Infrastructure Subcommittee

Texas AAM Committee

Meeting #3, April 11, 2024

Agenda

- Opening remarks
- Full committee meeting recap
- Flesh out infrastructure recommendations
- Decreasing AAM’s Environmental Footprint
- Closing remarks – Next meeting dates

Full Committee Meeting Recap

- Context for legislative recommendations
  - Texas airports and FAA preemptions
  - Electric infrastructure and management in Texas
  - Texas and local economic development information
  - Workforce Development
  - Summary of FL, VA, and OH’s AAM leadership advantages
- 21 AAM needs

Infrastructure Recommendations

Recommendation 16 *

Need: AAM infrastructure at existing airports

Recommendation: Modify Chapter 21 of the Transportation Code to enable existing airports to function as vertiports and increase available funding if the vertiport meets public use/public good standard.

Who: legislature

Funding source: N/A

How much: $0

Decreasing AAM’s Environmental Footprint

- Develop vertiports at existing airports. Most of the vertiport infrastructure is already in place and the development process for new infrastructure is well defined if under-funded. This reduces the expense and environmental impact of new construction

Recommendation 17

Need: Funding for new vertiport development

Recommendation: Create a state matching program for new public good/public use vertiport construction

Who: TxDOT, AAM office

Funding source: general, rider, federal

How much: $100M (this would fund 5-10 vertiports)

Florida bill to fund new vertiport construction

As part of the Supply Chain Innovation Grant Program

“The Department of Commerce and the Department of Transportation shall also consider applications for funding submitted by public and private entities seeking to develop and establish vertiports in this state. Each award made for vertiport development shall be matched dollar-for-dollar by nonstate funds. For purposes of this subsection, the term "vertiport" means a system or infrastructure with supporting services and equipment used for landing, ground handling, and takeoff of manned or unmanned vertical takeoff and landing (VTOL) aircraft.”

https://www.flsenate.gov/Session/Bill/2024/1301/BillText/c3/PDF

Recommendation 18a **

Need: Electrical capacity at Texas airports

Recommendation: Provide funding to improve electrical capacity at Texas airports for airborne and ground vehicles. (infrastructure)

Who: TxDOT, AAM office, ERCOT

Funding source: general, federal, rider, PPP

How much:

Real Estate “Bucket”

- Adequate power including underground lines at least within approach/departure corridors (consider local generation as primary)
- Backup power source/redundancy
- Power requirements in general is going to be massive need along with the distribution and delivery systems with high amperage for charging
- Fueling systems for AV gas, Heavy fuel?, electricity

Decreasing AAM's Environmental Footprint

- Push for renewable energy sources for charging at vertiports
- Consideration of additional electrification efforts across all transportation infrastructure. The incremental investment in electrical infrastructure (e.g. substations and chargers) will not only have benefits for AAM vehicles, but also have immediate impact on EVs and electric ground service equipment (eGSE).

Recommendation 18b

Need: Electrical capacity at Texas airports

Recommendation: Provide funding to improve electrical capacity at Texas airports for airborne and ground vehicles. (capacity studies)

Who: TxDOT, AAM office, ERCOT

Funding source: general, federal, rider, PPP

How much: $100,000 per airport, 30 airports to start

Recommendation 19 **

Need: Funding to support ancillary infrastructure (e.g., micro wind sensors)

Recommendation: Increase TxDOT aviation funds and allow funds to be used off-airport to construct infrastructure to enhance the aviation system.

Who: TxDOT, OOG, AAM office

Funding source: federal, state, general, rider

How much:

Airspace “Bucket”

Airspace surveillance sensors

- Primary / secondary radars
- ADS-B
- Gap filler radars for more remote locations
- Any sensor that can help identify where an aircraft is in the air relative to other aircraft and structures

Weather monitoring and tracking

- Weather tracking tools for wind management, particularly in cities such as wind lidar
- Regular weather apps aren’t enough, for low altitude flying particularly in cities, higher fidelity weather tracking and active sensing is needed.

Real Estate “Bucket”

- AAM will require all the same things that exist on existing airports PLUS other support to facilitate operations
- Multimodal connectivity and infrastructure (including ground transportation)
- Connectivity to airside facilities as support and extension of traditional air service models
- Maintenance/sustainment infrastructure and facilities
- Ability to move aircraft to maintenance or “weather event” hangars or other safety structures. 737s are heavy and can survive a nasty thunderstorm, AAM aren’t

Recommendation 20 ****

Need: Gap analysis for AAM integration into existing airport infrastructure

Recommendation: Develop a statewide plan that addresses the potential locations for and classifications of vertiports and other associated infrastructure to help define the future operational environment UAM/AAM.

