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Are Flying Taxis Real and Taking Off Soon? - *"Lights, Camera, Action… Yes They Are!"*

From left to right: **Alex Bolton**, *Chief of Staff for Congresswoman Nicole Malliotakis (R-NY);* **Matthew W. Daus, Esq.**, *Transportation Technology Chair at the City College of New York's University Transportation Research Center; and* **Behnaz Razavi**, *City Activation Manager at Supernal. The panel discussed "AAM Legislative Perspectives" at the ACRP Insight Event held in Washington, D.C.*

What Is Advanced Air Mobility?

Just like the media mentions, the term "robotaxis" as a simplified reference to automated or driverless cars (and for many years, reporters mistakenly referred to transportation network companies like Uber and Lyft as ridesharing services), some folks have been using the parlance "flying taxis" to reference this new and emerging mode of aviation. Not only is that an oversimplification, but there are other terms of art, such as AAM or UAM that have been thrown about that are sometimes confused and misunderstood.

The Airport Cooperative Research Program (ACRP) defines ***Advanced Air Mobility (AAM)*** as encompassing "manned and unmanned, autonomous and pilot-supervised aircraft of any size and mission operating safely and responsibly in an integrated National Airspace System."[1] ***Urban Air Mobility (UAM)*** refers to AAM use cases specific to urban environments, which may offer less space, and require shorter distances for operations. AAM also involves the development

[1] National Academies of Sciences, Engineering, and Medicine. 2020. Advancing Aerial Mobility: A National Blueprint. Washington, DC: The National Academies Press. https://doi.org/10.17226/25646.

of electric vertical takeoff and landing (eVTOL) aircraft, which can efficiently navigate crowded urban spaces, and take off and land in many environments. AAM or ***eVTOL Aircraft*** feature multiple rotor systems or propellers that enable their vertical takeoff and landing, eliminating the need for traditional runways. They have a compact and sleek design, with distributed electric propulsion systems that offer improved efficiency and reduced noise compared to conventional aircraft. They also typically accommodate a small number of passengers, ranging from a few to a dozen. The design focus centers on maneuverability, ease of use, and integration with existing transportation infrastructure to provide convenient and accessible aerial transportation options.[2] This revolutionary approach aims to decrease urban congestion, provides rapid access to remote and rural areas, and reduces the environmental impact of transportation – to usher in a new era of sustainable and efficient aerial mobility solutions.

The Case for AAM – Why Should Ground Transport Operators Care?!

I was initially skeptical about this new mode, until I became personally involved with AAM projects on a variety of levels over the past 5 years or so. I have had the opportunity to become involved in AAM developments through client representation and participation in research efforts. In 2018, I was part of ***NASA's Strategic Advisory Group for its UAM Market Study***.[3] The study focused on airport shuttles, air taxis, and air ambulances as specific markets. As part of the ***Legal and Regulatory Strategic Advisory Group***, I contributed to considerations surrounding federal regulation, certification, and regulatory barriers for UAM. Also, in my capacity as the Partner and Chair of the Transportation Practice Group at Windels Marx, I have consulted with and advised UAM/AAM stakeholders and companies over the years on legal, legislative and funding issues.

As part of my university hat, at the US DOT center at City College (CUNY), I have been involved in teaching course work to graduate students, and have held events and facilitated research in this area. Finally, I have also become involved with the ***Airport Cooperative Research Program (ACRP)***, which is managed by the ***Transportation Research Board (TRB)***. The ACRP is an industry-driven, applied research program that develops near-term, practical solutions to airport challenges. The ACRP functions as a neutral convener and facilitator for information sharing among diverse public and private sector stakeholders.

With our streets getting more congested every day, and with advances in technology, just like the famous cartoon "The Jetsons" – or in various "Star Wars" movies, the expanded use of our airspace is inevitable. I am now, after several years of exploring and learning more about this emerging mode, convinced that it is viable and will be incredibly useful to society in certain places and for certain types of mobility services – especially medical emergency, airport connections, luxury and rural transport. The luxury travel use case is already there, but the big question is whether underserved communities in transportation deserts will be served through some form of government subsidized affordable services.

