

ADVANCED AIR MOBILITY

2024 ADVISORY COMMITTEE REPORT SUMMARY AND RECOMMENDATIONS

What is AAM?

Advanced Air Mobility (AAM) is a system that includes regulations, aircraft, and infrastructure. The Federal Aviation Administration (FAA)—which controls US airspace and AAM certifications—calls AAM a “new era of aviation,” including Urban Air Mobility (UAM) and Regional Air Mobility (RAM). AAM involves providing services using aircraft such as electric Vertical Take-Off and Landing (eVTOL) aircraft, as well as small Unmanned Aircraft Systems (sUAS), commonly known as “drones”. Drones are already being used for deliveries and public safety in Texas, and several companies plan eVTOL operations for cargo and passenger transport in the State by 2030. AAM requires both physical and digital infrastructure, both of which need more development in Texas. Multiple universities and other organizations in Texas are also researching various aspects of the AAM system.

\$115B

Nationwide economic growth by 2035
Deloitte (2021)

\$10B

Investor disclosed funding for 2022 – 2023
McKinsey and Company (2024)

79%

Reduced AED delivery time with drones
Mateen, F., Leung, et al. (2020)

84%

Emission reduction with drone delivery
Rodrigues, T. A., et al. (2022)

What are the challenges?

- **Communication** - Public understanding of AAM is limited, with concerns about privacy, noise, and safety. Effective communication of benefits and addressing concerns is crucial.
- **Electricity** - The AAM industry will require significant electrical capacity which could strain Texas' electric grid. Accurate demand estimates and early communication with utility providers are essential.
- **Safety** - Ensuring safety for AAM passengers and people on the ground is vital. Air traffic integration and cybersecurity are key challenges. A collaborative, multidisciplinary approach can help ensure safety in Texas and the US.
- **Workforce** - A highly-trained workforce will be required, including eVTOL pilots, drone operators, engineers, mechanics, and manufacturing personnel. A coordinated approach among Texas education providers will help meet workforce needs.
- **Standards** - Uniform standards for AAM physical infrastructure and zoning are necessary to avoid a patchwork of regulations that could hinder the industry.
- **Research and Development** - AAM faces R&D challenges, including optimizing fuel technologies, integrating AAM systems with air traffic management, and ensuring safety and security. Focused R&D efforts are needed to address these gaps.

How can the State help?

Texas could maximize the benefits of the AAM industry by focusing on leadership, planning, and innovation, similar to several states already preparing for the future of Advanced Air Mobility.

Recommendation 1. Leadership

Designate key industry and state points of contact to lead and coordinate the development of AAM in Texas.

Recommendation 2. Planning

Create a series of coordinated statewide plans and working groups to help shape the future of AAM in Texas.

Recommendation 3. Innovation

Provide funding to TxDOT to create a program for state universities to support research and development for AAM technologies, products, and services in Texas by providing matching funds for federal grants and requiring a minimum percentage of community or industry match.

This report was prepared on behalf of the Texas Advanced Air Mobility (AAM) Advisory Committee by Texas State University with support from the Texas Department of Transportation pursuant to Senate Bill 2144, 88th Texas Legislature, Regular Session (2023), to assess current state law and any potential changes to state law that are needed to facilitate the implementation of advanced air mobility technology in Texas. This report and its accompanying recommendations do not express an opinion of the Texas Transportation Commission or TxDOT.

For the full report: <https://www.txdot.gov/content/dam/docs/aviation/aama/aam-committee-final-report-2024.pdf>

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Recommendation 1. Leadership

Designate key industry and state points of contact to lead and coordinate the development of AAM in Texas.

Leadership is crucial for success and is essential for proper planning and strategic innovation. Without strong leadership, Texas will fail to capitalize on its natural advantages and reap the full benefits the AAM industry can bring, thereby falling behind other states.

1.1. AAM Advisory Committee.

Direct TxDOT to continue and expand the AAM Advisory Committee, in part to support the development of the Statewide AAM plan.

Rationale: Continuation of the AAM Advisory Committee will allow members of the industry to share their contemporary and critical knowledge with policymakers and state leaders. Expanding Committee membership will also ensure all aspects of this wide-ranging emerging industry are represented. Additionally, Committee input on future AAM plans will be critical. Their contribution to planning ensures that the State and industry work together on critical issues to produce comprehensive plans.

1.2. AAM Office (TxDOT). Create an office at TxDOT to provide technical support for AAM infrastructure at Texas airports, with a particular focus on electric and autonomous AAM aircraft needs.

