ADVANCED AIR MOBILITY STUDY

APRIL 2024

EXECUTIVE SUMMARY

GDOT

Georgia Department of Transportation

PHOTO SOURCE: ARCHER AVIATION

ADVANCED AIR MOBILITY (AAM) STUDY

STUDY PURPOSE AND PROCESS

The State of Georgia stands at the forefront of AAM innovation. The Georgia Department of Transportation (GDOT) AAM Study was a comprehensive effort to understand and identify the next steps to advance AAM in Georgia. Major initiatives in the study included:

- A national scan of AAM actions across the country and how they might impact GDOT's actions.
- An overview of the potential economic impact of AAM among different states.
- An identification of use cases and potential Concepts of Operations (CONOPS) for AAM in Georgia, including regional air mobility, rural air commuter service, special event service, and urban air mobility within the Atlanta area.
- A compilation of best practices for AAM landing area facilities and recommendations for changes to state administrative code to support these best practices.
- A set of tools and resources for outreach in Georgia to AAM operators and manufacturers, including economic and workforce development.
- An overview of the state's existing aviation infrastructure and its readiness for AAM, including a heliport inventory report and airport compatibility reports for ten Georgia airports.
- A community guidebook intended for widespread distribution throughout the state to educate and inform local governments on AAM.
- An action plan that organizes the initiatives identified in the study and provides next steps for Georgia to advance AAM.

THIS EXECUTIVE SUMMARY INCLUDES:

- AAM Definition
- AAM in Georgia
- Nationwide Overview of AAM Initiatives, Best Practices for Landing Areas, Advancing the AAM Industry, and Economic Projections
- Heliport Inventory Process and Findings
- Airport Compatibility Analysis
- Electric Infrastructure Analysis
- Best Practices for Local Governments
- AAM Blueprint and Action Plan

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PHOTO SOURCE: BETA TECHNOLOGIES

WHAT IS AAM?

Advanced Air Mobility (AAM) is an emerging transportation system primarily utilizing electric vertical takeoff and landing (eVTOL) aircraft to move cargo and passengers at low altitudes within urban, suburban, and rural areas.

AAM builds upon the concept of Urban Air Mobility (UAM) by expanding its range (e.g., inter-city and regional travel) and use cases (e.g., air ambulance, firefighting, air cargo).

Many of the leading original equipment manufacturers (OEMs) are targeting entrance into service between 2025-2030. In general, these aircraft hold somewhere between four to eight passengers. The early entrants will be piloted, while later entrants hope to start out autonomously. Early eVTOL flights will likely range from 60-150 miles with cruise speeds of 100-200 miles per hour.

In early stages, AAM will rely on existing aviation infrastructure, like airports and heliports. As it scales, new aviation infrastructure, known as vertiports, will be built specifically for eVTOL operations.

EXAMPLE EVTOL AIRCRAFT


PHOTO SOURCE: ARCHER AVIATION


PHOTO SOURCE: LIFT

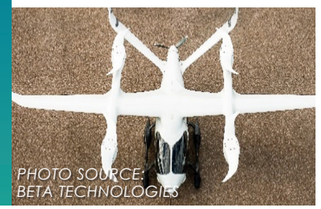
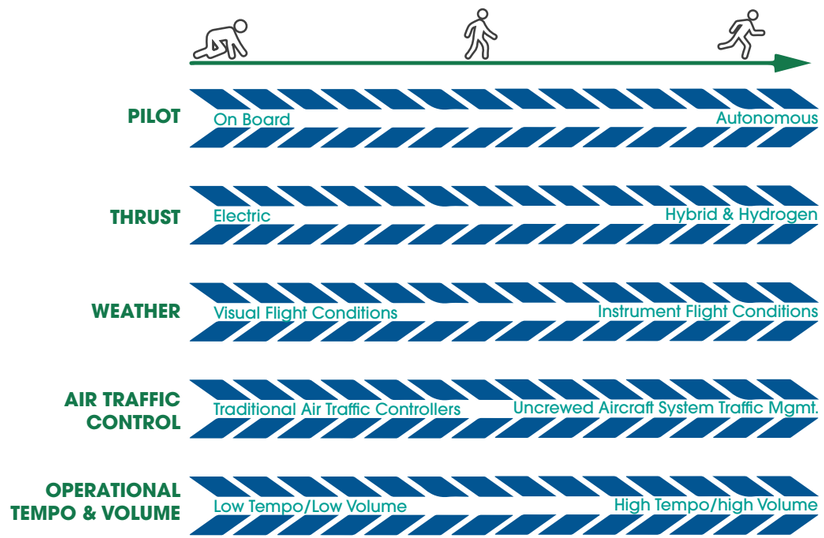


