Urban Air Mobility
Adding the Third Dimension to Urban and Regional Transportation

Aviation Noise & Emissions Symposium
March 2, 2020

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TECHNOLOGY IS REDEFINING FLIGHT

Tech Drivers
- Propulsion
- Electrification
- Autonomous Systems
- Mobility Services
- 5G

New Capabilities
- eVTOL
- Electric and Hybrid-electric

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
What is Urban Air Mobility (UAM)?

- UAM uses three-dimensional transportation to better serve the needs of our communities.
- UAM integrates with existing metropolitan transportation systems.
- Nothing new: regional airline travel and helicopter service (e.g., Blade) are current/historical forms of UAM in service today.
- Everything new: electric vertical takeoff and landing (eVTOL) aircraft make UAM safer, quieter, greener, and more economical than ever before.
What is Urban Air Mobility (UAM)?

Zones of operation:
- City center
- Suburbs to city
- Edge city to (edge) city
- Rural Access
- Hub Airport Access

Styles of operation:
- Airline
- Air metro
- On demand
- Airport shuttle
- Emergency services
What is Electric Vertical Take Off & Landing (eVTOL)?

eVTOL aircraft use drone technology like electric motors to take off and land vertically and fly horizontally.

Benefits of eVTOL:
- Sustainable
- Quiet & Safe
- Affordable
- Community friendly

Uses of eVTOL:
- Passenger travel
- Cargo delivery
- Essential and emergency services
Urban Air Mobility: Statistics

- UAM industry projected to be $1.5T 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)

- The world’s drone use for industrial purposes will reach $40B by 2023
Urban Air Mobility: Statistics

- In 2017 there were 12 known companies developing eVTOL aircraft.
- Today there are at least 225 eVTOL aircraft, with a dozen in the process of FAA certification.
- In 2019 alone, there were over 1,000 test flight of full size eVTOL aircraft.
Automotive OEMs Going Vertical

- Hyundai Motor Group
- Honda
- Porsche
- Tesla
- Toyota
- Mercedes
- Geely
Social & Economic Impacts of Urban Air Mobility

- People are willing to spend up to 60 minutes for their daily commute.
- UAM increases daily commute radius to 200 miles.
- UAM can leapfrog infrastructure projects to deal with transportation deserts.
- UAM unites geographically constrained areas and lessens the burden on ground infrastructure.
- UAM brings housing options closer to economic centers and closes social divides.
Challenges to UAM Implementation

- Technology
- Regulation / Certification
- Infrastructure
- Air Traffic Management
- Public Acceptance
“The future of the [drone] industry is still up for debate in many ways, since it depends on five factors… First, and perhaps most vital, is the issue of public acceptance… The industry has to build a lot of confidence before people will accept thousands of them flying overhead or board UAS air taxis.”

~ McKinsey & Co 12/2017
Noise & UAM: Necessary but not Sufficient

There are three critical factors that must be addressed to achieve public acceptance:

- Safety
- Public Benefit (e.g., increased travel options)
- Limited Adverse Impact (e.g., noise, visual impact, emissions).

To achieve or address these facets of public acceptance requires full and transparent engagement between the UAM industry (including the development of effective community engagement plans), regulators, and community members.
Even silence can be too loud

The perceived value of the thing making the noise is critical to whether or not it is perceived as “too loud” by the community.
New approach to noise: restricting or right-sizing?

- It is tempting to just set a maximum decibel level for any eVTOL aircraft that are utilizing a vertiport facility, but this oversimplifies the problem.
- When, why, who, and how many are equally important considerations
- Equip communities to gather the information they need (ambient noise levels, vehicle noise footprints, etc.) and balance noise impact against the value that the UAM operation will bring.
Getting noise right is key to political support

Elected officials and local decision makers don’t want to get any more phone calls from people complaining about something, especially not noise.
Are cities prepared?

- Are they incorporating urban air mobility into their transportation plans? Into their Comprehensive Plan Updates?
- Are they aware of the state of the UAM industry? The urgency?
- Do they have the necessary infrastructure and ground support?

Or will they be reactive to industry?
Cast of Characters

- Transportation Departments
- Elected Officials
- Public
- Essential Services
- Real Estate Developers
- Business Owners
- Airports
- Federal Regulators
- Insurance Companies
- State / Local Governments
- Public
- Essential Services
- Real Estate Developers
- Business Owners
- Airports
- Federal Regulators
- Insurance Companies
- State / Local Governments
- Transportation Departments
Crawl – Walk – Run Adoption Approach

• Crawl
  • Public engagement, safety, and legislation
  • Pilot projects, demonstrations and data gathering

• Walk
  • Repurpose existing infrastructure
  • Develop new regulations

• Run
  • Build and scale new infrastructure
  • Streamline new regulations, permitting and licensing
  • Develop data management practices for privacy and efficiency
  • Advocate and safeguard public safety
Community leaders that are not planning today for the inevitable third dimension of transportation will be chasing it when it arrives.
Introducing… the Community Air Mobility Initiative

CAMI is a 501(c)(3) nonprofit organization dedicated to supporting the responsible integration of the third dimension of urban transportation at the state and local level.