I do not think this mode will replace completely any other existing modes, yet it will likely interact with and form connections throughout the mobility ecosystem. AAM and UAM also hold

[2] https://ntrs.nasa.gov/api/citations/20205000636/downloads/2021-08-20-eVTOL-White-Paper-Final_V48.pdf
[3] https://ntrs.nasa.gov/citations/20190001472

substantial importance for the ground transportation industry, impacting both passenger and goods transport. These concepts offer an unprecedented opportunity to alleviate congestion on roadways, reducing travel times, and enhancing overall efficiency. By providing efficient point-to-point connections with multiple, alternative modes of transportation, AAM and UAM can significantly complement ground transportation, especially for daily commuters in urban areas, and streamline last-mile delivery solutions for goods.

As an example, Blade Air Mobility, which provides mainly short-distance flights with helicopters, also integrates a ground transportation option to get to and from beginning and end destinations.[4] This integration promises to transform the way people and products move, fostering seamless intermodal connectivity and optimizing the use of transportation resources to meet the evolving demands of modern societies.

So yes, flyting taxis are here, and the passenger ground transportation industry should care and explore this now, as the business opportunities for partnerships with AAM and UAM providers is a wide-open field. There is a famous phrase that is uttered by most pilots over the years – namely "**Lights… Camera… Action!"** – inspired by Hollywood movie sets, right after completing pre-flight checklists and being cleared for takeoff. In my view, AAM is ready for take-off, so let's all take our seats. This article sets forth the flight plan for this emerging mode, and seeks to educate those who have not had AAM in their line of sight.

State of Play of the AAM/UAM Industry

In recent years, the global aviation industry has seen a significant rise in the acceptance of electric and hybrid aircraft, particularly for urban, suburban, and rural operations. AAM can facilitate transportation in regions underserved by current air travel modes, including intricate urban environments and areas isolated from traditional modes of transportation. The industry is now consistently developing ongoing advancements in various fields like software, electronics, sensors, energy storage, and electric aviation – offering transformative potential to reshape cargo and passenger transportation across industries. These coming to market aircraft are designed for short distances, independent of runways, and feature high levels of automation. Rules and regulations controlling this market are still works in progress and may be influenced by public opinion and private interests.

The AAM landscape is seeing the emergence of numerous air vehicle projects, including more than one dozen with substantial private investments, driven by both traditional aerospace players and newcomers to aviation. Although many of these concepts are still in their early developmental stages, they hold the potential to revolutionize transportation operations and introduce entirely new capabilities. This burgeoning vertical lift industry, coupled with its ground infrastructure and air traffic management systems, presents a significant challenge to existing airspace monitoring systems and regulatory frameworks.

AAM will transform many industries like transportation, emergency response, and logistics. Initial use-case research shows this much. However, as capabilities emerge through

[4] https://www.blade.com/essential-ground-connect

technological advancement, new missions may arise beyond air taxi and package delivery. This could include security patrols for safety, rapid response for emergencies and fires, police patrol, and even the delivery of life-saving medicines during emergencies. Like the cell phone and the computer, new and as yet unseen missions filling what will become important economic issues, can develop as this sector grows.[5]

While the AAM industry is still emerging, Blade Air Mobility (Blade) has been innovating in the UAM field. On February 14, 2023, Blade completed an AAM test flight in New York with BETA Technologies, and secured up to twenty BETA Technologies aircraft for delivery in 2024.[6] This past June, Blade partnered with Jet Blue to offer helicopter service from Manhattan to both John F. Kennedy International Airport, and Newark Liberty International Airport.[7] Blade also solidified its place in the organ transport industry by acquiring Trinity Air Medical in 2021, creating a nationwide, multi-modal organ transport platform.[8]