PHOTO SOURCE: BETA TECHNOLOGIES

CRAWL, WALK, & RUN PHASES OF AAM



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AAM IN GEORGIA

AIR TAXI


PHOTO SOURCE: NASA

- Air taxi service would include passenger operations that occur in urban, suburban, and rural areas.
- Atlanta ranked the tenth worst US city for traffic congestion; eVTOL air taxis could provide an alternative to ground transportation.
- Studied CONOPs include:
  - » Atlanta Metro area to bypass road congestion
  - » Special event mobility, like the Masters Tournament in Augusta
  - » Rural commuter service to increase rural travel options
  - » Atlanta Metro to ATL Airport

PUBLIC SERVICE


PHOTO SOURCE: NASA

- Public service may be one of the first sectors to embrace eVTOL aircraft.
- Purported lower maintenance costs and greater reliability than helicopters means eVTOL aircraft could supplement ambulances, firetrucks, and helicopters.
- On Atlanta highways, eVTOLs could expedite access to care when ground transport is limited by congestion.
- In rural areas, eVTOLs could provide greater and more affordable access to healthcare.

AIR CARGO

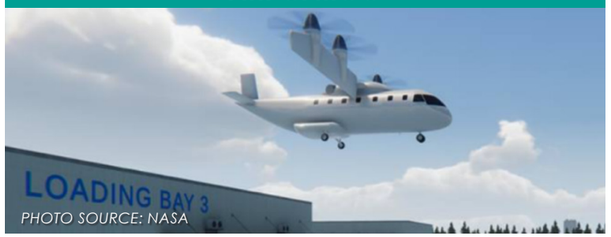


PHOTO SOURCE: NASA

- eVTOL aircraft would cover the middle-mile of the logistics supply chain, connecting factories or airports to distribution centers.
- eVTOLs could supplement cargo vans and/or feeder aircraft.
- UPS, headquartered in Atlanta, is investing in drones and eVTOLs.
- 2022 GDOT Air Cargo Study demonstrates significant growth potential for air cargo in the state.

PRIVATE/RECREATIONAL

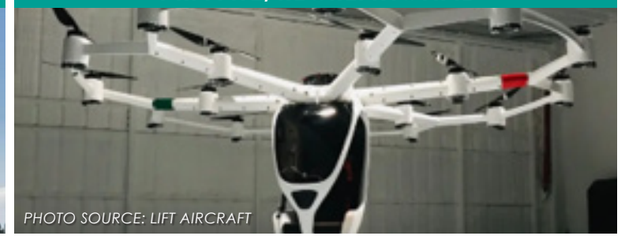


PHOTO SOURCE: LIFT AIRCRAFT

- Some OEMs are developing “ultralight” aircraft that avoid many hurdles of FAA aircraft certification.
- Ultralight aircraft cannot fly over any congested area of a city, nor can they operate commercially.
- As a state known for recreational gliders and skydiving, Georgia may see these aircraft used for similar recreational purposes.

AAM WORKING GROUP

The GDOT AAM Working Group established in this study consisted of a diverse collection of individuals representing airports, industry, transit systems, local governments, academia, utility providers, the FAA, and state officials. The Working Group met in person three times through the summer of 2023 and informed the development of the Community Guidebook and AAM Blueprint and Action Plan.

The AAM Working Group will continue to meet several times per year to provide feedback and guidance on the implementation of the study.