Who: TxDOT, AAM office

Funding source: federal, state, general, rider

How much: $300,000

Airspace “Bucket”

- Integrate AAM into master planning at major state airports
- Support GA airports where AAM operations will start from
  - Promote electrification of these GA airports
  - Facilitate development of ancillary infrastructure at these GA airports, e.g., parking, hangars
- Corridor development
- Protection of obstacle limitation surfaces around vertiports

Technology “Bucket”

- Support TSA at major airports where AAM guests will be screened separately from airline guests
- Ground movement support – if an AAM aircraft needs to be moved does it taxi autonomously or does it need to be towed?
- Pre-flight routine – if an aircraft is autonomous, will a ground crew at its take-off site do a pre-check or can that be done remotely? What training is required for that pre-check?
- Communications – Even autonomous vehicles will require some type of operations center where they can be monitored/managed.
- Operational validation of:
  - PSU integration
  - Vertiport automation system integration
  - Autonomous navigation technology

Real Estate “Bucket”

- Employee/others parking
- Delivery routes and logistics
- Integrated communications and airspace management
- Support zoning and land use regulations that facilitate private and public vertiport development
- Accessibility redundancy especially for emergency response
- Emergency services accessibility
- Fire and emergency response access
- Security
- Landing and take-off “pads” with proper safety arcs for the aircraft type
- 5G and fiber connectivity potentially including secure networks
- Site flexibility for evolution in use cases, technology, and growth

Land Use/Planning “Bucket”

- Establish best practices for land use planning and develop a timeline/blueprint for how to approach vertiport siting, approval, certification (if necessary), construction, and zoning changes processes at the federal, state and local levels, similar to what FDOT has developed.

Recommendation 21*

Need: New designated revenue streams to pay for and maintain AAM infrastructure

Recommendation: Develop and recommend a list of revenue streams to educate the legislature on their options

Who: legislature

Funding source: N/A

How much: $0

Real Estate “Bucket”

- There is a lack of funding for infrastructure planning, permitting, and development prior to AAM operations

Real Estate (New Recommendations?)

- A completely different passenger loading and unloading process to include “checked” or “carry-on” luggage
- Passenger waiting areas and operations support with restrooms, life safety systems, communications, ability to perform maintenance, ability to be dropped off and picked up
- Must address pick up and drop off of passengers/users including accommodation of Autonomous Vehicle operations
- Will operating companies be vertically integrated and own/operate the vertiport or will the community? Will Port San Antonio or Houston Airports own their vertiports and create the licensing framework for companies to access them and use them?

Non-infrastructure recommendations with buckets

Recommendation 1

Need: Official definition of AAM in state statute (VTOLS, drones, etc.)

Recommendation: Adopt FAA definition

Who: Texas Legislature

Funding source: N/A

How much: $0

Airspace

- Clear definitions and distinction of who is responsible for managing the airspace **(Rec. 1)**
  - We can argue whether FAA or the State owns the airspace or more specifically, the “management” of the airspace but the authority to allow aircraft into the airspace needs to derive from a specific source and be codified.
  - Airspace management tools that allow operators to safely takeoff, conduct their flight operation, safely land and repeat as needed

FAA AAM Definition

(1) ADVANCED AIR MOBILITY; AAM.—The terms ‘‘advanced air mobility’’ and ‘‘AAM’’ mean a transportation system that transports people and property by air between two points in the United States using aircraft with advanced technologies, including electric aircraft or electric vertical take-off and landing aircraft, in both controlled and uncontrolled airspace.

AAM Coordination and Leadership Act (P.L. 117-203, 136 Stat. 2227)

Recommendation 4

Need: ~~State standards for infrastructure consistency~~

Recommendation:

Who:

Funding source:

How much:

Real Estate

- At the state DOT level, lean on more inclusive infrastructure guidelines like EASA’s PTS-VTP-DSN (industry is pushing FAA and ICAO to align with EASA’s guidance)

Decreasing AAM’s Environmental Footprint

- Recommend refining current federal/state guidelines with emphasis on noise, privacy, public outreach especially when considering hours of operations, etc.

