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for Aviation Research and Education

AUGUST 25, 2025

Key Considerations of Physical and Digital Infrastructure and Exploring Minimum Service Levels

AAM MULTISTATE COLLABORATIVE

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ABOUT THE NASAO CENTER

The National Association of State Aviation Officials (NASAO) established its Center for Aviation Research and Education (C.A.R.E) in 1986, a nonprofit organization (501(c)(3)) that seeks to enhance state roles in the future of the national air transportation system. Through its relationship with NASAO and the states, this organization is uniquely situated to collect, analyze, and disseminate state-focused information on the aviation industry and the National Airspace System. The Center also provides educational opportunities aimed at youth and educators, fostering enthusiasm for the diverse careers found within the industry.

An early meeting of the multistate collaborative, hosted in July, 2024 in Oregon. (Photo by Kenji Sugahara)

ABOUT THE COLLABORATIVE

The NASAO AAM Multi-state Collaborative is an initiative of state government agencies or instrumentalities focused on the role of states in the development and integration of Advanced Air Mobility into the US National Airspace System. The Collaborative serves as a forum for states to discuss state-level policies and infrastructure needed to support AAM operations, with expert contributions from a variety of private sector stakeholders across this growing sector of the aviation industry.

INTRODUCTION

Advanced Air Mobility (AAM) represents a significant evolution in air transportation, introducing new technologies and a new mode of travel that can greatly enhance mobility. States have a crucial role to play by understanding and implementing Minimum Service Levels (MSL) for both physical and digital infrastructure. A minimum service level represents the baseline at which the infrastructure becomes truly useful for AAM operations, providing the necessary support for safe and efficient transportation. By leveraging existing ground infrastructure or aviation facilities, states can facilitate the adoption of emerging aerial vehicles and associated technologies. To fully unlock AAM's potential, it is essential to develop a robust and efficient framework that is standardized across state lines. While many aspects deserve attention, a primary focus should be on defining the MSL needed to ensure safe, reliable, and scalable operations. The physical and digital infrastructure of AAM are closely interconnected, each critical to the success of this new transportation mode. By establishing a harmonized framework that all states can adopt, necessary support and focus can be directed toward the Federal Aviation Administration (FAA) to ensure the viability and safety of AAM.

With the support of industry, the FAA is continuing to provide the basis of several aspects of AAM. However, state DOTs and Aviation Authorities have the responsibility to work with the FAA, other federal agencies, and industry to ensure seamless development and integration of existing and new infrastructure being developed by both private and public proponents. States can have a role in filling in data gaps where the FAA does not have primary coverage. States have a critical role to support infrastructure licensing/registration, system planning, and local municipalities. State governments should lean on their aviation departments for expertise as subject matter experts. If the aviation department needs assistance, they can turn to other state aviation agencies such as those that are part of the AAM Multistate Collaborative or the National Association of State Aviation Officials (NASAO).

KEY CONSIDERATIONS

Below is a fairly comprehensive list of key considerations for states as they develop their own frameworks for Minimum Service Levels for Infrastructure (MSL-I). These considerations are organized into sections addressing various aspects: where the infrastructure may be located, the minimal digital infrastructure required, how it can be managed, and how it can be integrated into the existing aviation system.

These considerations should be taken within the context of a crawl-walk-run methodology; the industry is still in the crawl phase. Industry and government are still figuring out what works. Investments should be made with an eye toward evaluating products rather than full deployment. Coordination with the FAA is critical to ensure that investments in technology are made with consideration to acceptance by the FAA. Physical infrastructure may be developed through public-private partnerships (PPP) with other state agencies or industry. The approach to infrastructure development can be either proactive or passive, depending on each state's mission, goals, and potential legislative support. This paper takes into account the role of states in comparison to the FAA. All statements refer to what activities are in the purview of the states, which may be different pending specific statutory authority. This service level should not be geographically confined or constrained; instead, it should begin by defining the characteristics of a service area including the level of both air and ground risk. Identifying and focusing on key service areas will be crucial in establishing a state-level minimum service level. Initially, key service areas will likely start at airports, where existing infrastructure and air traffic control procedures, where applicable, are already in place. As the Federal Aviation Administration (FAA) provides further guidance, this service can be extended to new vertiports/drone ports (AAM facilities) specifically designed for AAM operations.

The general needs of operators and FAA acceptance must also be considered when defining these minimum service levels. The specific infrastructure will vary depending on the operator and the type of airframe they use as well as their level of autonomy. Operators will need to develop their own procedures tailored to their operations unless they are required to integrate with existing aviation procedures. Understanding and categorizing different operator groups will be key to ensuring that the minimum service level meets diverse needs. Relevant standards, such as those established by ASTM International and RTCA, should guide the development of these service levels and should be informed by international work with organizations such as ICAO. The FAA's guidance will also play a critical role in shaping the requirements for AAM infrastructure and should be adopted at state level whenever appropriate. One important consideration is whether a facility must meet a minimum level of data service as part of its state licensing requirements. The answer is likely yes, and ASTM standards may serve as a benchmark for these data service requirements.

Physical Infrastructure

In the context of Advanced Air Mobility (AAM), the question of where infrastructure is situated is crucial for the successful integration of this new mode of transportation. The infrastructure for AAM can be located at traditional aviation facilities such as airports or at new, off-airport sites specifically designed to accommodate electric vertical takeoff and landing (eVTOL) vehicles or drones. The choice of location will significantly influence the types of infrastructure needed and the procedures required to support AAM operations. Where possible, states should explore leveraging existing infrastructure as well as creating infrastructure that benefits existing incumbent aviation. These themes are explored in the leveraging existing infrastructure paper.