NATIONWIDE OVERVIEW

- At least 20 states are undertaking AAM planning efforts and have focused on:
  - » Dedicated Funding: Several states have identified the need to allocate dedicated funding to support AAM program development.
  - » Statewide Point of Contact: Several states recognize the importance of a centralized point of contact for AAM coordination and advocacy.
  - » STEM Initiatives: Several states prioritize advancing STEM initiatives to cultivate a skilled workforce for AAM industry support.
  - » Community Engagement and Public Information: Several states acknowledge the need for robust community engagement and public information programs for AAM.
  - » Infrastructure Analysis and Best Practices: Best practices for AAM development are identified and implemented as part of the state's strategic planning.

BEST PRACTICES FOR LANDING AREAS

- FAA Engineering Brief (EB) 105 serves as interim guidance for vertiport design as the FAA develops an Advisory Circular on the matter.
- Adding AAM-specific language to Georgia Administrative Code Chapter 672-9 would allow the State to better regulate vertiports.
- Additional best practices include:
  - » Avoiding legislation that conflicts with FAA authority.
  - » Providing consistency in standards across the state.
  - » Integrating AAM infrastructure into existing statewide plans.
  - » Organizing cross-department coordination to raise awareness and literacy of AAM.

ADVANCING THE AAM INDUSTRY

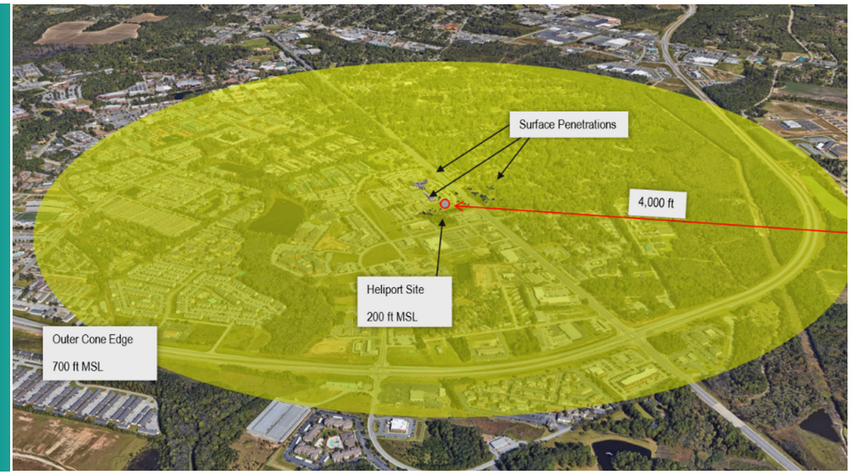
- Archer Aviation, a leading eVTOL OEM, has already sited its aircraft manufacturing plant in Georgia.
- Three key sectors of the AAM industry:
  - » Design and testing
  - » Aircraft manufacturing
  - » Passenger and cargo service providers/ operators
- Georgia can continue to attract the AAM industry by:
  - » Incorporating electric aircraft charging needs into statewide plans.
  - » Coordinating with existing aerospace industry in the state.
  - » Collaborating with industry, universities, technical colleges, and high schools to develop an AAM workforce.

ECONOMIC PROJECTIONS

- There are numerous economic benefits to AAM, including job creation, workforce development, and sustainability and safety.
- eVTOL OEMs are partnering with automobile manufacturers and airlines.
- Investment in AAM is already approaching $8 billion.
- 2021 Morgan Stanley Research shows a base global market for AAM of more than $9 trillion in 2050.
- Airport Cooperative Research Program estimates the total market assessment of AAM in the US is $43 billion in 2025 and $250 billion by 2035.
- State studies suggest AAM revenues/ expenditures could range from $3.6 billion - $16.4 billion over the next 25 years, depending on the state.