Rationale: TxDOT coordinates the funding and management of capital improvement projects at the State's nearly three hundred General Aviation airports, which will play an important role in AAM implementation. TxDOT needs a focused office dedicated to AAM to foster expertise and allow for the efficient integration of AAM infrastructure into the existing transportation network. Combining the knowledge and understanding of AAM with traditional aviation will accelerate the efficient adoption of AAM technology into cargo and passenger mobility operations.

1.3. AAM Position (OOG). Create a position at the Office of the Governor to increase adoption and awareness of Texas on the national and international stage to attract investment in autonomous vehicles including AAM technologies (for example, through demonstration day coordination, conference booths and presentations). Additionally, this position could provide guidance and resources to public safety agencies across the state to assist in the awareness of AAM technologies and how to safely interact with these services.

Rationale: The AAM industry has only recently emerged and faces issues related to public perception and understanding. A representative at the Office of the Governor (OOG) will raise awareness of Texas as a welcoming environment for AAM among industry leaders. The position will also serve as an AAM single point of contact for industry interests and public awareness.

1.4. State Agency Information Sharing. Reestablish the working group from HB 2340 (2019) and include members of the AAM community in the group.

Sec. 418.055. The work group shall develop recommendations for improving the manner in which electronic information is stored by and shared among state agencies and between state agencies and federal agencies to improve the capacity of the agencies to:

- (1) respond to a disaster; and
- (2) coordinate the agencies' responses to a disaster.

Rationale: AAM aircraft can provide timely and critical information during disasters. Close coordination between agencies during a disaster is critical and inclusion of AAM information sharing protocols will maximize response efforts and ensure safe operations.

1.5. AAM Public Awareness. Develop communication materials to be posted on TxDOT's website to inform decision makers, the public, the aviation community, and recreational drone users about AAM.

Rationale: Other AAM leader states have addressed communication in part by having webpages dedicated to AAM on their Department of Transportation websites. These pages act as AAM information hubs, providing basic knowledge about the industry and linking to other authoritative sources. TxDOT should have space on their website allocated to AAM to help inform decision makers and the general public about AAM in Texas.

AAM leadership in Texas will require a combination of appointing key leadership roles and coordinating communication, as detailed in action steps 1.1 – 1.5.

Recommendation 2: Planning

Create a series of coordinated statewide plans and working groups to help shape the future of AAM in Texas.

Planning will help ensure coordinated action at the state and local levels, bringing diverse opinions from a variety of players together. Planning will help maximize benefits and minimize risks and challenges. Without proper planning, Texas will fail to maximize the benefits of AAM for its residents and businesses.

2.1. Statewide Strategic Plan. Develop a statewide strategic plan which establishes a vision and direction for AAM including near-term, medium, and long-range goals in conjunction with industry and community representatives. This plan should include topics like AAM use cases; evaluation of existing infrastructure and necessary infrastructure upgrades, including ones allowing for autonomous operations; potential route planning; regulatory best practices; next steps; and other pertinent information.

Rationale: Other AAM leader states have statewide strategic plans which provide information about AAM and lay out future steps. Developing a consensus based strategic plan for AAM in Texas will provide industry and state and local policymakers with an idea of how AAM can function in Texas.

2.2. Statewide Economic Impact. Estimate the economic impact of AAM in Texas, similar to other AAM leader states, with a particular focus on electric and autonomous aircraft.

Rationale: The AAM industry has the potential to generate significant economic benefits. Currently, Texas must rely on national estimates and is at a disadvantage competing against states that have already completed state-specific economic impact assessments. A statewide economic impact study for Texas will quantify the potential economic impact of the AAM industry for state leaders and help generate private investment to act as a building block for long-term planning.

2.3. Cybersecurity Risk Mitigation. Establish a statewide working group to evaluate cybersecurity and data risks posed by AAM technologies and develop strategies to minimize risks. The working group shall include representatives from state and local public safety agencies, National Institute of Standards and Technology (NIST), Cybersecurity and Infrastructure Security Agency (CISA), and industry.

Rationale: The highly automated nature of AAM aircraft introduces potential cybersecurity issues, which could lead to data leaks or other problems. With a collaborative multi-disciplinary effort between state, federal, and industry representatives, these cybersecurity risks to autonomous vehicles can be thoroughly investigated and minimized. This working group could also collaborate with other established groups that are evaluating autonomous vehicles more broadly.

2.4. First Responder Training. Create a Texas Division of Emergency Management-led industry and agency working group to develop curriculum and a resource repository to assist first responders in dealing with AAM-related emergencies.

