcoming Significant AAM Activities & Milestones

- **Fall 2024** – Expected publication of the Powered-Lift final rule for training and certifying pilots
- **Late 2024** – Expected publication of the AAM National Strategy by the U.S. Department of Transportation
- **2025** – Expected publication of comprehensive Advisory Circular on Vertiport Design
- **2025** – Expected Type Certification of first AAM Aircraft (design approval)

Early Engagement and Multi-Dimensional Engagement

- Collaboration and early engagement at all levels of government is essential for the successful implementation of AAM operations
- Engagement on AAM should be Multi-Dimensional
  - Far-reaching (all relevant stakeholders, public and private sectors)
  - Horizontal across local jurisdictions
  - Vertical (i.e. local, state, tribal, and Federal government agencies, departments, and officials
- AAM industry has a leading role in community engagement in the areas they would like to operate in the future
- We encourage cities, municipalities, and AAM operators to engage with us early in the planning process to discuss potential operations, vertiport locations, routes, and other AAM infrastructure

Summary

- AAM spans an array of concepts, from piloted to fully autonomous operations.
- We are building out an ecosystem to safely and efficiently enable the full range of a new way of flying so that it is beneficial and equitable to the public.
- The FAA has established a focal point for industry to coordinate with the FAA as they work though regulatory and operational aspect of their new services.

AAM
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Questions?