AI For Air Traffic Control and Advanced Air Mobility

Akbar Sultan
Director
Airspace Operations and Safety Program

July 23, 2025

Future Airspace Vision Drivers

- Variety
  - Vehicles, Performance and Missions
  - Takeoff and landing locations
- Density
  - Operations increase from 10's K to millions
  - Emergent aviation lower altitude operations
- Complexity
  - New operations, airspace
  - Interoperability
- Human-centric approach for provision of airspace and safety services limits scalability

Transformation is Needed to Accommodate Future Operations

AAM Evolution From Midterm to Mature Operations

Deliver to FAA, industry, and standards organizations specification for data flows, functions, and capabilities to inform rules and standards.

Current NASA Focus

INITIAL

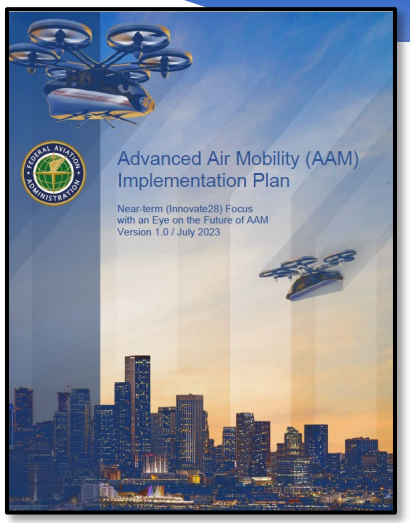
- Leverage current regulations
- New airspace routes as necessary
- Operational needs addressed in Letters of Agreements
- Pilot on-board

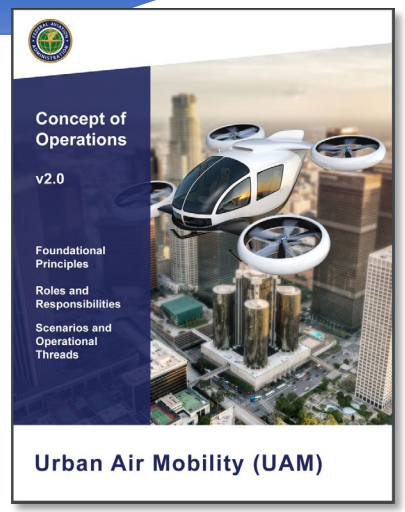
MIDTERM

- Initial regulatory changes for UAM
- Cooperative Operating Practices introduced
- Cooperative Operating Areas introduced
- New, safety-critical automation for airspace integration
- Remote PIC Introduced

MATURE State

- Extensive, new regulatory framework for UAM
- New performance-based airspace volumes
- Automation enables extensive human over the loop capabilities
- Remotely piloted/supervised vehicles are expanded