Growing AAM companies are also partnering with airlines. In the past year, at least two airlines have placed orders for AAM aircraft from developers that have yet to fly or certify production aircraft. United Airlines has planned an AAM route between New York City and Chicago with Archer Aviation.[9] Delta Air Lines has placed its order with Joby Aviation.[10] AAM operators could fly an estimated 20,000 flights each day by 2030.[11] Many initial commercial AAM ventures look to fly short routes between downtown vertiports and large-hub airports. For these types of operations, high-density cities like New York or London may require 85 to 100 takeoff and landing pads, distributed among twenty to thirty vertiports.

The AAM industry has also seen developments in Dubai, Spain, and Australia. In October 2022, XPeng, Inc., a Chinese AAM company, successfully conducted a 90-minute test flight in Dubai, marking a major step toward air taxis in the region.[12] Umiles Next, a Spanish AAM manufacturer, completed test flights in November 2022 in Spain.[13] More recently, Vertiia, an Australian manufacturer, completed its first test flight in New South Wales in February 2023.[14] AAM is changing perspectives on transportation all around the world.

AAM holds tremendous importance in shaping the future of transportation by addressing critical challenges, enabling innovative use cases, and revolutionizing the way we move people and goods. The significance of AAM lies in its potential to alleviate urban congestion, enhance accessibility to remote areas, and dramatically reduce the environmental impact of traditional

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[5] National Academies of Sciences, Engineering, and Medicine. 2020. Advancing Aerial Mobility: A National Blueprint. Washington, DC: The National Academies Press. https://doi.org/10.17226/25646.

[6] https://www.blade.com/UAM-eva

[7] https://www.thrillist.com/news/new-york/jetblue-blade-partnership-helicopter-transfer-nyc

[8] https://www.bloomberg.com/news/articles/2021-09-09/helicopter-service-blade-doubles-down-on-transporting-organs#xj4y7vzkg

[9] https://www.archer.com/news/united-airlines-and-archer-announce-first-commercial-electric-air-taxi-route-in-chicago

[10] https://news.delta.com/delta-joby-aviation-partner-pioneer-home-airport-transportation-customers

[11] https://www.mckinsey.com/featured-insights/the-next-normal/air-taxis

[12] https://www.standard.co.uk/tech/flying-taxi-passes-90-minute-test-drive-dubai-b1032808.html

[13] https://www.flyingmag.com/umiles-next-begins-flight-testing-evtol-air-taxis-autonomous-systems/

[14] https://gizmodo.com.au/2023/02/vertiia-evtol-aircraft-amsl/

transportation modes. With the rise of population in cities and increasing traffic congestion, AAM offers a practical solution for efficient point-to-point travel, minimizing the time wasted in transit, and easing the strain on existing infrastructure. This is particularly crucial for daily commuters and emergency services that can bypass congested roadways, ensuring swift access to critical locations. Furthermore, the accessibility AAM brings to underserved rural and remote regions can drive economic growth, healthcare access, and disaster relief capabilities, transforming previously isolated communities into prosperous centers.

Legislative Perspectives on AAM

Earlier this summer, the ACRP held an "Insight Event" entitled: "***On-Demand Aviation Services for Mobility, Logistics, Emergency Response, and Humanitarian Use Cases***" on July 10 and 11, 2023. This Insight Event highlighted advances in aviation technology that are enabling innovations in urban, regional, and on-demand aviation, including AAM. Findings from this insight event will inform and guide not only future ACRP-related activities, but also broader TRB research activities.

During the two-day ACRP Insight Event held at the TRB's Keck Center in Washington, D.C., subject matter experts discussed topics including the need to build institutional readiness and capacity at airports, enhancing public sector preparedness, and identifying challenges, gaps in understanding, and future research needs for AAM. I was delighted to be a member of the planning committee for the Insight Event, and would like to thank **Matt Griffin,** ***ACRP Senior Program Manager***, and **Adam Cohen,** ***Senior Research Manager at the University of California, Berkeley Transportation Sustainability Research Center***, for putting together an amazing conference with such thoughtful discussions and impressive panelists.