The UAS program will *not* be used to:

- Conduct random surveillance activities
- Target a person based solely on individual characteristics, such as race, color, ethnicity, national origin, sex, sexual orientation, age, gender, religion, or disability
- Harass, intimidate, or discriminate against any individual or group
- Conduct personal business or any other unauthorized use
- Support any facial or license plate recognition technology
- Carry or deploy any types of weapons
- Monitor traffic for the purpose of issuing traffic citations
- Intercept and collect Wi-Fi data

Recommendation 7a

Need: Public awareness about the benefits and potential of AAM

Recommendation: Provide funds to create communication materials targeted to the public, decision makers, and recreational drone users that can be implemented as appropriate.

Who: Texas Economic Development, TxDOT, Program Manager

Funding source: general fund, rider, industry funds (advertising campaign), federal funds

How much: $500,000 annually each from state and industry

Airspace

- Educate. The Legislature will benefit from raising their awareness regarding the required digital infrastructure that enables AAM. Vertiports and aircraft are certainly necessary, but to scale AAM, digital services are critical for supporting increasingly autonomous aircraft to operate from, between, and at nodes such as vertiports and airports. This digital infrastructure includes services from Provider of Services of UAM (PSU) and Vertiport Management Systems (VMS) that are part of the FAA's envisioned service providers that will manage UAM aircraft. Any movement towards positioning Texas as a destination for AAM must include these and other types of digital services to spur industry investment and subsequent growth. **(Rec 7)**

Technology

- Public education and buy-in around autonomy **(rec. 7)**

Recommendation 7b

Need: Public awareness about the benefits and potential of AAM

Recommendation: Host ASM IWG workshop

Who:

Funding source:

How much:

Recommendation 8

Need: AAM research and development in Texas

Recommendation: Support research and development for AAM technologies, products, and services in Texas by providing funds and resources for state universities (e.g., developing unmanned traffic management systems)

Who: TxDOT, A&M/TTI, university systems, AAM program manager

Funding source: general, federal (DoD, FAA, NASA (SBIR, STTR), NSF, NREL, USDOT, DOE, FEMA)

How much: $20M bi-annually

Airspace

- Airspace digital twins **(Rec. 8)**
  - Digital twins of airspace to be used for AAM operations for R&D, simulation and modelling. Think, how will new aircraft, with presumably different performance characteristics or new service areas be integrated into the airspace?

Recommendation 13

Need: Air traffic management and airspace deconfliction (FAA preemption?)

Recommendation: Provide funding for research, testing, and integration of UTM technology.

Who: TxDOT, OOG, AAM office

Funding source: general, federal, state, industry

How much: $40M bi-annually (can be matched federally)

Airspace

- Big Picture: Small drones and larger aircraft envisioned will all operate in the broader National Airspace System (NAS). As operational density increases, autonomous systems will interact with each other and with crewed aircraft. The Legislature would benefit from maintaining a strategic perspective that charts a path that aligns with FAA XTM concepts while supporting innovative but safe operations for the entire NAS, not just AAM. (**Rec. 13)**
- **Situational awareness displays (Rec. 13)**
  - Software that accumulates all the sensor information and displays it to a remote operator or mission control center

Technology

- Counter-UAS technologies – we will need to assume that bad actors will introduce nefarious UAS equipment into the ecosystem. Knowing that a small UAS is a potential risk will allow law-abiding AAM and other UAS to take action safely. **(rec. 13)**

Other Texas AAM Needs and Recommendations

Legislative framework

1. Official definition of AAM in state statute (VTOLS, drones, etc.)
2. Flexible regulatory scheme for AAM efforts
3. List of ways that AAM will not be used and encouragement of liberal use when applicable (e.g., use on state land)
4. ~~State standards for infrastructure consistency~~
5. Continuation of AAM Advisory Committee

AAM Understanding and Influence

5. AAM representation on the 9-member TxDOT Aviation Advisory Committee
6. A position at TxDOT or OOG to serve as a central point of contact and AAM ambassador to increase adoption and awareness of AAM
7. Public awareness about the benefits and potential of AAM
8. AAM research and development in Texas
9. Economic impact study for Texas (similar to the Wisk study done in California)