States and municipalities are often responsible for approving and system planning where AAM facilities can be built. This involves supporting local municipality zoning decisions and land use planning to ensure that facilities are located in areas that are compatible with surrounding land uses, such as residential, commercial, or industrial zones. Municipalities must integrate AAM facilities into broader urban planning efforts, considering factors like traffic flow, proximity to other transportation hubs, and potential impacts on local communities. This includes aligning vertiport locations with multi-modal transit options to facilitate last mile service.

Local governments are typically responsible for issuing construction and operational permits for aviation facilities. This process ensures that development meets local building codes, safety standards, and other regulatory requirements. States may establish specific licensing requirements for vertiport and droneport operators, ensuring that they comply with both state and federal regulations. This could include criteria related to safety, operational procedures, accessibility, and environmental standards. State aviation entities are often tasked with regulating both public and private heliports and will likely be tasked with regulation of vertiports and drone ports.

eVTOLs require charging stations to recharge their batteries between flights, and the necessary stations use three phase electrical charging. Firefighting equipment, first aid stations, and other emergency response infrastructure are critical and must be updated to handle any incidents that may occur at the vertiport. States that plan to regulate sites should leverage FAA Infrastructure guidance for comprehensive designs standards.

The vertiport must be easily accessible by other modes of transportation, possibly with adequate parking facilities for passengers and staff. This connectivity is crucial for integrating the vertiport into the broader transportation network. Where possible, the vertiport should be connected to public transportation systems, such as buses or trains, to facilitate passenger transfers and enhance overall accessibility. Droneport facilities will need to be developed with the use case as well as community needs in mind.

For facilities, whether on or off airport, the use and extension of existing aviation supplement charts will be important to ensure that AAM operations align with established standards. This may involve the development of additional procedures to accommodate the unique aspects of AAM, such as vertical takeoff and landing, operations near or on airports, and the integration of these procedures into the broader aviation system. Other aspects may include notation on charts of droneports and high AAM traffic areas.

Digital Infrastructure

Digital air traffic procedures also play a critical role in AAM infrastructure. These procedures must be supported by robust systems that could be either private or public, depending on the nature of the operations and the facility. Facility-specific procedures will need to be clearly defined and supported by Geographic Information System (GIS) data, which provides essential spatial information for navigation and operations.

A full complement of sensors located at both on airport and off airport facilities may be necessary to ensure safety, security, and efficiency in AAM operations throughout all phases of flight especially in areas where there is no or limited FAA primary radar coverage. Sensors should be scaled to the risks of service areas. These sensors could include Automatic Dependent Surveillance-Broadcast (ADS-B) for tracking aircraft, radar systems for airspace with high tempo operations, optical and acoustic sensors to assist with detection of non-cooperative aircraft, and weather sensors to monitor atmospheric conditions.

Remote Identification (Remote ID) is also essential, especially for tracking uncrewed aircraft systems (UAS) and ensuring that non-cooperative detections, such as those of unauthorized or unidentified aircraft, are managed effectively. The specific needs of a site should be independently studied and tailored to airspace complexity at the location.

Solutions need to be tested and scaled appropriately, and decisions and investments should be made on an evaluation and testing basis as AAM is still in its infancy. Developments such as federal requirements for universal conspicuity for all aircraft or changes to right of rules could affect risk calculations.

In addition to radar and ADS-B, optical sensors and systems designed for UAS detection are potentially critical components that protect legacy aviation infrastructure. These systems will ensure that all vehicles, whether cooperative or non-cooperative, are detected and managed within the AAM ecosystem, likely all operating in a low altitude environment. What will be crucial is the work with the FAA to ensure that operators are able to leverage the data produced by states or third parties to receive credit for their operators' safety cases.

Ultimately, the successful deployment of AAM infrastructure relies on a careful balance between physical facilities, digital procedures, and an interoperable comprehensive network of sensors and detection systems. Each of these elements must be seamlessly integrated to support the safe and efficient operation of AAM vehicles, whether they are operating in controlled or uncontrolled airspace from existing airport facilities or from new, purpose-built facilities.

Data Standards

Data information is a cornerstone of the infrastructure that supports AAM. The digital landscape for AAM is composed of various databases and data sources, managed at both the state and federal levels, as well as by private entities. These data resources are crucial for ensuring safe, efficient, and reliable operations within the AAM ecosystem.

State-run databases and infrastructure play a vital role in supporting AAM. These systems often include obstacle and GIS data, which provide critical information on terrain, buildings, and other potential obstacles for aircraft.

Weather data is another key component, offering real-time information on atmospheric conditions that can affect flight safety. Additionally, sensor data collected by state-run networks contributes to a comprehensive understanding of the airspace environment, enhancing situational awareness. Master Record Surveys, which provide detailed information about airports and landing sites, are also maintained at a state level, ensuring that AAM operators have access to up-to-date data. The concept of digital twins—virtual models of physical assets—is increasingly being integrated into state infrastructure, allowing for advanced simulation and planning of AAM operations.

Federally run databases and infrastructure are equally critical in supporting AAM. The FAA's Airport Data and Information Portal (ADIP), which includes Master Record Surveys, is a key resource for accurate and reliable airport data. The System Wide Information Management (SWIM) system is another essential federal resource, providing a centralized platform for sharing real-time air traffic management information. ADS-B data, while managed federally, can be supplemented by state sensor networks to provide a more complete picture of air traffic, particularly in areas not fully covered by the federal system.

Private databases also contribute to the digital infrastructure for AAM. These databases may contain proprietary information that is kept confidential unless the owners choose to publish it voluntarily. Private entities may collect data on various aspects of AAM operations, including specialized weather information, sensor data, or other operational insights. While this data remains private, it can play a significant role in enhancing the overall safety and efficiency of AAM if shared within the broader ecosystem.

Existing information sources, such as weather data from airports and other weather services like NOAA and state Departments of Transportation (DOTs), also feed into the AAM digital infrastructure. These sources provide critical environmental data that supports both air navigation and other operational considerations. The integration of information from SWIM, ADIP, and ADS-B further enriches the digital landscape, ensuring that AAM operations are underpinned by comprehensive and accurate data.

