ADVANCED AIR MOBILITY: INTEGRATING THE THIRD DIMENSION INTO OUR TRANSPORTATION SYSTEMS

Washington Airport Management Assn Annual Conference
October 6, 2021
Supporting the responsible integration of the third dimension into our daily transportation needs through education, communication, and collaboration.

CAMI is a 501(c)(3) nonprofit organization dedicated to the responsible integration of advanced air mobility into communities by providing education, communication, and collaboration.

CAMI understands the importance of connecting communities and industry by working with all stakeholders to develop advanced air mobility that integrates with existing and future urban and regional transportation systems.

CAMI educates and equips state and local decision makers, planners, and the public with the information they need to set policies and design infrastructure and systems to successfully integrate aviation into daily transportation options.
TECHNOLOGY IS REDEFINING FLIGHT

Tech Drivers

- Propulsion
  - Electrification

- Autonomous Systems

- Mobility Services
  - Electric and Hybrid-electric

New Capabilities

- eVTOL

Solution Areas

- Moving goods
- Moving people
- Automating tasks

Thematic Benefits

- Lowers the barriers for leveraging UAVs to get jobs done
- Lowers the operating cost of small aircraft on short routes
- Increases the number of access points to the air
- Stimulates latent demand for flight where ground transportation is used today

© CAMI 2021
AAM is a broad concept focusing on emerging aviation markets and use cases for on-demand aviation in urban, suburban, and rural communities. AAM includes local use cases of about a 50-mile radius in rural or urban areas and intraregional use cases of up to a few hundred miles that occur within or between urban and rural areas.

Urban Air Mobility: History, Ecosystem, Market Potential, and Challenges
https://escholarship.org/uc/item/8nh0s83q
Urban Air Mobility: Statistics

The aviation industry will develop, build and deliver an air taxi faster than most cities can build a new highway.

- UAM industry projected to be $1.9+T by 2040, making it the single largest new industry to emerge this generation (Morgan Stanley research)
- Hybrid-electric aviation travel industry could reach $178B by 2028 (UBS)
- Estimated total investment to date is $5B
- In 2017 there were 12 known companies developing eVTOL aircraft. Today there are at over 400 eVTOL aircraft concepts, with a dozen in the process of FAA certification
- In 2019 alone, there were over 1,000 test flights of full size eVTOL aircraft.
- We anticipate the first low volume operations by 2023, reaching commercially scaled volumes by 2028.
Automotive OEMs Going Vertical

Hyundai Motor, Urban-Air Port to jointly build UAM stations in UK

[Photo by Kim Jae-hoon]

Daimler invests in flying taxi firm Volocopter
AAM: Technology Push vs Market Demand Pull

Technology Push

Research & Development → Production → Marketing → Need?

Market Pull

Research & Development → Production → Marketing → Expressed Market Need
Marchetti’s Constant

- 150+ miles
- 10 miles
- 45 miles
- 70+ miles

© CAMI 2021
Built Environment

CITY CENTER
High-density downtown/CBD employment centers and surrounding neighborhoods

SUBURBAN
Predominantly lower-density residential users with some segregated mixed uses

EDGE CITY
Medium-density employment centers outside of the urban core

EXURBAN
Very low-density residential uses on the urban fringe

RURAL
Typically unincorporated
Emergency Services

- Disaster response
- Aeromedical
- Firefighting
- Law enforcement
Air Taxi

- On demand, point-to-point
- App-based like transportation network companies / ride hailing services.
Air Metro

- Fly a specified route on a specified frequency but without exact scheduled times
- Potential strategy to serve transportation deserts

Image: Cincinnati Bus Diagram from 2011
Microhaul Airline Operations

- Scheduled air carrier flights with set routes and times
- Potential to serve regional air mobility, and for hub airport access.
- Potential to increase utility of smaller nearby airports and distribute passengers
Understanding Community Integration: The Convergence of Two Historically Distinct Disciplines

Local Communities
- City councils, mayors, city managers
- Urban planners, transportation engineers
- Public transit
- Residents and businesses
- Disadvantaged communities
- Others

Aviation
- Federal government
- Port authorities
- Air carriers
- Manufacturers and suppliers
- Tenants and employees
- Communities impacted by operations
- Others