Matt Griffin, *ACRP Senior Program Manager*

Adam Cohen, *Senior Research Manager at the University of California, Berkeley Transportation Sustainability Research Center*

On July 10th, I was honored to moderate a panel discussion with **Alex Bolton,** ***Chief of Staff for Rep. Nicole Malliotakis (R-NY)***, and **Behnaz Razavi,** ***City Activation Manager at Supernal*** on "Legislative Perspectives on AAM." The panel discussion included an introduction to current AAM-related federal legislation, which includes the 2022 Advanced Air Mobility Coordination and Leadership Act, the U.S. Senate Urban Air Mobility (UAM) Funding Bill, and the House UAM Funding Bill. These laws and pending bills have focused on either creating: (a) exploratory and advisory committees on AAM use cases and the regulation of same; or (b) aviation funding streams to develop AAM infrastructure and garner private investment.

The ***Advanced Air Mobility Coordination and Leadership Act*** established a working group to plan for and coordinate efforts related to safety, operations, infrastructure, physical security and cybersecurity, and the federal government's investment necessary for maturation of the AAM ecosystem in the United States, particularly passenger-carrying aircraft, in order to: (1) grow new transportation options; (2) amplify economic activity and jobs; (3) advance environmental sustainability and new technologies; and (4) support emergency preparedness and competitiveness. This legislation was sponsored by U.S. Senator Jerry Moran (R-KS), and co-sponsored by U.S. Senator Kyrsten Sinema (I-AZ). It was enacted in October of 2022. Congress Member Nicole Malliotakis was a member of the House Transportation Committee during the 117th Congress (2021-2022), and was a co-sponsor of the legislation as well.

The ***Senate UAM Funding Bill*** provides for a two-year grant program of $12,500,000 per year for state, local, and tribal government agencies, port authorities, and metropolitan planning organizations to develop and implement the infrastructure necessary for AAM. The bill was sponsored by Sen. Alex Padilla (D-CA), and co-sponsored by Sen. Jerry Moran (R-KS), but never made it out of Senate Committee in the 117th Congress. The ***House UAM Funding Bill*** mirrors the Senate proposed legislation with respect to the amount of the allocation of $12,500,000 per year for state, local, and tribal government agencies, port authorities, and metropolitan planning organizations to develop and implement the infrastructure necessary for advanced air mobility. The House legislation, however, does not include the language cited above that specifically contemplates converting heliports to vertiports. The bill was sponsored by Rep. Rick Larsen (D-WA), and passed in the House in June 2022. Neither the Senate UAM Funding Bill nor the House UAM Funding Bill were enacted during the most recent congressional session, and neither chambers has reintroduced the legislation in the current session.

The panel's conversation then focused on how AAM industry stakeholders can engage regulators. Alex Bolton expressed how regulators want to understand what AAM technologies can do for their constituents here and now, but they often have poor and outdated knowledge for lawmaking purposes. Research for legislative efforts must be thorough and clear regarding starting points, relevance for constituencies, cost and viability, social and economic impacts, and connection to existing and potential policy.

Matt Daus *discussing recent legislation and pending bills as the moderator of* ***the AAM Legislative Perspectives Panel at the ACRP Insight Event.***

Behnaz Razavi spoke from a planning perspective. She raised one key concern about how unified standards must be adopted linking air planning to land use planning for infrastructure to be possible. Long-term regional plans must incorporate planning for AAM and local aviation to make funding truly available through regional planning organizations. Communities must be involved with planning to determine optimal infrastructure locations, and AAM must be considered a part of transportation networks as a whole.