In summary, the data infrastructure that supports AAM is a complex and layered system involving state-run, federally managed, and privately held databases. Each component plays a vital role in ensuring that AAM operations are safe, efficient, and well-coordinated, ultimately supporting the growth and success of this new mode of transportation. States have a role to support the data collection, visualization and governance of all these databases. Planning should be conducted to simplify and maximize the value of data collection and retention procedures.

DIFFERENTIATING AAM

States should continue evaluating the need and FAA CONOPs surrounding uncrewed traffic management (UTM). For UTM, it is important to define the roles and responsibilities of various authorities, including the FAA and local air traffic control (ATC). AAM operations will need to draw on lessons learned from the operations of existing heliports.

Understanding how low altitude airspace is managed at heliports, both on and off airports, provides valuable insights that can be adapted for AAM. Additionally, the role of ATC in managing these operations, particularly in congested or complex airspaces, must be clearly delineated. States should adopt a statewide plan to evaluate statewide UTM services.

One approach to avoid conflicts between AAM operations and traditional aviation is to site AAM infrastructure, such as vertiports or droneports, separate from conventional runways unless they are operating as conventional aircraft. This separation minimizes the risk of operational interference and simplifies prioritization issues. Existing procedures related to Notice to Air Missions (NOTAM) and Temporary Flight Restrictions (TFR) will need to be adapted to account for AAM, ensuring that these new modes of transportation are fully integrated into the broader airspace management system.

The interaction between different modes of communication is another critical consideration for AAM. Communication services may be provided by either private or public entities, with various technologies playing a role. Cellular networks and satellite communications will be essential for maintaining connectivity, especially in areas where traditional aviation communication infrastructure may be lacking. The Federal Communications Commission (FCC) has set aside specific spectrum for Uncrewed Aircraft Systems (UAS), which will be crucial for ensuring reliable communication links for AAM operations. Spectrum considerations. Additionally, Common Traffic Advisory Frequency (CTAF) will play a role in facilitating communication among aircraft operating in the same airspace, particularly in non-towered environments.

SUMMARY

Overall, the successful integration of AAM into the national airspace system will require careful consideration of these factors, leveraging existing procedures where applicable, and adapting new strategies to meet the unique demands of this emerging mode of transportation.

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Overview of the Collaborative and Role of the States

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Telluride Regional Airport

Boulder Municipal Airport

THE COLLABORATIVE

Advanced Air Mobility (AAM) represents a new generation of aircraft technologies that can provide new levels of safety, efficiency, and sustainability while supporting the modernization of traditional aviation and airports. State governments will play a crucial part in planning and developing the essential infrastructure, policies, and funding required to support and integrate this transformative mode of transportation on the ground. This is the logical evolution of state and local government in conjunction with the Federal Aviation Administration's (FAA) national role in certifying aircraft and operators and conducting national system planning and regulation of AAM operations in the National Airspace System (NAS). Essentially, the states seek to evolve their traditional role as the local partner of the FAA in the NAS.

By assuming this critical role, states can usher in an era of greater connectivity and accessibility through AAM operations, and access market opportunities that were previously impractical to serve using legacy commercial aviation. Although manufacturers are still testing their designs for FAA certification, it is necessary for states to begin preparing for AAM to support the industry when it is ready to fly.

As states anticipate the launch of this next stage of aviation technology, state aviation officials recognize the mutual benefit of the creation of the "Advanced Air Mobility Multistate Collaborative" (AAM Multistate Collaborative, or Collaborative) as a forum for aviation and economic development. The Collaborative provides an opportunity for representatives from participating states to exchange views and methods for approaching AAM, to learn from each other, and to identify and develop common approaches. Key topic areas for consideration include but are not limited to:

- Explore approaches to harmonize policy and planning while accounting for differences among states in order to give industry and operators a consistent operating environment on the ground across the country;
- Develop and define approaches and service levels for minimum viable infrastructure, both digital and physical, that represent targets that can be included in state system plans to make the system viable, relying on FAA and industry standards and guidance;
- Define the challenges and explore potential approaches for sustainable system funding based on community needs, value to end users, and discussions with stakeholders; and
- Develop a roadmap for states to roll out common minimum viable infrastructure and necessary service levels.

The AAM Multistate Collaborative is gathering with the following intentions and desired outcomes:

- Create interoperability of policy and infrastructure across states so that industry can expect continuity of infrastructure and operations across the country;
- Provide a roadmap to harmonize AAM policy across the participating states;
- Provide a strategy to develop the minimum viable infrastructure and necessary service levels across the participating states; and
- Provide feedback to the FAA and other federal partners to inform developing rules, policies, and standards to ensure they can be practically implemented on the ground.

AAM Multistate Collaborative organizers have identified the benefits of working together to develop a harmonized framework, including methodologies and technologies, that will be necessary to establish safe, coordinated ecosystems for AAM to evolve from laboratories to the skies. As leading proponents for this rapidly emerging aviation sector, Collaborative members will be invested in developing a supportive environment for the successful deployment of AAM that is dependent on coordinated activities guided by the federal leadership of the FAA. Combining these efforts by the states provides a unity of purpose and the power of strength in numbers to work with the FAA in a partnership that thrives by gaining the most from limited resources.

The Collaborative is led by the AAM Multistate Collaborative-Steering Committee, comprised of state aviation officials and their supporting organizations who serve as stewards of the Collaborative initiatives. The Steering Committee is the leadership organization, the convenor of state officials, and communicates information and decisions of the AAM Multistate Collaborative.

What is AAM in the Context of the Collaborative?