Rationale: AAM aircraft are new and continually evolving, and first responders are not fully prepared to deal with them should they malfunction. With the proper training and resources, first responders will be able to more effectively respond to AAM-related emergencies, keeping themselves and the public safe. To ensure the optimal design of training materials and resources, there should be a collaborative effort between experienced members of both private industry and agency.

2.5. Statewide Airspace Infrastructure. Develop a plan for an AAM Airspace Integration System to provide airspace awareness that includes:

- i. Proposed operator
- ii. System capabilities and architecture
- iii. Phased implementation
- iv. Data exchange mechanisms between public and private third-party system operators
- v. Support for public safety to integrate into airspace infrastructure

Rationale: AAM aircraft and traditional aircraft will share the airspace regardless of their function. With an increase in these technologies populating the airspace, a system designed to safely integrate these aircraft and improve communication between operators will be critical in ensuring the safety and security of cargo and passengers in the air.

Successful AAM planning in Texas will require a coordinated effort from multiple expert stakeholders, as detailed in action steps 2.1 – 2.8.

HOW CAN THE STATE HELP? (CONTINUED)

Recommendation 2. Planning (continued)

2.6. Uniform Infrastructure Standards.

Identify ways to encourage the use of consensus-based vertiport standards (e.g., templates) and support uniform planning and zoning enabling language related to powered-lift aircraft, autonomous aircraft, electric aviation, and other advances in aviation technology across the state.

Rationale: Consistency, predictability, and interoperability will be important in establishing this industry throughout Texas. There are two areas where uniformity is especially important: infrastructure standards, and planning and zoning. Encouraging the use of AAM standards, such as for vertiport infrastructure, will allow industry partners to function in a consistent manner across the state, create a predictable operating environment, and enable the entrance and competition of multiple AAM Offices of Emergency Management (OEMs) and operators. Without statewide best practice guidelines relating to planning and zoning, the development of the AAM industry in Texas and its related benefits could face a patchwork of conflicting rules.

2.7. Electrical Infrastructure. Estimate the required electrical generation and transmission capacity in conjunction with the major state utilities, ERCOT, etc. for the different implementation phases of AAM in Texas and evaluate the use of other fuel sources.

Rationale: The potential electrical demand of the AAM industry is one of the most pressing issues in its full-scale implementation. To support the burgeoning field of AAM in Texas, it is imperative to develop a comprehensive electrical capacity plan that addresses the anticipated demands of this transformative technology. Long lead times for establishing additional electrical capacity necessitate planning for the establishment of vertiports and associated infrastructure. By proactively planning, Texas can ensure the reliability and efficiency of its electrical grid for AAM and understand how to leverage and augment planned ground EVs infrastructure development for more efficient development.

2.8. Workforce Development. Direct the Texas Workforce Commission, the Higher Education Coordinating Board, Texas State Technical College, and the Texas Education Agency to develop an action plan to educate the workforce required to support a robust AAM industry in Texas, with a particular focus on electric and autonomous aircraft.

Rationale: This industry is expected to create thousands of high-paying jobs, and because AAM aircraft function differently than traditional aircraft, these jobs will require specialized training. Training programs for aviation-related occupations, such as mechanics, technicians, line staff, hospitality staff, eVTOL pilots, drone operators, engineers, and other workers who understand the nuances of the technology and operating system will be crucial to meet future workforce needs.

Recommendation 3. Innovation

Provide funding to TxDOT to create a program for state universities to support research and development for AAM technologies, products, and services in Texas by providing matching funds for federal grants and requiring a minimum percentage of community or industry match.

Example topics include autonomous aviation integration into the National Airspace System, improved batteries, fuel cell technology, alternative fuels, and AAM use cases for various markets.

Although there are ongoing AAM research efforts in the state, a cohesive and coordinated structured research initiative is needed to avoid redundant research, increase efficiency, and accelerate results. An organized and flexible approach would accelerate the development of viable AAM solutions and promote rapid innovation. This would make Texas and its universities a focal point for AAM technology research and potentially improve its appeal for students across the country.

An approach similar to the National Science Foundation's AI research institutes could be used, establishing dedicated R&D centers within Texas university systems. Each center would focus on specific R&D themes and promote interdisciplinary collaboration in engineering, technology, urban planning, and regulatory affairs, focusing on themes like battery technology, system integration, safety protocols, and infrastructure design. Collaboration with industry leaders and government agencies would ensure applicable research outcomes for the AAM industry.