

Community Integration of Advanced Air Mobility

Nancy Mendonca, NASA ARMD Deputy AAM Mission Manager

September 27, 2023

Effort Overview

- Partnership Strategy announced at AEWG meeting Nov 17, 2020
- NASA Announcement of Collaborative Opportunity Released March 11, 2021
  - https://sam.gov/opp/dc732d1b12e64e49949717e42154a7f0/view
  - 6 proposals received
- 5 Proposals accepted and Community Umbrellas and Annexes signed May 7, 2021
- Obtained support for this effort from Crown Consulting and CAMI
- Kicked off with the 1st of 4 workshops June 16, 2021
- Workshops completed June 2022
- Document published May 1, 2023

Annex Schedule and Milestones

- Within 2 months
  - Provide information on the development of the AAM/UAM framework, barriers, community milestones, and the results of ARMD's AAM and other related efforts to date. Provide information on the community's current goals and associated timelines, descriptions of current efforts underway and planned efforts that have been approved for implementation.
  - Partner and NASA finalize plans for tabletop workshops
- Within 12 - 16 months
  - Partner and NASA participate in at least four tabletop workshops to develop inputs into the local transportation plan(s). These updates would include the stakeholders, steps, and actions necessary to integrate AAM into the local or regional area multi-modal transportation systems. (12 months)
  - NASA and partner contribute to the development of a common local taxonomy to facilitate AAM integration and development across multiple localities. (13 months)
  - Partner deliver proposed updates to transportation plan(s). (14 months)
  - NASA and partner contribute to the development of a document capturing best practices and strategies to support public acceptance and AAM implementation for follow-on adopting localities. (15 months)
  - Partner provide plans and NASA comment on potential AAM demonstrations. (16 months)

MassDOT Proposal Overview

- Team:
  - **Lead: MassDOT Aviation Division** – responsible for aviation infrastructure planning and funding processes (MA Metropolitan Planning Organization (MPO) responsible for non-aviation infrastructure planning and funding processes). State approval authority for new landing areas, maintains Mass Statewide Airport System Plan (MSASP) for 35 state airports.
  - **Port Authority for Commonwealth of Mass** – Owns and operates Boston-Logan (BOS), L.G. Hanscom (BED) and Worchester (ORH). BED is region's largest GA airport
  - **Shoreline Aviation** – Corporation that operates Marshfield Municipal Airport (KGHG) and provides FBO, aircraft maintenance and Charter 135 operations
  - **MIT International Center for Air Transportation (ICAT)**
  - **UMass, Amherst** Center for Collaborative Adaptive Sensing of the Atmosphere (CASA) & Research & Aviation Training Facility – real world weather and counter-drone sensing and alerting in Texas. Close ties with MA rural stakeholders and recently developed ATM simulator. CASA also part of NCTCOG proposal
  - **Northeastern University, Kostas Research Institute (KRI)** – Collaborative Innovation Accelerator & vehicle cross functional R&D
  - **Beta** – charging infrastructure manufacturer
  - **Regent** – OEM
  - **Boston Consulting Group (BCG)** – Strategic consulting,
  - **MassAutonomy** – non-profit that will lead AAM Integration Task Force's (ITF) 1st two initiatives
  - **Runway Realty Ventures**; real estate company focused on AAM property investments

- Developing Plans
  - ITF developing AAM Roadmap for 2030
  - Promoting demonstration projects for infrastructure and operations

Dec 6th - Skyports - MassDOT Aeronautics Division partnership announced to demonstrate how its drone services could link communities across the Cape Cod region in Massachusetts Here

First Community Integration workshop take aways

Partners already seeing benefit – two have already commented that pulling together a team as part of the proposal is already paying off