In the context of the state role and the focus of this Collaborative, AAM encompasses the integration of new types and modes of aircraft, powerplants, and flight into the ground-based facilities that are part of the national system of aviation facilities, as well as new policies, infrastructure and services to support these aircraft and operators. This includes exploring how new aviation and aviation technology can integrate with and enhance other transportation modes. The Collaborative's role is to focus on those policies and services that are within the scope of state government policies regarding commercial operations, system planning, land use, licensing and permitting, and ground-based infrastructure – to support this transformation and modernization of aviation.

What is the Role of the States? What is In and Out of Scope Given our Understanding?

The Collaborative acknowledges and agrees that the best path forward is to logically extend the operational status quo to support the integration of AAM in the NAS. This recognizes the FAA's preemptive role in AAM for governing the use of the airspace, providing airspace configuration, and providing air traffic control and separation services; and recognizes the traditional role of state and local government in managing the ground infrastructure for aviation.

The Collaborative recognizes that our opportunity at the state level is to harmonize and develop policy, planning, and infrastructure that supports and improves aviation safety, and is a necessary part of the FAA's overall strategy to give industry clarity on how to operate and what to expect across different states. The Collaborative's focus is on the Value-Added Services, Policy, and Planning guidance that can be provided at the state and local level. Therefore, the following topics are in-scope:

1. **Scope and Role of the States:** Identify those areas that are the responsibility of state and local government in complement to the mission of the FAA, and identify grey areas for collaboration between the states and FAA. Identify specific areas where state government can collaborate with their local jurisdictions, industry, and the FAA to develop a harmonized system on the ground and support industry development in line with community need;

2. **Exchanging Lessons Learned:** Exchange experiences, legislative and policy models, working and technical data to help toward harmonization and reduce the effort of any one state, encourage open sharing with experiences of interaction and pilot projects to date;

3. **Policy Harmonization:** Seek appropriate regulatory, government agency, and industry input to ensure states produce interstate harmonization and common infrastructure through the existing system planning and state licensing and regulatory functions that are beneficial to the industry, consistent with standards and FAA policy, and can be used to raise awareness and support education of local authorities as they grapple with local policy issues;

4	**Physical and Digital Minimum Viable Infrastructure and Minimum Service Level Goals:** Identify basic needs, equipage and ownership for the deployment of digital and physical infrastructure in support of AAM activities including those ground-based services and capabilities that may need to be deployed to new and existing aviation facilities and how the states can support and facilitate deployment in the context of industry need and FAA oversight;
5	**Leveraging Existing General Aviation Infrastructure:** Identify the challenges and opportunities for general aviation airports in the context of AAM and develop strategic planning guidance and approaches for states to help their aviation systems be ready for, and support the development of, AAM;
6	**Exploring the Challenges of Sustainably Funding AAM Infrastructure:** Identify and explore the challenges of sustainment funding for needed AAM ground-based infrastructure so as to ensure that infrastructure is developed effectively with a future sustainment model that ensures the infrastructure can be kept in service with an equitable distribution of cost and work with our Economic Development agencies to help make communities aware of the opportunities of AAM and facilitate discussions on sustainment between industry and localities; and
7	**Extend Existing State-FAA Collaboration for AAM:** Grounded in areas of existing interaction between state and local government and the FAA, we can identify those areas that can be extended or leveraged, such as noise complaint management and procedure development, and new areas that need to be developed in the context of new technologies and FAA concepts of operations, such as UAS Traffic Management and UAM, ensuring the states continue to be a strong partner to the FAA.

Within this context, the Collaborative views the following as out of scope regarding role of the states, while also recognizing that as sovereign entities, individual states may still wish to explore these topics:

- Providing air traffic management or control services, provided that states may provide infrastructure and data to support the FAA mission in partnership;
- Airspace management and flow management services or components, except in the context of supporting FAA air traffic management services or FAA concepts of operations such as UTM or UAM; and

- Certification of equipment and personnel (e.g., certificating), which is the prerogative of the FAA.

The AAM Multistate Collaborative is developing Collaborative Topic Papers describing the ideas and consensus among the participants regarding the seven in-scope topics as described above. The objective of the topic papers is to document areas of consensus and agreement, seek and incorporate industry and operator input, and propose key items for further work between and among the states acting as a high-level strategic roadmap to support and accelerate the roll-out of AAM across the United States.

What are the Focal Principles of the AAM Multistate Collaborative?

To help guide the development of the Collaborative Topic Papers, the AAM Multistate Collaborative has, through deliberation, identified a key set of principles that will be considered in the development of each paper to ensure a consistent set of Collaborative Topic Papers:

1	**Harmonization** identifies four specific areas to foster harmonization across states: i) harmonization of policy and enabling legislative collaboration across state boundaries, where appropriate; ii) harmonization of policy and services to support industry and community safety and regulatory compliance; iii) support for interoperability between equipment and facilities; and iv) identification of Minimum Viable Infrastructure to ensure consistent service standards and availability across the country;
2	**Collaboration** guides our deliberations to seek the input of multiple stakeholders across the aviation industry and the communities they serve to develop a community needs-driven set of concepts that should support consistency across states while also respecting the sovereignty of each state; and
3	**Sustainability** recognizes that any long-lasting AAM contributions to the national aviation system must be sustainable in three ways: i) environmental sustainability ensures that we are good stewards of both our natural and community resources; ii) economic sustainability ensures that we are good

3	stewards of public finance and support a system that address community needs while not unduly burdening communities with excess costs; and iii) equity ensures that the integration of AAM into the national aviation system serves the needs of all stakeholders in the community in a transparent and equitable manner.

CONCLUSION

States can focus on the development of policies to support harmonized planning, licensing, and registration across states. States can work directly with the FAA to extend current collaborative processes to AAM, clarifying grey areas and providing the ability to manage local equities as part of a cohesive national aviation system. States can develop basic infrastructure frameworks and roadmaps, with minimum service level goals that allow for the states to offer consistent service levels and consistent modernization to the AAM industry, while also recognizing that the infrastructure will be approached differently in different states based upon their unique needs and circumstances. Finally, the states can work collectively with industry to develop a long-term sustainable operational funding model that distributes costs equitably and in return for value added services that improve the safety and usability of the airspace for all users.