Safe Operations

10. Legislation governing information sharing among agencies using AAM during disasters (HB2340-89R)
11. Funding for safety training for first responder personnel
12. Mitigation of cybersecurity risks
13. Air traffic management and airspace deconfliction (e.g., UTM)*

Workforce Development

14. Diverse, highly skilled workforce (near-term)
15. AAM knowledge and skills pipeline (long-term)

Infrastructure Needs

16. AAM infrastructure at existing airports
17. New vertiports
18. Electrical capacity at Texas airports
19. Funding to support ancillary infrastructure (e.g., micro wind sensors)
20. Gap analysis for AAM integration into existing airport infrastructure
21. New designated revenue streams to pay for and maintain AAM infrastructure

Recommendations Discussion

Categorize funding source (state, federal, private)

Estimate level of $ magnitude or priority

Recommendation 2

Need: Flexible regulatory scheme for AAM efforts

Recommendation:

Who: legislature

Funding source:

How much: $0

Recommendation 3

Need: List of ways that AAM will not be used and encouragement of liberal use when applicable (e.g., use on state land)

Recommendation:

Who:

Funding source:

How much: $0

Use of Unmanned Aircraft

GOVERNMENT CODE CHAPTER 423. USE OF UNMANNED AIRCRAFT (texas.gov)

Recommendation 4

Need: Continuation of AAM Advisory Committee

Recommendation:

Who: TxDOT

Funding source: TxDOT state funding or general funds

How much: $120,000 bi-annual

Recommendation 5

Need: AAM input on TxDOT aviation policy

Recommendation: Add AAM representation to the existing 9-member TxDOT Aviation Advisory Committee.

Who:

Funding source: TxDOT

How much: $0

Recommendation 6 (short-term)

Need: A position at TxDOT or OOG to serve as a program manager to increase adoption and awareness of AAM (through demonstration day coordination, conference presentations, etc.)

Recommendation:

Who: TxDOT or OOG

Funding source: State aviation funds, general, or rider

How much:

Recommendation 6 (Long-term)

Need: An office at TxDOT or OOG to increase adoption and awareness of AAM (through demonstration day coordination, conference presentations, etc.)

Recommendation:

Who: TxDOT or OOG

Funding source: State aviation funds, general, or rider

How much: $2M (Program Manager 5 salary range, additional travel funds)

Number of people: 3-4

Recommendation 9

Need: Economic impact study for Texas

Recommendation: Conduct an economic impact study for Texas.

Who: Tx economic development, OOG, AAM program manger

Funding source: general funds, rider, TxDOT state funds, industry

How much: $300,000-500,000

Recommendation 10

Need: Legislation governing information sharing among agencies using AAM during disasters (HB2340-89R)

Recommendation: update legislation with eVTOL

Who: legislature

Funding source: N/A

How much: $0

TX HB 2340 2019 (R) Sec. 418.055

Information Sharing Working Group

a) In this section, "work group" means the work group established under this section.

b) The division shall establish a work group of state agencies involved in disaster management. The work group consists of members appointed by the chief of the division who represent:

   1) the comptroller's office;

   2) the Department of State Health Services;

   3) the Texas Department of Transportation;

   4) the General Land Office;

   5) the Health and Human Services Commission;

   6) institutions of higher education; and

   7) to the extent practicable, appropriate federal agencies.

c) 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.

d) Not later than November 1 of each even-numbered year, the work group shall submit the group's recommendations to the governor.

Recommendation 11

Need: Funding for safety training for first responder personnel

Recommendation: Provide a funding mechanism to help with first responder training

Who: AAM office, Texas DPS, TDEM

Funding source: general, federal (DOJ, homeland security, FEMA)

How much: $2M annually

Recommendation 12

Need: Mitigation of cybersecurity risks

Recommendation:

Who: DIR

Funding source: general, federal

How much:

Recommendation 14

Need: Diverse, highly skilled workforce

Recommendation: Support education and workforce development for AAM by providing funds and resources for state universities, community colleges, and vocational schools to develop and offer programs and courses related to AAM.

Who: workforce solutions, TWC, TEA, THECB, TSTC

Funding source: federal (DOD), state, general

How much: $10M annually (for a set period of time)

Recommendation 15

Need: AAM knowledge and skills pipeline

Recommendation: Integrate AAM into K-12 curriculum (e.g., NASA toolkit)

Who: TEA

Funding source: federal, state, general

How much: $2M