Overall observations

- Able to identify additional issues e.g. concern from DOTs about how they will continue to provide services without fuel taxes
- Communities are already considering workforce issues – 3 of the teams have partners focused on workforce
- Localities are considering counter-drone activities along with early missions
- Teams leveraged existing partnerships rather than create new ones e.g. Central Florida Automated Vehicle Partners (CFAVP) includes KSC
- Information (education) is greatly desired. Great conversations around hydrogen, electrical grid planning, weather, requirements for citing vertiports

Best Practices document – Leveraging work being done by partners, by CAMI and incorporating available inputs, document will provide information to the entire community in critical areas. Targeting areas related to Integration and Community Engagement

First Community Integration workshop take aways

Individual Highlights

- MA DOT – Partnered with a winged, ground effect OEM for costal use cases. Using a non-profit to develop their AAM Roadmap
- MN DOT – Completing 1st draft of "Public Engagement Plan" in July. Will be sharing with NASA and other partners.
- NCTCOG - Partners have longstanding experience partnering with NASA – DFW, Hillwood, Bell and are heavily engaged in demos e.g. City of Arlington AAM Pilot Program
- OH DOT – Completed and shared their state-wide AAM economic analysis study
- City of Orlando – Beginning regional passenger demand assessment for central FL including targeting vertiport locations. 75M visitors annually – AAM early operations will have enormous public engagement implications

Next Steps

- Expanding outline for best practices document and preparing for workshops with each individual participant in August

Second Community Integration workshop take aways

Focused on overviewing “playbook” document structure and validating community areas of concern that should be addressed in that document. (No longer using “best practices” as there haven’t been enough AAM “practices” to identify the best. Each locality asked to support an online effort to prioritize “plays”. Results not in yet.

5 separate 1.5 hour meetings, averaging 25 participants each, followed by a questionnaire to prioritize areas of concern articulated by localities. Results not in yet.

Overall observations

- Enormous need for outreach and education
- Current concerns are primarily around how they fulfill their responsibilities within the ecosystem
  - Understanding what is the FAA role going forward e.g. process to approve routes – what’s the communities’ role?
  - Balancing against other responsibilities and resource requirements
  - How to achieve the benefits while minimizing the potential negatives around equity, job creation, accessibility, affordability, public funding availability, tax revenue potential
- Acknowledging potential of AAM and being proactive
- Multiple localities standing up AAM working groups/task forces and developing AAM Roadmaps – MA, MN, OH, TX (examples in deck)

Workshop #3 Sept 29th, Final draft of playbook – Mid-February

Take aways from conversation

- Continuing to see multiple benefits from the Agreement, especially in cross-pollination. Adoption of good ideas e.g. NCTCOG adopting OH idea to have a demonstration corridor Rt 33 in OH & I-30 in TX. Increased understanding of the challenges. One partner included developing an AAM Roadmap as part of their Annex proposal, now 3 of them are. Also facilitating other cross-pollination Los Angeles to Detroit and Orlando to Los Angeles
- Positive reception for the "playbook". The term is familiar to and resonates with the local planers. Identified more potential "plays" than we have the resources to complete.
- Enormous need for education about AAM, both at the "101 level" for the general public, but in greater depth for elected officials and other decision makers. They are critical because they will vote the funds for infrastructure. Convincing might be harder than getting the funding. This is a challenge due to lack of materials and "information" bandwidths. Scenarios well suited to tell the AAM "story". Demonstrations also needed as part of education.
- Policy/regulation is a concern because there isn't clarity around how large of a role the FAA will assume and thus how large or small a role the communities will have. Communities would benefit from clarity now because it takes time to develop policies and processes to exercise responsibilities
- Lack of resources to adequately plan, educate and fund infrastructure. Both funding and decision makers' time. Compounded by AAM being in a gray area between ground transportation and airport-based aviation.
- There are intermodal concerns we've not thought of nor is there a clear path to understanding – interplay of revenue e.g. will UAM reduce revenue from public transportation, can AAM reduce wear, road maintenance expenses and neighborhood impacts especially from trucks, can AAM allow communities to transfer land from public rolls to property tax rolls that generate revenue, can AAM reduce "concrete" decreasing heat islands and runoff, addressing transit deserts, increasing regional integration?
- Readily acknowledging the local challenges; privacy, visual clutter, fragile electric grids, noise, exclusion of low and middle income people, paying for the infrastructure, shifts in tax revenue generation, who's going to get the complaint calls.