The AAM Multistate will, over the course of 2024 and 2025, develop and publish a series of Collaborative Topic Papers that will act as a guide for future collaborative work between the states as we seek to develop an overall roadmap for how state and local governments can support and accelerate the roll-out of AAM across the country.

NEXT STEPS

The Collaborative has already held four in person meetings and three public briefings and intends to continue this pace through the end of 2025.

In addition to this scoping document, the Collaborative is focused on publishing an initial set of topic papers that lay out the broad consensus of the group on: i) Policy Harmonization; ii) Approaches to Infrastructure Development, and iii) Leveraging General Aviation Infrastructure. In addition to these topic papers, the Collaborative also intends to explore and develop a paper on how the state aviation agencies can better collaborate with their

respective economic development agencies to foster growth and development of the AAM industry. Finally, the Collaborative intends to develop a Sustainable Funding problem statement that can be used as a working document to explore and develop potential sustainable funding models in collaboration with industry and the FAA.

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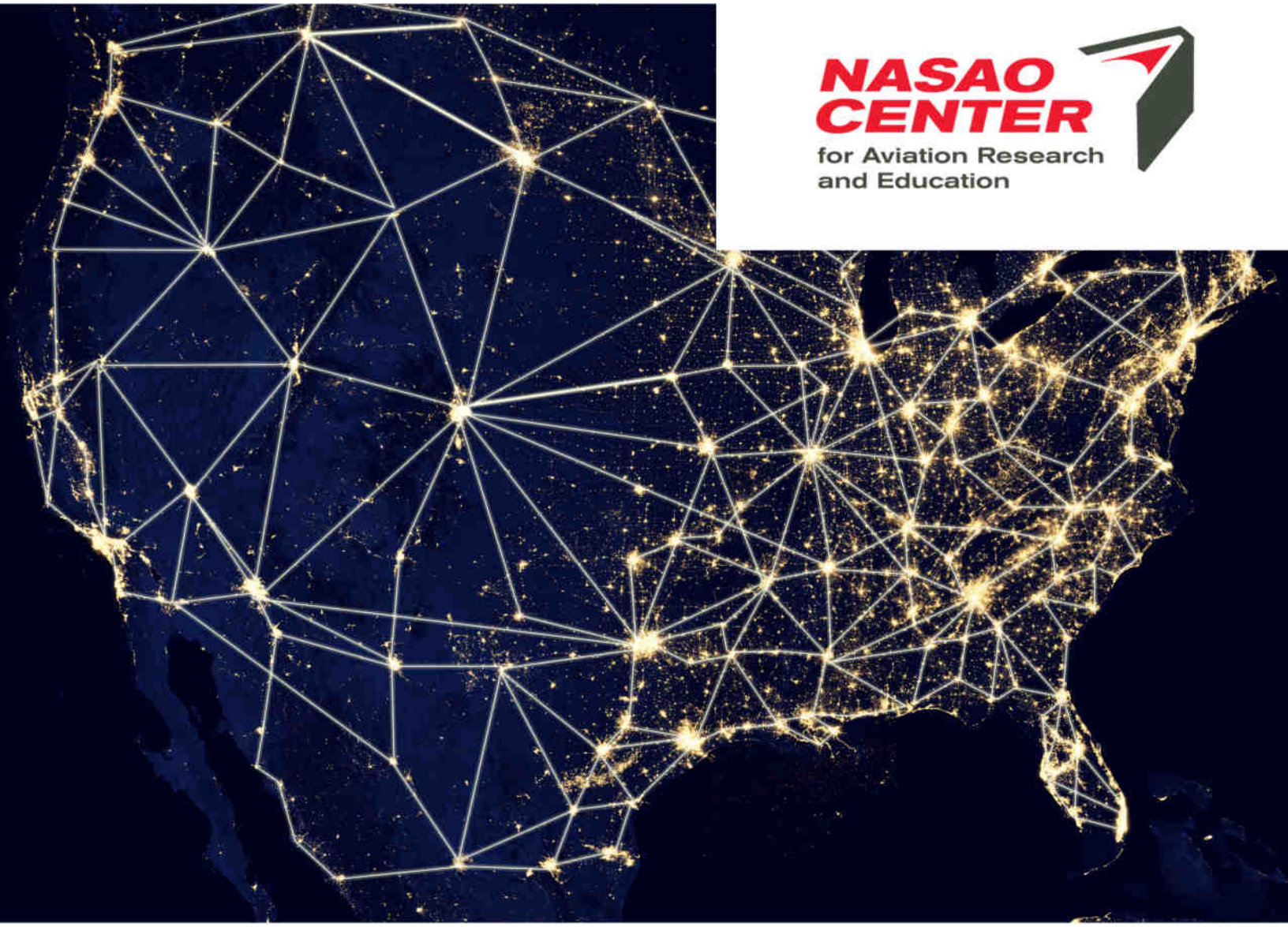

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Policy Harmonization Across the States

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EXECUTIVE SUMMARY

Policy harmonization between states and relevant federal and standards entities is vital for cohesive governance and successful integration of Advanced Air Mobility (AAM).

- **Why it matters:** As AAM technologies accelerate, inconsistent policies across jurisdictions could hinder safety, mobility, and economic opportunity. With aircraft operating across state lines in shared airspace, a coordinated approach is vital.

- **What's missing today:** The Federal Aviation Administration (FAA) oversees airspace and aircraft certification, but gaps remain in areas under state and local control—such as land use, facility licensing, and multimodal integration. Without alignment, states risk duplicative efforts, public confusion, and regulatory conflict.