AAM/UAM and UAS Community Integration

Cohen 2020
Public Acceptance is Multifaceted

Trust
- Safe Vehicles
- Safe Infrastructure
- Secure Operations

Public Benefit
- Emergency Services
- Increased travel options
- Economic opportunities

Limited Adverse Impacts
- Noise and visual impact
- Emissions and environment
- Privacy

Integration
- Existing transit & roads
- Grid capacity
- Social Equity
Potential Impacts of AAM

- Connect affordable housing with jobs and services
- Reduced emergency response times
- Stronger connection of rural areas to urban opportunities
- Workforce development and economic opportunities
- Increased utility of GA airport infrastructure

- Noise and visual pollution
- Increased demands on local grid capacity
- Negative impacts on existing public transit
- Sprawl and gentrification
- Competition for funding for other critical infrastructure
Multimodal Integration

Physical integration provides places where people can make seamless connections between travel modes (e.g., AAM, on-demand mobility, shared AVs, public transportation)

Co-locating multiple modes could support development of mobility areas and create a network effect that can multiply effectiveness of AAM, on-demand mobility, and shared AVs

Integration with mobility on demand (MOD), mobility as a service (MaaS), and public transportation is key

Airports have the opportunity to become unique and valuable community assets as mobility hubs and microgrids.
Systems Master Planning for Advanced Air Mobility

A comprehensive process which includes internal assessment, community engagement, resources and data collection, and development of an implementation plan. Considerations include:

- Integration into multi-modal transportation systems
- Incorporating local priorities and policies
- Addressing sustainability – environment, economy, equity
- Business models and forecasting
- Infrastructure mapping
- Airspace management and route design
- Grid capacity and power strategies
- Funding and timelines

© CAMI 2021
Concluding Thoughts

• Airports provide a key piece to the advanced air mobility puzzle, and there is an opportunity to revitalize underused or disused GA airports

• Planning and policy are needed to mitigate adverse impacts and maximize potential benefits

• Key focus areas:
  • Multimodal integration
  • Land use
  • Environmental impacts
  • Social equity

• Research, demonstrations, and evaluations can:
  • Assist local and regional governments develop the ability to integrate AAM with existing transportation services
  • Understand the impacts, equity, and community concerns with AAM
  • Validate the technical and institutional feasibility of AAM deployments

© CAMI 2021
CAMI’s Online Resources

CAMI Notes:
- What is Urban Air Mobility?
- Community Benefits of Urban Air Mobility
- eVTOL Aircraft: What they are & why they matter
- Urban Air Mobility Operations Overview
- Legal Considerations for Urban Air Mobility
  Part 1: Aviation Law
- Components of Public Acceptance for AAM & UAM

Videos
- UAM 101
- American Planning Association: Advanced Air Mobility
- AAM 101

Guidebooks (coming soon)
- Why We Need Advanced Air Mobility for our Cities: A Planner’s Guide to Advanced Air Mobility
- Incorporating Advanced Air Mobility into Regional and GA Airports
- Foundational Information for Advanced Air Mobility

https://www.communityairmobility.org/resources

© CAMI 2021
The mission of the Urban Air Policy Collaborative is to develop a policy framework for the local implementation of advanced air mobility through the sharing of knowledge, discussion of issues, development of recommendations, and collaboration with peers through an ongoing program of workshops, presentations and conversations. The UAPC has two programs – the Cohort and the Forum.
Kickoff Meeting


Module 3: Social Equity and Integrating AAM into the Transportation Ecosystem: Multimodal Integration, Equity, Community Engagement

Module 4: AAM Modeling and Forecasting: Regional and Local Modeling and Simulation, Market and Economic Forecasting

Module 5: Community and Environmental Impacts Part: Noise, Visual Pollution, Routes


Module 7: Planning for AAM Part 2: AAM at Existing Airports, Digital Policy, Utilities and Energy

Module 8: Roles and Responsibilities, Next Steps, and Wrap Up
Supporting the responsible integration of the third dimension into our daily transportation needs through education and advocacy.

Yolanka Wulff

Yolanka@communityairmobility.org
www.communityairmobility.org