Additional areas where NASA could contribute

- Expand audience for AAM STEM materials by making them available to local entities. Identify gaps in these materials that would benefit local decision makers.
- AEWGs are a great SME “force multiplier”, but still need to up the “gain”.
- NASA is ideally suited to support planning efforts around market and demand studies. Need to determine how we can both pass this national level learning along to communities while leveraging the local level learning they will be generating. Scheduling a session where we can review NASA’s relevant studies with the localities including their academic partners.
- SBIR’s are poised to benefit local communities and can continue to have an impact

Nancy’s observations

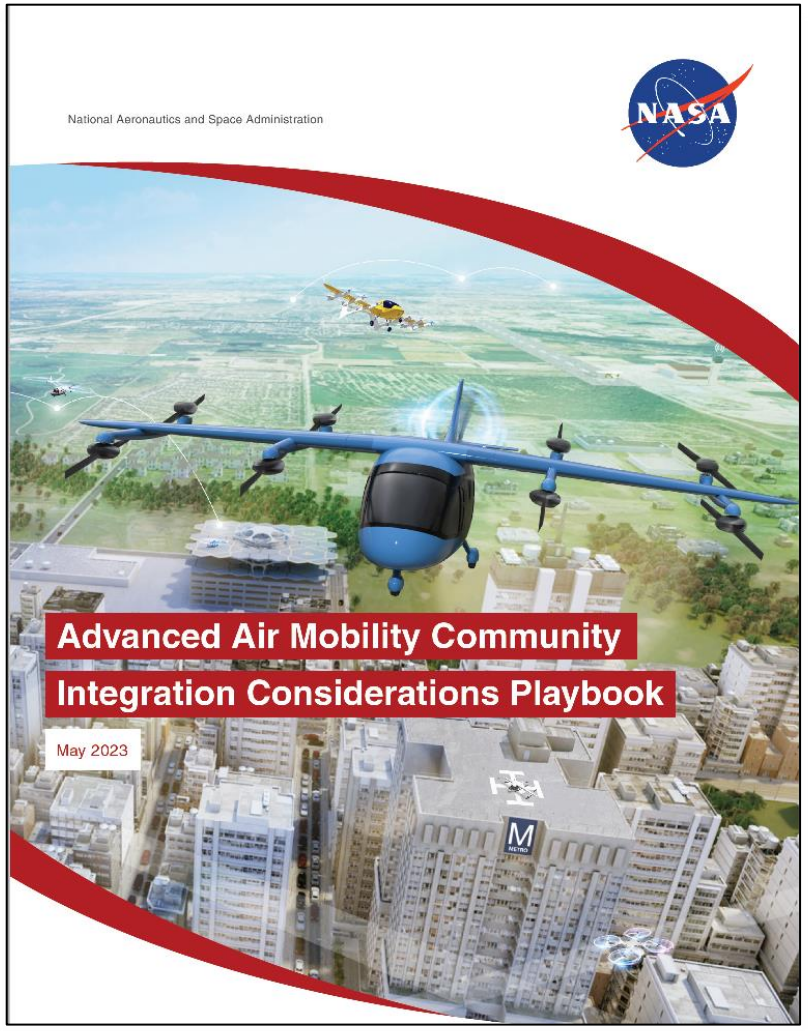
- Seeing a positive perspective on AAM, but need to realize that this won’t be universal.
- Public good missions have a positive connotation, but need to provide an increased capability, a reduction in cost AND net positive impact.
- Communities are using sUAS as a stepping stone to get to UAM. We’ve not been able to look in depth at the gaps between what focusing on UAM gives us vs what’s needed by sUAS and RAM. Could be some serious “gotchas”.
- Equity is tough. There are lots of negative examples, but positive ones don’t generally make the news.
- Localities need to be “educated” consumers. Unless the local elected officials are able to capably represent their constituents, we could see the creation of another generation of “robber barons” or railroad tycoons who could doom a town by bypassing it.
- ARMD’s work has typically been focused on 3 stakeholders – FAA, OEMs and Airlines. AAM introduces a 4th stakeholder – local communities. We ignore them at the peril of the ecosystem.