- **What states can do:** By coming together to establish shared priorities, model policies, and implementation strategies, states can streamline governance, support safe deployment, build public trust and ensure national interoperability. This paper outlines where consensus exists and how states can lead, collaborate, and contribute meaningfully to the national AAM landscape.

Defining Policy Harmonization

Policy harmonization refers to the alignment of state, local, and federal frameworks to support shared regional mobility needs, including AAM. It involves standardizing regulations, fostering intergovernmental collaboration, and aligning legislation through model laws and synchronized updates. As aircraft operate in shared airspace and across state lines, harmonization ensures consistent policies that promote mobility, interstate commerce, and equitable airspace access. It also enables scalable operations and provides operators with consistent expectations across jurisdictions. Early collaboration is critical to support interoperability, land use compatibility, and minimum service levels for intermodal systems.

This paper identifies key areas where states can lead—including infrastructure licensing, operational standards, and regulatory alignment—with input from local, tribal, and industry stakeholders. The Collaborative is well-positioned to share best practices, define staffing and governance models, standardize terminology, and support community engagement—moving states toward a cohesive AAM future.

Stakeholder Landscape

States serve as a critical connector between federal and local stakeholders, uniquely positioned to convene municipalities, utilities, airports, and municipal planning organizations (MPOs). A broad mix of actors influences aviation policy alignment, and active engagement across these groups is essential. By fostering collaboration, this group can balance federal, state, industry, and public interests—advancing policies that support all stakeholders and enable industry growth. Key stakeholders include:

- **Local Stakeholders:** Municipalities, urban planners, and communities for safety, zoning, permitting, and integration.
- **State Stakeholders:** Departments of Transportation (DOTs), MPOs, Airport Commissions, legislatures, utility commissions, and planning agencies to align transportation and economic goals.
- **Tribal Stakeholders:** Sovereign tribal nations and inter-tribal organizations to ensure cultural, environmental, and access considerations.
- **Federal Stakeholders:** FAA, United States DOT, Transportation Security Administration (TSA), Department of Energy (DOE), Department of Commerce (DOC) for regulation, safety, funding, and international standards.
- **Industry Stakeholders:** Manufacturers, operators, public interest groups, and standards bodies to ensure innovation is safe, sustainable, and community aligned.

Key Policy Areas Under State Purview

States are critical to enabling AAM by aligning infrastructure, regulations, and workforce strategies with local priorities. Through clear regulatory language, guidance to municipalities, and coordination with federal partners, states can ensure AAM delivers both community benefits and statewide value. While each state must work within its legal and constitutional framework, the Collaborative has identified two primary areas within state purview:

1. **Land Use, Safety, and Regulatory Standards**

   States can provide zoning and siting guidance, establish licensing protocols, and promote safety standards that build public trust. While local authorities control land use, state-level consistency supports safe and predictable integration.

2. **System Planning and Operational Policies**

   Integrating AAM into transportation and aviation plans ensures that infrastructure, funding, and service levels support multimodal connectivity. Coordination with the FAA and streamlined operator policies—such as registration and permitting—will help establish a cohesive regulatory environment.

Land Use, Safety, and Regulatory Standards

Land use compatibility near airports and heliports has long been a concern—heightened by increasing urbanization and housing demand. Residential developments near airports often expose communities to noise, emissions, and operational impacts. These same concerns now apply to siting new vertical lift infrastructure, including vertiports, drone ports, and short take-off and landing (STOL) facilities. While some FAA and state policies address airport land use compatibility, vertiport-specific guidance is still emerging.

In most states, land use permitting falls to local governments, with varying support from state agencies. State environmental and natural resource departments enforce environmental regulations, while local planning agencies oversee zoning, permitting, and community development. Regional commissions may also help coordinate cross-jurisdictional planning. However, many local entities lack familiarity with aviation infrastructure, making state-level education, guidance, and technical support essential. States can look to existing models—such as California's land use compatibility guidelines—for inspiration.

Lessons Learned from Past Infrastructure Deployment:

- Interstate construction disproportionately harmed disadvantaged communities.
- Post-construction litigation related to noise has imposed costly burdens on airports.
- Multimodal and intermodal planning has often been insufficient, reducing the utility of new infrastructure.
- Equity and access considerations have been inconsistently applied.
- Environmental and air quality impacts have sometimes lacked clear state and federal guidance.

Key Considerations for Siting New Facilities (Vertiport, Drone Port, STOL):

- Adherence to FAA engineering briefs, advisory circulars, and applicable technical standards.
- Application of existing airport and heliport land use compatibility frameworks.
- Evaluation of surrounding land use sensitivities (residential, commercial, industrial).
  - Use of risk-based zoning and safety buffers.
  - Consideration of approach/departure corridors and noise impacts.
- Support for "complete trip" planning, including first- and last-mile access.
- Equity in site selection and mitigation of potential community burdens.
- Strong intermodal and multimodal connectivity to enhance value and access.
- Adequate utility infrastructure, including power availability.
- Drone ports require similar evaluation, though with smaller footprints and unique operational profiles.

Finally, consistent operator and facility licensing—modeled on traditional aviation approaches—can simplify compliance and reduce complexity for operators working across states. State DOTs should explore uniform licensing standards for vertiports and drone ports to support safe and scalable integration.

State Transportation System Planning and Aviation System Planning

Planning Integration and Interoperability

Aviation planning must align with state transportation goals to ensure interoperability. States should harmonize terminology, metrics, and infrastructure strategies to create seamless AAM integration. Regional collaboration will strengthen infrastructure placement, policy alignment, and resource sharing.

State Considerations Include:

- Harmonize aviation system plans and airport master plans.
- Coordinate airport improvements with FAA standards.
- Standardize private landing site requirements.
- Adopt model service levels and licensing policies.

- Explore sustainable funding mechanisms such as user fees, infrastructure financing, and public-private partnerships (P3s).