CAMI educates and equips state and local decision makers, the public, and the media with the information they need to set policies and design infrastructure and systems that address transportation needs for their communities.
CAMI Resources

What is Urban Air Mobility (UAM)?

UAM uses three-dimensional transportation to better serve the needs of our communities.

Urban Air Mobility (UAM) is the idea of integrating aviation into our cities and towns. It is one way to move people faster, more efficiently, and more conveniently. UAM uses electric aircraft and helicopters to offer a new option for transportation.

In other words, UAM is a revolution. New aircraft that use electric technology offer a safer and more affordable way to travel. Some of these aircraft look like the traditional airplanes. Others use multiple electric motors to take off and land vertically, known as VTOL. These vertical takeoff and landing aircraft, called eVTOLs, are currently being tested by companies around the world and are already ready for commercial operations.

UAM may share airspace with small unmanned aircraft systems (USAs or drones), but it is not the same thing. As a broad- or area-based and the size of the aircraft differentiate UAM from UAS operations like cargo drone delivery.

As with another aircraft, airlines, and the Federal Aviation Administration (FAA) in the United States and the European Union’s Technical Airworthiness Administration (EASA) in Europe, UAM has its own guidelines and regulations to ensure safety. These regulations also ensure that UAM can operate within the same airspace as other aircraft, so there is no need for a new system of airspace management.

The following provides a snapshot of how UAM’s operation can be used in different areas, including the benefits and challenges. The FAA’s Urban Area Airspace Use Plan, published in 2019, illustrates the potential of urban air mobility.

What is Urban Air Mobility (UAM)?

UAM Zones of Operation

With new types of aircraft, new opportunities for connecting our communities. Operations within city centers are extending use of UAM beyond the typical recreational flight, expanding opportunities for businesses and services, complementing traditional transportation modes, and increasing accessibility for a variety of situations, such as emergency response, remote work, and more.

City Center

Flights from vertiports within a city center provide an alternative to driving in dense urban traffic. Existing terminals and new infrastructure will support this type of operation.

Suburb to City

Flights from suburbs into the city center provide an alternative to transportation congestion and can be used in areas with high traffic densities.

Edge City to Edge City

Smaller communities that need access to each other. This can be a more efficient way to travel and can connect smaller cities.

Rural Access

Remote areas that do not have sufficient ground connectivity due to geography or other constraints can benefit from UAM. This will help increase accessibility and connectivity.

Airport Shuttle

Access to major commercial airports can be facilitated with UAM that offers a new option for transportation.

Emergency Services

The new UAM aircraft under development are designed to be used in 2022 and beyond to reduce response times, lower operating costs, and minimize the use of the dedicated roadways.
CAMI Workshops

Agenda

UAM Primer
• Introduction to CAMI and Urban Air Mobility  
  A. Dietrich & Y. Wulff (CAMI)
• eVTOLs – What Are They?  
  J. Sherman (Vertical Flight Society)
• Infrastructure Considerations  
  D. Swanson (Swanson Aviation Consultancy)
• Legal and Insurance Issues  
  E. Rivera Esq. (Fox Rothschild LLP)

Making UAM a Reality
• Local Influences on UAM Development  
  P. Vascik (BlueSky D2D LLC)
• Integrating UAM into Urban / Regional Transportation  
  C. Fernando (Aviation Consultant)
• Available Tools and Resources  
  D. Shapiro, (NASA)
Two Outstanding Back-to-Back eVTOL/UAM Events!

**UAM Infrastructure Workshop**
March 17-18, 2020
8:00 am – 5:00 pm
Rowan University
vtol.org/infrastructure

**Government Employee Discount Available**

**UAM 101**
An introduction to Urban Air Mobility for state and local decision makers
March 16, 2020 13:00 - 17:00
Glassboro, NJ
communityairmobility.org/events
CAMI wants to work with you...

- Find us at [www.communityairmobility.org](http://www.communityairmobility.org) and on LinkedIn
- Contact us at [contact@communityairmobility.org](mailto:contact@communityairmobility.org)
- Sign up for newsletters and information on our website
- Join as a member – contact us or through our website
- Invite us to make a presentation to your company, agency or jurisdiction
- Ask us about customized local assistance with your project

We are here to help people and communities take to the skies!
Supporting the responsible integration of the third dimension into our daily transportation needs through education and advocacy.

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