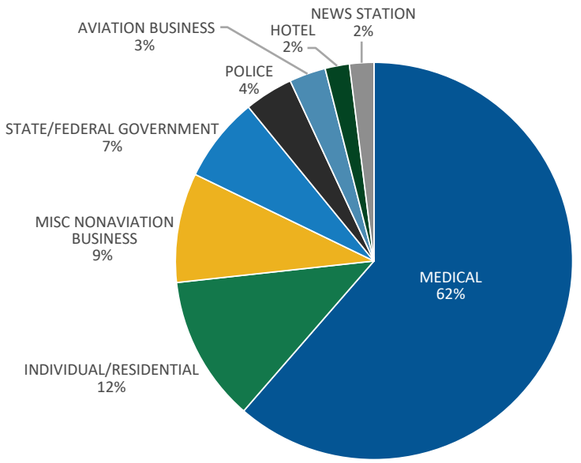
PHOTO SOURCE: BETA TECHNOLOGIES

HELIPORT INVENTORY

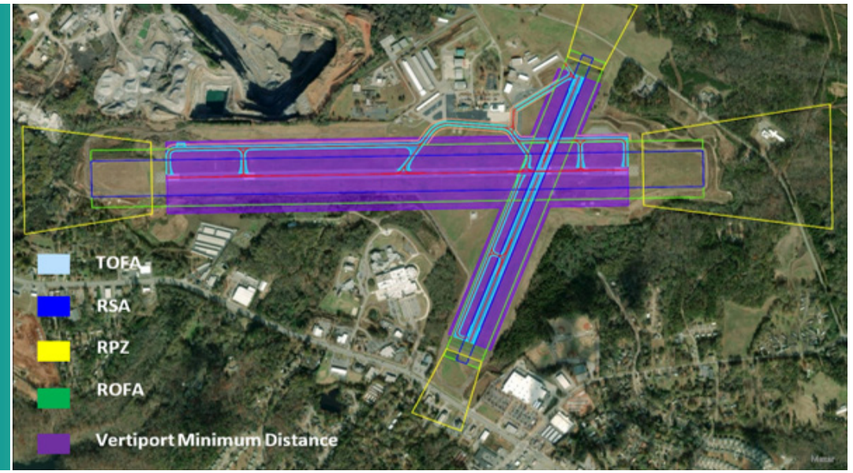


- Georgia heliports were inventoried and analyzed to determine which had the greatest potential to be used or converted to vertiports based on landing area size, obstructions, airspace, and use.
- All heliports in Georgia are private-use, limiting the impact of any conversion to a vertiport to the users of those facilities.
- **Key finding: Most heliports in the state are too small to meet EB 105 landing dimension criteria.**
  - » Analysis found that 9 of the 130 facilities may be viable.
  - » Viability only extends to the existing function of the facility (air medical operations at hospital heliports, for example).
  - » eVTOLs in Georgia will thus rely primarily on airports and newly constructed vertiports.

GEORGIA HELIPORTS BY USER CATEGORY



AIRPORT COMPATIBILITY ANALYSIS



- Ten of Georgia's public use airports were analyzed to determine their compatibility to support AAM operations.
- The compatibility reports examined airport capacity, aircraft charging, electric fire safety, and supporting infrastructure, and made recommendations for each airport based on those factors.
- Exhibits were created that marked critical airport design areas to avoid for on-airport vertiport siting.
- Georgia airports with excess capacity can accommodate eVTOLs with their existing runways, taxiways, and aprons, while airports that are approaching their capacity may need to identify suitable locations for onsite eVTOL landing areas.
- **Key finding: To support eVTOL operations, airports should focus on installing electric aircraft charging stations, developing electric aircraft fire safety protocols, and ensuring the availability of supporting infrastructure such as weather observation technology, ADS-B capability, and high-speed data/ broadband.**

ELECTRIC INFRASTRUCTURE ANALYSIS

- Georgia Power reports electric capacity is above demand forecasts through 2041.
- The cost to bring additional power to the airport is generally borne by the utility company and the cost recovered over time through its rate structure.
- The remaining cost to install electric distribution cables from the panel to the charger and the cost of the charger would be borne by the airport, a third-party operator, or a combination of the two.
- **Key Finding: Approximately $57.3 million to install chargers (one landside and one airside) at Georgia's 102 public use airports.**
  - » Depending on project complexity, the cost for each airport ranges from $500,000 to $750,000.