Registration and Licensing

Some states already register and license aircraft and operators. Expanding these frameworks for AAM can improve safety, oversight, and cross-border consistency.

Airport Integration

State collaboration with the FAA is essential to integrate vertiports at existing airports. This includes:

- Aligning with federal infrastructure requirements.
- Leveraging funding opportunities and exploring sustainable funding models.
- Supporting seamless operational transitions for AAM.

ACTION ITEMS

States should act now—alongside federal, local, tribal, and industry partners—to coordinate policy frameworks, close regulatory gaps, and build infrastructure-ready environments.

Through this collaboration, states can:

- Establish shared principles and model legislation.
- Align planning efforts and infrastructure priorities.
- Create consistent licensing, registration, and planning protocols.
- Promote equity, safety, and intermodal integration.
- Engage communities and industry early and often.

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NASAO CENTER
for Aviation Research and Education

AUGUST 25, 2025

Utilizing Public General Aviation Airports for Advanced Air Mobility

AAM MULTISTATE COLLABORATIVE

NASAO CENTER
for Aviation Research and Education

MEMBERS OF THE COLLABORATIVE

ABOUT THE NASAO CENTER

The National Association of State Aviation Officials (NASAO) established its Center for Aviation Research and Education (C.A.R.E) in 1986, a nonprofit organization (501(c)(3)) that seeks to enhance state roles in the future of the national air transportation system. Through its relationship with NASAO and the states, this organization is uniquely situated to collect, analyze, and disseminate state-focused information on the aviation industry and the National Airspace System. The Center also provides educational opportunities aimed at youth and educators, fostering enthusiasm for the diverse careers found within the industry.

An early meeting of the multistate collaborative, hosted in July, 2024 in Oregon. (Photo by Kenji Sugahara)

ABOUT THE COLLABORATIVE

The NASAO AAM Multi-state Collaborative is an initiative of state government agencies or instrumentalities focused on the role of states in the development and integration of Advanced Air Mobility into the US National Airspace System. The Collaborative serves as a forum for states to discuss state-level policies and infrastructure needed to support AAM operations, with expert contributions from a variety of private sector stakeholders across this growing sector of the aviation industry.

NASAO CENTER for Aviation Research and Education

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INTRODUCTION

With the emergence of numerous new aviation technologies, Advanced Air Mobility (AAM) has flown to the top as one of the premier technologies that will positively impact the aviation industry and the public. AAM's introduction to the aviation system includes several key topics noted below that will be assessed by this briefing paper.

- **New** aircraft types and flight modes such as electric vertical takeoff and landing (eVTOL) and short takeoff and landing (STOL) that will result in new airfield configurations;
- **New** aircraft energy storage and propulsion systems such as battery-electric and hydrogen fuel cell-electric propulsion;
- **New** airport infrastructure needs to address high-density operations;
- **New** flight procedures that accommodate AAM aircraft size, aircraft performance, flight modes, autonomous/remote flight, and high-density operations;
- **New** types of services that will change how General Aviation (GA) airports are used;
- **New** revenue and sustainment models for GA airports that will change the revenue mix and how grant funding is used; and
- Community outreach and preparing local government for AAM.

Opportunity to Support New Aircraft and Operations

Per the United States Department of Transportation's (USDOT) National Plan of Integrated Airport Systems (NPIAS) 2023-2027 report, there are 5,069 public-use aviation facilities such as airports, heliports, and seaplane bases in the United States.[1] 3,287 public-use facilities, 65%, are included in the National Plan of Integrated Airport Systems (NPIAS) and are deemed eligible to receive federal funds; while 1,782 facilities are classified as GA airports but are not included in the NPIAS.

GA airports provide unique benefits to their surrounding communities by supporting and facilitating numerous businesses, industries, and services. From providing a critical link to the medical system through air ambulance services to training the next generation of aviators through aviation educational programs, these GA airports serve a critical role in their local communities above and beyond a direct quantifiable economic contribution. Per the Alliance for Aviation Across America Executive Summary, the national total economic contribution of GA airports is $246.8 billion annually.[2]

1 https://aviationacrossamerica.org/economic-impact/executive-summary/

2 https://www.faa.gov/airports/planning_capacity/npias/current

A majority of GA airports have available physical capacity with lower operational activity than these facilities can support even in their current configuration. This may provide more flexibility to deploy AAM technology at these GA airports. Further, with capacity and the promise of lower operating cost for AAM operations, GA airports will be able to provide connectivity to rural America using AAM aircraft to transport cargo (e.g., packages, medical supplies) and passengers. With lower operating cost a central premise of AAM, and the majority of Americans within a half-hour drive of a GA airport, AAM provides an opportunity to rethink and reinvigorate programs like Essential Air Service (EAS), potentially breathing new life into America's rural communities.

As we consider how to integrate AAM aircraft into the National Airspace System (NAS), notes that many GA airports have adequate space with sufficient land to develop vertiports and other ground infrastructure within their airport property. Also, with new AAM aircraft and flight modes, currently unused or underused space could be converted to revenue generating space for AAM provided that the correct infrastructure and procedures are developed, subject to Federal Aviation Administration (FAA) design and safety guidance. Integrating air traffic at GA airports does not require developing entirely new safety cases and studies for integration of vertiports in a high-density urban core. Put simply, GA airports are where there is existing capacity to integrate additional traffic today – not in the primary and reliever airports.

GA airports have been supporting fixed wing and rotary aircraft for over a half century. The addition of a new type of aircraft will not produce a new aviation noise source (as would a new developed vertiport) which may ease public acceptance. GA airports are well positioned to support new freight, passenger, and emergency aviation services, including supporting new intermodal connections, that will make the airport a stronger, more attractive asset for the community – potentially even revitalizing Essential Air Services. GA airports already have much of the safety and passenger infrastructure, along with trained personnel, that will be needed to operate aviation facilities. Space comes at a premium towards the urban core which may create opportunities for AAM aircraft operators to store and maintain their aircraft fleets at these facilities.