Advanced Air Mobility Technical Capability Progression

Strategic Planning & Deconfliction in Cooperative Areas

TCL-1

Strategic Deconfliction Sim

Integrated Evaluation

Integration of Tactical Deconfliction

TCL-2

Tactical Deconfliction Sim

Integrated Evaluation

Resilient Operations

TCL-3

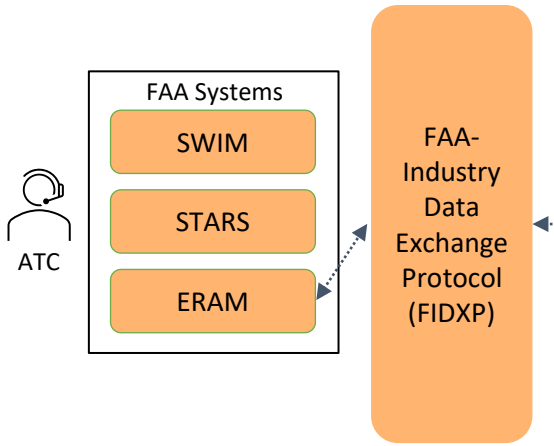
Integrated Safety System Sim

Integrated Evaluation

Tech transfers to FAA and Industry to enable midterm UAM operations

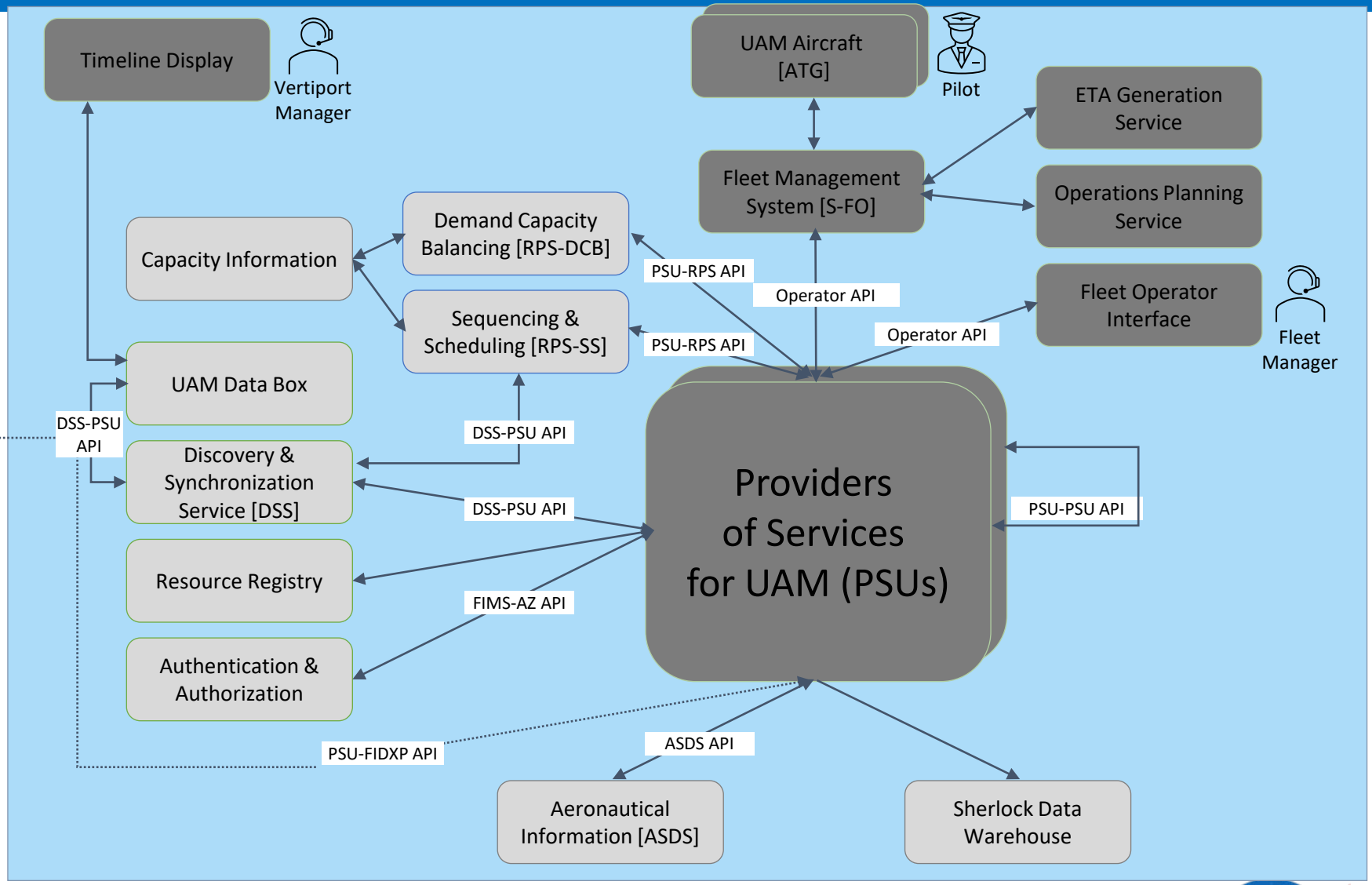
Evolving the UAM Architecture

ASDS: Airspace Structure Definition Service
ATG: Airspace Traffic Generator (simulator)
RPS: Resource Planning Service
S-FO: Surrogate Fleet Operator



Color Key:

- FAA Function
- Core UAM Function
- Supporting UAM Function

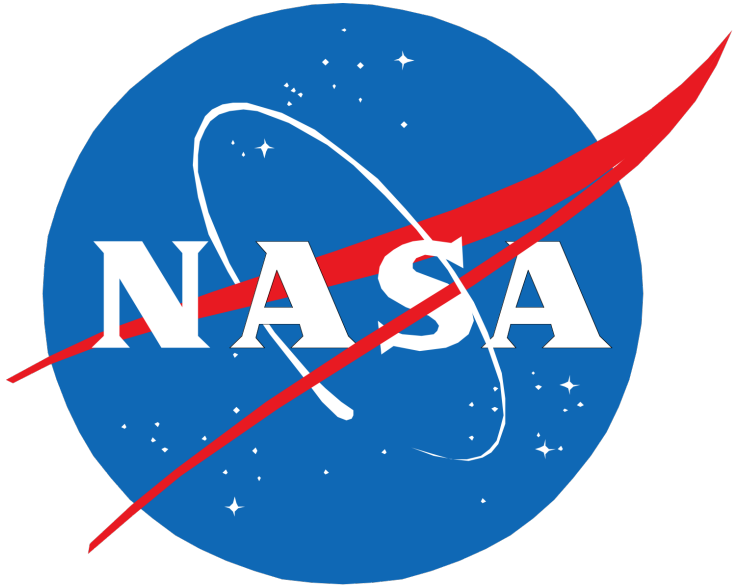


Learnings Informing Standards and Rules

ML/AI Applications

- Scaled safe and efficient operations
  - Total System Performance
  - Merging and Spacing
  - Detect and Avoid
  - Degraded Visual Operations
  - Digital Taxi - Surface Operations/Runway Incursion Prevention
  - Wrong Surface Approach Prevention
  - Prognostic In-Time System Wide Safety
  - Prevention of Loss of Control/Upset recovery
  - Resilient vehicle operations

- Enabling capabilities
  - Validation and Verification
  - Assurance
  - Means of Compliance for Certification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