AAM Community Integration Considerations Playbook

CONTENTS

Introduction 4
Background 5
Scope 6
Stakeholders 8
Integration Challenges 9
- Institutional Readiness 11
- Equity 12
- Community Engagement 13
- Planning for Multimodal Integration 14
- Funding 16
- Economic Development and Workforce Readiness 17
- Data 19
- Operations and Interoperable Infrastructure 21
- Environmental Sustainability 22

Conclusion 23
Acknowledgements 24
Points of Contact 24
References 25

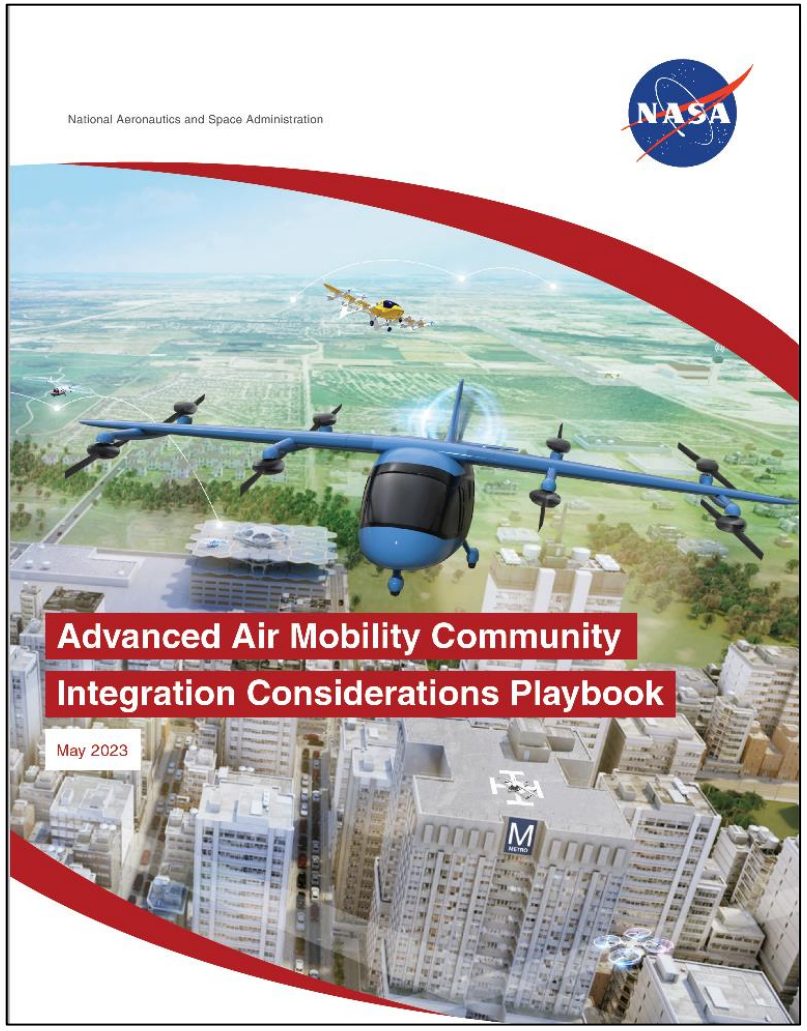


Over 100 considerations collected covering areas of integration between AAM and Communities
https://ntrs.nasa.gov ~ May 2023