New Propulsion Types Require New Sources of Energy

AAM aircraft will operate using battery-electric, hybrid-electric, sustainable aviation fuels, and hydrogen propulsion systems. Each of these new propulsion modes has specific infrastructure requirements. Generation and distribution of the electricity to GA airports to support electric and hybrid electric systems will be a costly process, if it does not currently exist, to deliver three-phase power to support AAM aircraft charging.

Sustainable aviation fuels may need new, distinct fueling and storage equipment. Hydrogen is promising for clean aviation, but will likely need to be produced locally, which puts additional demand on the electrical infrastructure at the airports.

In addition to the transmission, distribution, and equipment requirements to support new propulsion, there are also legal and safety requirements to be considered. The airport energy infrastructure will need to be defined in a way that doesn't violate Airport Improvement Program (AIP) public-use grant assurances by, for example, supporting proprietary aircraft without market-rate compensation. GA airports will also have to consider the impact on the electric grid and energy distribution systems relative to other needs in the region. Furthermore, requirements for fire extinguishment and firefighting tactics for electric, hybrid-electric, and hydrogen propulsion systems will need to be addressed.

New Revenue Models

With new aircraft type, new propulsion, and new flight modes, there will be both new business opportunities and new business challenges for GA airports. One challenge would be shifts in the mix of fuel and energy sales that are one of the primary drivers of revenue (either direct or through lease) for GA airports. However, new opportunities arise including providing access to new energy sources and potentially new safety and value-added services that are specific to AAM.

Vertiports at GA airports will need to accommodate more than one aircraft for charging. The charging location of these aircraft will need to be defined. Hangar space may be needed to store these aircraft when not in use. This in turn will be revenue generation for the GA airport. Supporting multiple new propulsion modes, such as electric charging and hydrogen fueling, will also generate potential new revenues for GA airports including ground rents, surcharges, and fuel taxes.

As many of these vehicles make the transition to remote and autonomous operations in the coming years, there is the opportunity to provide additional value-added services such as supporting new communications services and navigational aids that may be required for the safe operation of these vehicles. Finally, given the premise of lower operating costs for AAM, it is likely that the overall volume of operations will continue to increase – thus while individual fees or surcharges may be lower, the overall sustaining revenue may increase. We need to evaluate both the challenges and the opportunities to GA airport revenue and cost models in order to provide development insights and guidance to this key piece of our national aviation system.

Finally, it is important to consider how these new models will impact the public financial obligations of these airports, including grant assurances, appropriate aeronautical uses, and ensuring equitable and market-based fees for new types of participants.

New Infrastructure Needs to Address Higher-Tempo / Higher-Density Operations

As our arguments describe above, in the near term new AAM operations are likely to be developed and centered at GA airports, as this is where the physical capacity exists for substantial additional traffic. Further, these airports tend to serve entire regions with substantial population and needs within a short distance, and many are adjacent to larger metropolitan areas and can serve as facilities that support additional multimodal and/or public safety/emergency operations. However, increased traffic flows at GA airports are already straining the typically lightly staffed operating personnel system, therefore we need to consider additional infrastructure at GA airports to take advantage of capacity to grow the volume, tempo, and density of operations while enhancing overall safety. For example, mixing eVTOL and low-stall speed STOL aircraft with current GA traffic may require rethinking procedures. New aircraft that are increasingly reliant on data services may require additional communications and information services.

The challenge is how we can enhance navigational and safety infrastructure at GA airports while also recognizing the financial constraints of GA airports: how do we improve services like weather, situational awareness, and navigation while minimizing deployment and sustainment costs? The answer likely lies in the development and deployment of new digital services that align to concepts for more digitally assisted flight modes utilizing capabilities such as the Providers of Services for Urban Air Mobility (UAM) that are contemplated under the FAA's UAM ConOps. Therefore, we need to explore and identify the types of services, service levels, and profiles that are appropriate to support new and increased traffic at general aviation airports.

New Procedure Types That Accommodate New Aircraft Types, New Flight Modes, and High-Tempo / High-Density Operations

Given that AAM will involve the integration of many new aircraft types, propulsion types, and flight modes into the NAS, including eVTOL and STOL that have very different flight

profiles from current GA aircraft, much of the modernization required at GA airports will involve the development of new procedures. New procedures will need to be developed for new aircraft and flight modes that ensure safe approach and departure, minimize ground risk, and either integrate or procedurally deconflict new AAM traffic and conventional aviation traffic. Procedures for conventional aviation traffic may need to be updated or modified to maximize safety, and potential additional chart objects or updates for the supplement may be needed. This will need to be a concerted effort that will require educating our GA airports and identifying the new planning and procedural items that have to be tracked.

Community Outreach and Preparing Local Government for AAM

State and local government should work with the private sector to better define and quantify how AAM will improve the quality of the life for the community: this includes public benefit in emergencies as well as commercial benefit and improved access. The challenge is that with potentially new infrastructure, procedures, and technology, as well as substantial additional flight modes and operations, we will need to help our localities update land use planning, zoning and related state and local licensing regulations. We need to help local governments develop the capability and capacity – working in partnership with their local or regional GA airport who are their resident aviation experts – to understand the planning and development opportunities and needs that come with AAM, and how this can enhance their local and regional transportation systems.

CONCLUSION

Utilization of existing GA airports in the country as the initial deployment sites for AAM have several advantages over focusing initially on developing and constructing off-airport properties:

- they have physical capacity,
- they understand how to manage aviation rules and safety,
- they are often well located to adjacent communities.

Fostering continual development at GA airports will further improve and stabilize the social economic value of the local communities and likely accelerate the roll-out of AAM into these communities while providing the communities another mobility option in conjunction with meeting the basic needs of the communities.

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