ANNUAL ELECTRIC REQUIREMENTS & SUPPLY IN GWH

YEAR	REQUIREMENT	SUPPLY
2023	84,522	88,118
2041	97,659	101,813

COMMUNITY GUIDEBOOK

The guidebook is intended to help local governments, urban and rural alike, start planning for AAM as part of their broader mobility plans. It includes information on exactly what AAM is, the roles and responsibilities of AAM stakeholders, community best practices, and tools to assist with its successful integration into Georgia communities.

BEST PRACTICES FOR LOCAL GOVERNMENTS

- Appoint an AAM Lead Staff Member.
- Coordinate Early with Stakeholders.
- Review Zoning Ordinances.
- Map Aeronautical Use Facilities, 14 C.F.R. Part 77 Surfaces.
- Ensure Land Use Compatibility.
- Identify Existing Ambient Noise Levels.
- Establish an Electric Aircraft Fire Safety Protocol.
- Create Community First AAM Policies.

THE GUIDEBOOK ALSO CONTAINS A TOOLKIT WITH LINKS TO RESOURCES ON THE FOLLOWING TOPICS:

- AAM 101
- INFRASTRUCTURE
- NOISE
- LAND USE COMPATIBILITY
- AIRSPACE

AAM BLUEPRINT

The AAM Blueprint is a roadmap that highlights the potential for legislative, administrative, and strategic waypoints to advance AAM in the State. The waypoints are listed here.

CONTINUE TO ENGAGE WITH STAKEHOLDERS

AAM stakeholders in Georgia have been engaged at multiple levels of government, including through the efforts of the GDOT AAM Working Group, the establishment of the Archer Aviation manufacturing plant in Covington, and the installation of electric aircraft charging stations at several airports across Georgia. This engagement should continue and be expanded upon.

SUPPORT LOCAL GOVERNMENTS

The federal, state, and local governments all have unique roles in advancing AAM. The State of Georgia is in a unique position to support local governments by providing guidance to add clarity to the role and responsibilities that local governments have when it comes to enabling and advancing AAM. The AAM Community Guidebook produced as part of this study is the first step in supporting local governments to advance AAM, and additional steps should be taken to continue this effort.

DEVELOP AN AAM WORKFORCE

For AAM to scale, a next-generation workforce will be needed, ranging from pilots and technicians to engineers and operations personnel. Georgia has nation-leading workforce development programs and efforts should be made to leverage Georgia universities, technical colleges, and high schools to ensure Georgia continues to lead in workforce development.

EXPAND ECONOMIC DEVELOPMENT AND OUTREACH EFFORTS

Archer Aviation's manufacturing facility in Covington demonstrates Georgia's ability to attract major AAM manufacturers, building upon the existing aerospace industry already in the state. Georgia can attract manufacturers and operators by using and building innovative economic development tools. This includes supporting an AAM demonstration program in which the objective of the program would be to partner with stakeholders for site selection, community outreach, and the development of a comprehensive AAM route.

AAM ACTION PLAN

The AAM Action Plan takes the broad concepts outlined in the AAM Blueprint and turns them into a plan for the development of AAM in Georgia.

PHASE 1

ONGOING INITIATIVES

- Continue to host the AAM working group and assess membership/structure.
- Serve as a point of contact for local governments and other agencies.
- Partner with GDEcD Center of Innovation for Aerospace to further economic development services.

PHASE 2

2024-2025

- Develop additional stakeholder engagement tools, including email newsletters and a dedicated AAM page on GDOT's website.
- Distribute the guidebook and conduct targeted workshops to educate local officials about AAM.
- Integrate AAM into the work of the statewide electric infrastructure planning efforts.
- Develop and Invest in an AAM Demonstration Program.

PHASE 3

2025 AND BEYOND

- Survey the University System of Georgia's existing aviation and electric infrastructure programs for AAM opportunities.
- Survey aviation and electric infrastructure programs in Georgia's Technical College System for AAM opportunities.
- Partner with industry and high schools to introduce AAM early.
- Create a joint Georgia Power and Georgia Department of Economic Development Vertiport Site Selector Tool.

PHOTO SOURCE: JOBY AVIATION