AAM Community Integration Considerations Playbook

- Integration Challenges
  - Institutional Readiness
  - Equity
  - Community Engagement
  - Planning for Multimodal Integration
  - Funding
  - Economic Development and Workforce Readiness
  - Data
  - Operations and Interoperable Infrastructure
  - Environmental Sustainability

- Challenge considerations organized by
  - Organizational Strategies
  - Research
  - Policy Considerations



Over 100 considerations collected covering areas of integration between AAM and Communities
https://ntrs.nasa.gov ~ May 2023

AAM Community Integration Considerations Playbook

COMMUNITY ENGAGEMENT

It is widely acknowledged that community engagement is critical to enabling AAM operations. The challenge is to identify paths for providing information to members of the community, forums to solicit and listen to feedback, and avenues and opportunities for keeping them informed. Many of these forums and processes exist for use by other forms of transportation and community outreach and can be assessed for their abilities to be effectively employed to meet this challenge.



PLAY | **Ensure broad and meaningful community engagement in the transportation planning process for AAM.**

ORGANIZATIONAL STRATEGIES

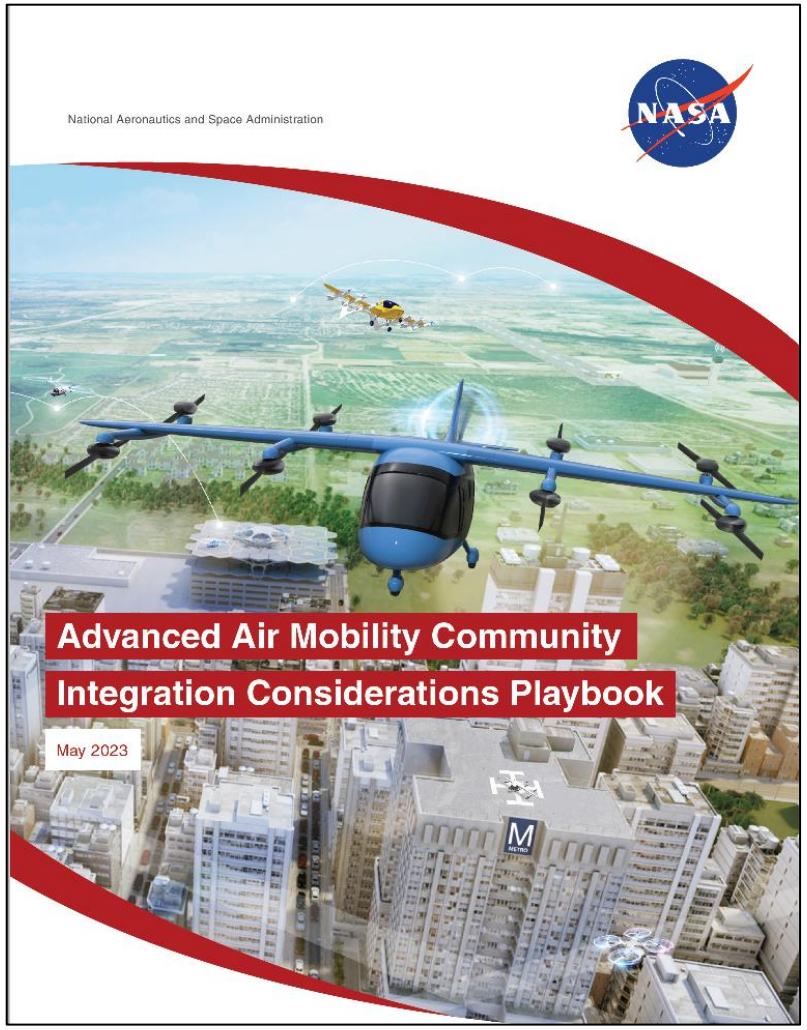
- Understand community stakeholders and the public's interests, goals, and concerns regarding AAM planning and implementation.
- Ensure historically underserved communities and vulnerable populations are included in the planning and implementation of AAM.
- Work collectively to address community concerns and mitigate potential adverse impacts.
- Create tailored AAM informational products for the general public and community groups that take into account their awareness and familiarity with aviation and AAM.
- Conduct education and outreach, especially among underserved communities and vulnerable populations, about AAM and its impacts.
- Respond to community feedback with meaningful responses and/or updates to the planning, design, and implementation of AAM, such as infrastructure siting and service characteristics.