Click Here to See Video from the Legislative Perspectives Panel

U.S. DOT AAM Initiatives

In addition to the ACRP Insight Event panels, attendees were notified of the ***U.S. Department of Transportation's (DOT) Request for Information (RFI)*** seeking public input on the development of a national strategy on Advanced Air Mobility as required by the Advanced Air Mobility Coordination and Leadership Act. The comment period deadline for the RFI was extended from July 17 to August 16, 2023. Once these responses are reviewed, we can expect potential procurement opportunities.[15]

In addition to the RFI, the ***Federal Aviation Administration (FAA)*** released its ***Advanced Air Mobility Implementation Plan*** called **Innovate 28, or I28**. The purpose of I28 is to document the work required to enable initial AAM operations in a variety of operational settings or "key sites" in the near-term. I28 will leverage public-private partnerships to identify key locations and use cases of interest to AAM industry stakeholders while promoting an all-hands-on deck approach to ensure the necessary steps are taken to enable these operations. Leveraging lessons learned from

[15] https://www.federalregister.gov/documents/2023/06/27/2023-13532/request-for-information-on-advanced-air-mobility-extension-of-comment-period

Original Equipment Manufacturers (OEMs) and/or operators conducting individual Entry Into Service (EIS) building block operations, I28 operations are expected to be larger in scale than initial EIS operations. I28 is intended to result in "leave behind" processes, infrastructure, procedures, and local knowledge at the selected key sites, meaning knowledge and processes that can be "left behind," or shared with those locations. Additionally, the collective experience gained through the I28 initiative is expected to support expanded operations in other areas of the country. The initiative will culminate in integrated AAM operations with OEMs and/or operators flying between multiple origins and destinations at one or more locations in the U.S. by 2028.[16]

Other ACRP Event Takeaways

From Left to Right: **Scott McMahon,** *President of DM Airports, LTD;* **Naashom Marx,** *Director of Strategic Innovation – Advanced Mobility at Cincinnati/Northern Kentucky International Airport;* **Alex Gertsen,** *Director of Airports and Ground Infrastructure at the National Business Aviation Association;* and panel moderator **Chris Oswald,** *Senior Vice President for Safety and Technical Operations at Airports Council International – North America.* The panel discussed scaling and governing AAM.

Click Here to Learn More about the ACRP and the Insight Event

Other panels at the ACRP Insight Event discussed the fundamentals, system planning, and use cases of on-demand aviation; stakeholder and community engagement; scaling and governing

[16] https://www.faa.gov/sites/faa.gov/files/AAM-I28-Implementation-Plan.pdf

AAM; and security considerations for AAM. To many experts and stakeholders, it is still not clear which use cases will actually dominate the market. No matter which use cases win out, some experts believe that automation and remote piloting will be key to achieving operational success.

There is also concern over ensuring AAM advances transit equity. This can mean using AAM services to reach underserved communities to fulfill basic transportation needs, to address the specific transportation needs of users with disabilities, or to deliver medicine, food, or other key resources to underserved communities – on a regular basis, but particularly during emergencies or natural disasters. Equity also means ensuring vulnerable communities are not disproportionately impacted by AAM operations and development. This can mean noise, construction, and other potential effects of AAM operations and development.

AAM experts discussed how the infrastructure that will support AAM operations is not yet fully developed. The industry needs official technical specifications for vertiports and other key infrastructure components so that grid capacity can be built out. Security experts also discussed all the considerations the FAA must make when creating regulations around security and flight patterns. This is precisely why the FAA, and its working group, look for public input and aim to work with industry and community stakeholders to create the best regulatory outcomes for the industry and communities.

Also featured as an evening keynote speaker was **Peter Irvine**, ***Deputy Director at the Office of Aviation Analysis, and Executive Lead for Aviation Policy at the U.S. Department of Transportation.*** Deputy Director Irvine spoke on the importance of AAM in advancing transportation networks and transportation technology. He also spoke about the importance of stakeholder input for the DOT's RFI for stakeholder input on AAM development and policy.

