



The Fusion of Art & Science

Atlantic City Advanced Air Mobility (AAM) Ecosystem

John Bradley Air Traffic Control Specialist ANG-E62 September 30, 2021



The Fusion of Art & Science in Air Traffic Control





Federal Aviation Administration William J. Hughes Technical Center 2

September 2021

Verification and Validation

Verification – Am I building the product right?

Validation – Am I building the right product?





Federal Aviation Administration William J. Hughes Technical Center 3

September 2021

Business Case for Shift Left and Agile Acquisition



September 2021

4

Live Virtual Constructive Environment (LVCE) to conduct Research Development Test & Evaluation (RDT&E)

Atlantic City AAM Ecosystem

- Leverage collaboration with other agency partners, industry, and academia.
- Take advantage of existing local airspace when applying concepts.
- Create environment that encompasses complete integration of people, processes, and tools.



Advanced Air Mobility (AAM) Mission

NASA



Develop validated AAM System Architectures that define a safe, certifiable, and scalable system

FAA WJHTC and NASA Laboratory Integration

FAA High Fidelity NAS Labs and NASA UAM assets

- NASA LaRC Air Traffic Operations Lab (ATOL) Mission
 Planner can simulate limited functionality expected
 from fleet operators and possibly a PSU
- FAA WJHTC Target Generation Facility (TGF) and NASA simulation drivers and scenarios
- NASA Tech Transfer of UTM capabilities to enable ability to simulate sUAS in FAA WJHTC UAS Laboratory
- ATOL Vertiport Scheduler to assist with the simulation of Vertiport operators
- UAM Simulator "FLYER"



ATM/AAM Integrated Environment Demonstration Display Areas



MITRE Micro-Wx Collaboration

Evaluating UAM Microscale Weather Hazard Variability – Atlantic City Proof of Concept

- Use JOULES model to simulate microscale weather variability – downtown ACY area
- 3 m horizontal and vertical wind conditions around buildings, street canyons, potential UAM vertiport areas
- Demonstrate range of micro-wx
 variability and potential hazardous
 scenarios given 3 unique scenarios:
 - 1. Afternoon sea breeze Winds 120^o at 12 knots
 - 2. 11 pm (overnight) land breeze Winds 270^o at 6 knots
 - 3. Afternoon, stiff southwesterly winds Winds 220° at 18 knots













Afternoon Sea Breeze

- 7.5 m altitude
- 30 min animation (3 sec updates)



Federal Aviation Administration

Atlantic City AAM Ecosystem – Airport Transfer



Atlantic City KACY

- Familiarity with airspace
- Proximity of airport to Atlantic City
- William J. Hughes Technical Center capabilities
- National Aviation Research and Technology Park

Airport Transfer

- Capable of simulating corridor between KACY & Atlantic City
- Promotes procedural separation
- Capable of simulating performance-based airspace over the city of Atlantic City
- Ability to evaluate communication, coordination, and information exchanges needed for the operation.



Atlantic City AAM Ecosystem – Cross Metro Transfer



Jitney Route

- Internal to the city of Atlantic City
- Designed to provide efficient access to visitor destinations while avoiding residential neighborhoods
- Makes note of AtlantiCare Regional Trauma Center





Atlantic City AAM Ecosystem – Regional Network



Regional Aerodrome (Vertiport) Access

- Capable of simulating regional corridors with 2 metering fixes
- Potential to evaluate 4D trajectory authorization with RTA
- Establishes transitions between metering fixes and jitney route





Atlantic City AAM Ecosystem – UTM



sUAS Operations

- Establishes Waterway Inspection Loop (bottom left)
- Establishes USCG Pitch and Catch Loop (top right)
- Potential to evaluate information exchanges between PSU and USS







Atlantic City AAM Ecosystem

- The AAM LVCE has taken off with a flight plan trajectory to meet the needs of emerging operational concepts and technologies.
- Future AAM ecosystems will rely on operational integration and information sharing between public (FAA) and private (industry) service providers.
- In some capacity, ATM, PSUs, and USSs will ultimately operate together to ensure the entire AAM ecosystem maintains the highest levels of safety, resiliency, and reliability.
- Advancing the AAM LVCE through partnerships to support RDT&E will be key to expediting these emerging operational concepts and technologies to bring these ecosystems to life.



Federal Aviation Administration William J. Hughes Technical Center 15