RESEARCH

- Determine locally tailored best practices to increase the involvement of underserved communities and vulnerable populations in AAM studies and data collection activities. These could include conducting studies in the community that are convenient for the participants and working with community leaders and/or multilingual and multicultural staff to help provide and gather information.

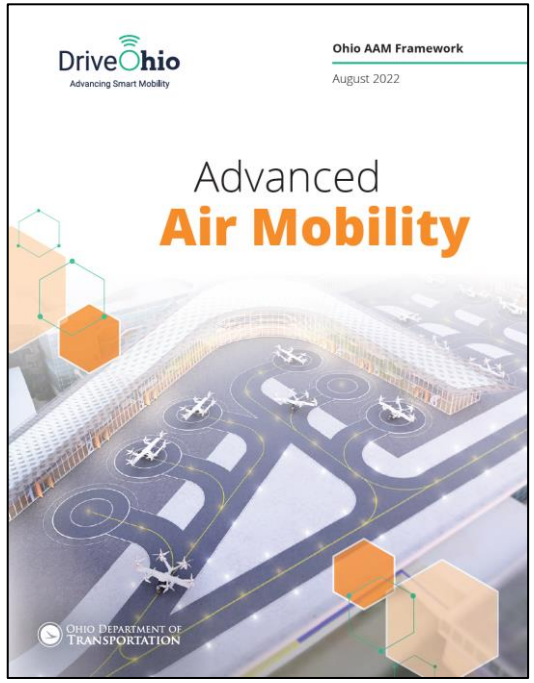
POLICY CONSIDERATIONS

- Supplement existing community engagement public comment processes for transportation planning with additional methods identified during research along with targeting potential communities. This could include focus groups, surveys, and town halls, and hosting community conversations with transportation advocates and metro, rural, and community leaders.



Over 100 considerations collected covering areas of integration between AAM and Communities
https://ntrs.nasa.gov ~ May 2023

Partner Developed Community Documents







- https://uas.ohio.gov/initiatives/flyohio-initiative/Advanced%20Air%20Mobility%20Framework
- https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=19530624
- https://rosap.ntl.bts.gov/view/dot/58749/dot_58749_DS1.pdf
- https://www.orlando.gov/Our-Government/Orlando-plans-for-a-future-ready-city/Advanced-Air-Mobility



Welcome to the Orlando Advanced Air Mobility Plan!

Cross-pollination supports a harmonized national implementation

Community Related Gaps

- Clarity around Roles & Responsibilities
- Grant structures
- Public awareness
- Taxonomy - “community”, perception vs acceptance, engagement vs involvement
- Separate planning processes for ground and aviation planning
- Separate academic/research dissemination forums
- Audience tailored information materials
- Community planners’ bandwidth
- Multi-modal transportation planning professionals, workforce and other professionals
- Databases to support noise informed operations e.g., weather conditions, ambient noise profiles and local noise ordinances
- State vs Regional vs Local preemption
- Community uniqueness – “If you seen one airport, you’ve seen one airport”
- Potentially different priorities from the remainder of the ecosystem e.g. equity

Community Informed Use Cases

- Follow-on under NASA's Space Act Agreement with 4 State/City partners
- Describe and potentially model AAM use cases that are informed by community considerations
  - Partners are able to leverage NASA's knowledge of emerging AAM use cases and architecture
  - NASA can better understand community derived requirements
  - Encourage the use of MBSE within the AAM ecosystem

Suburban/Urban Commuter – Activity Diagram