Another topic of discussion at the ACRP Insight Event was pending authorization legislation for the FAA. On Thursday, July 20, 2023, the House passed a reauthorization bill to renew funding for the agency for the next five years. The bipartisan bill aims to improve agency efficacy and operations while expanding the aviation workforce, investing in airport infrastructure, and enhancing the passenger experience for air travel.[17] The bill authorizes robust funding for airport infrastructure, including electric aircraft infrastructure, which can lay the foundation for AAM. The bill also encourages the safe yet more efficient testing and integration of new technologies, such as drones and AAM into the airspace. The House approved the measure by a bipartisan vote of 351 to 69. However, as of this writing, the Senate has yet to pass its own version of the FAA reauthorization bill. It remains to be seen whether any significant and clearly delineated AAM funding for vertiports or other projects will be included.

Government Funding, Partnerships & the Future

As we wait for progress on the House UAM Funding Bill, there are otherwise no government funding streams specifically dedicated to AAM and UAM projects. Additionally, all paths to funding require partnership with a state or local government controlling an airport with

[17] https://www.congress.gov/bill/118th-congress/house-bill/3935/text

coordination, oversight, and approval from the USDOT and FAA. However, the existing ***Strengthening Mobility and Revolutionizing Transportation (SMART) Grant Program*** does offer competitive funding for innovative community mobility and technology projects. Regarding aviation, the grant program does mention the use of innovative aviation technologies to support transportation safety and efficiency. SMART grants are only available to local, state, and federal governments and agencies, but private interests may be partners. $500,000,000 is being disbursed over the course of five years.[18]

Different state and local authorities have been exploring investments in AAM and UAM infrastructure and operations. The Port Authority of New York and New Jersey, for example, partnered with NASA in April, 2023 to study the integration of AAM into existing aviation systems.[19] Airport authorities across the country are exploring how to integrate AAM into their operations, preparing for a future where AAM is ubiquitous and operating at scale. As mentioned above, companies like Archer and Joby have already partnered with United Airlines and American Airlines to integrate AAM into their services.

If providers truly wish to create integrated transportation systems with AAM, ground transportation must play a key role in connecting users to those services. Partnering with AAM manufacturers and operators provides a key opportunity for ground transportation providers connecting passengers from vertiports to other destinations. Ground transportation can be a part of many different AAM use cases, including rural emergency medical transport, organ transport, as well as airport luxury.

Looking forward, AAM will play a pivotal role in shaping the future of mobility. Its potential extends beyond personal travel to encompass diverse industries, such as logistics, emergency response, and public services. Imagine the delivery of vital medical supplies and organ transplants via AAM aircraft, drastically reducing transit times and increasing the availability of life-saving resources. AAM also introduces a new dimension to disaster response, enabling rapid deployment of resources to affected areas, even in challenging terrain or amidst traffic disruptions.

The integration of the for-hire vehicle industry into the AAM landscape is poised to revolutionize urban transportation and redefine the concept of ridesharing. As AAM technology matures, the potential exists for on-demand urban air mobility services, where passengers can request aerial rides just like traditional rideshare services, reducing congestion on roads and offering a novel and efficient way to navigate urban centers. This integration between for hire vehicles and AAM aligns seamlessly with the broader vision of sustainable transportation networks, as electric propulsion and optimized air routes contribute to minimizing carbon emissions and noise pollution, just as for-hire vehicle services give people mobility without the need to own personal vehicles in dense cities. With these advancements, AAM is set to create new avenues for business innovation, employment opportunities, and transformative services, fostering an interconnected, efficient transportation ecosystem that enhances our quality of life and propels progress in the 21st century.

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[18] https://www.transportation.gov/grants/SMART

[19]https://aashtojournal.org/2023/04/14/nasa-ny-nj-port-authority-studying-uam-airspace-needs/#:~:text=A%20new%20%E2%80%9CSpace%20Act%E2%80%9D%20agreement,managed%20by%20the%20port%20agency.