[4910-9X]

DEPARTMENT OF TRANSPORTATION

[Docket No. DOT-OST-2023-0079]

Request for Information on Advanced Air Mobility

Agency: Office of the Secretary, DOT.

Action: Notice and request for information.

SUMMARY: The Department of Transportation (DOT) is seeking public input on the development of a national strategy on Advanced Air Mobility as required by the Advanced Air Mobility Coordination and Leadership Act. DOT has formed a team composed of multiple executive agencies that is seeking input on a variety of topics as outlined below.

DATES: Respondents are invited to submit comments no later than [INSERT DATE 60 DAYS FOLLOWING PUBLICATION IN THE *FEDERAL REGISTER*]

ADDRESSES: You may submit responses and other comments identified by "RFI Response: Advanced Air Mobility" and Docket No. DOT-OST-2023-0079, by any of the following methods:

- Federal Rulemaking Portal: https://www.regulations.gov. Follow the instructions for submitting comments.
- Email: AdvAirMobility_IWG@dot.gov. Include "RFI Response: Advanced Air Mobility" and Docket No. DOT-OST-2023-0079 in the subject line of the email.
- Mail/Hand Delivery/Courier: Docket Operations Office, U.S. Department of Transportation, 1200 New Jersey Ave. S.E., West Building Room W12-140, Washington DC 20590, between 9 a.m. and 5 p.m. Monday through Friday, except on Federal

holidays. Include "RFI Response: Advanced Air Mobility" and Docket No. DOT-OST-2023-0079 on the cover page of the submission. Because paper mail in the Washington, DC, area is subject to delay, commenters are strongly encouraged to submit comments electronically.

Any submissions received after the deadline may not be accepted or considered.

Instructions: DOT encourages the early submission of comments. All submissions should include the docket number for this request for information. All comments received will be posted without change to https://www.regulations.gov. All comments, including attachments and other supporting material, will become part of the public record and subject to public disclosure. Comments generally will not be edited to remove any identifying or contact information.

Confidential Business Information (CBI): CBI is commercial or financial information that is customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments in response to this RFI contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this RFI, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as "PROPIN" to indicate that it contains proprietary information. DOT will treat such marked submissions as confidential under FOIA and not place them in the public docket of this RFI. Submissions containing CBI should be sent to the name and physical or email address listed below.

FOR FURTHER INFORMATION CONTACT: Lauralyn Jean Remo Temprosa, Associate Director, Office of Aviation Analysis, Office of the Secretary, U.S. Department of

Transportation, 1200 New Jersey Avenue SE, West Building Room W86-310, Washington, DC 20590. AdvAirMobility_IWG@dot.gov, (202) 366-5903.

SUPPLEMENTARY INFORMATION:

I. Background

Advanced Air Mobility (AAM) is an emerging field in which novel aircraft currently in design and testing could provide new levels of accessibility, convenience, and connectivity for people and cargo – and thus transform our nation's transportation system to provide enhanced mobility for the traveling and shipping public. AAM aircraft – typically incorporating electric and hybrid-electric propulsion with vertical or short takeoff and landing capability – could greatly expand the reach and efficiency of current transportation networks by providing, among other things, shuttle services between airports and downtown locations, more dynamic and affordable medical evacuation and emergency response, rapid transportation of goods between cargo terminals and job sites, and on-demand air services between regions without existing rapid, reliable transportation links.

Provided that governments and industry work effectively together to deliver affordable and inclusive services to a broad range of the traveling and shipping public, the prospective benefits of this new and transformative technology could be significant[1], including expansion of existing aviation services nationwide, reduction in carbon emissions versus current forms of transportation, improved safety and simplicity of maintenance and operations of aircraft, new jobs and career fields in advanced technology, and reduced noise impacts versus traditional aviation. However, as with any new technology, AAM also introduces a series of challenges affecting multiple government and non-government stakeholders, such as ensuring the continued

[1] See for example, this private industry assessment: https://nexacapital.com/reports-and-commentary.

safety and security of the airspace, the security of aviation networks, fully understanding and developing infrastructure requirements, and ensuring input from local communities. The rapid emergence of AAM is already challenging existing regulations and practices of all Federal departments and agencies that are responsible for aviation, communications, defense and security, global affairs, and infrastructure development.

In October 2022 Congress passed, and the President signed, the "Advanced Air Mobility Coordination and Leadership Act"[2] ("the Act"), which requires the Department of Transportation to form an interagency working group to develop a national AAM strategy by 2024. The purpose of the strategy is to ensure the Federal government, in partnership with State, local, and Tribal entities, is ready to work with and oversee the AAM industry, including developing new transportation options, amplifying economic activity and jobs, advancing environmental sustainability and new technologies, and supporting emergency preparedness and American competitiveness so that the United States continues to lead the world in aviation into the 21st century.[3]

The DOT established and is leading the interagency working group (IWG) as outlined in the Act. Safety is the highest priority of the DOT and the Federal Aviation Administration (FAA). Currently, DOT and FAA are working to develop and communicate to the public its regulatory concept of operations to safely enable AAM operations. AAM operations will typically start as piloted flights using traditional air traffic control procedures and existing regulatory structures. However, more ubiquitous and economical AAM operations are expected to require development of new technologies, procedures, and regulations that incorporate highly

[2] Advanced Air Mobility Coordination and Leadership Act, Pub. L. 117-203, accessible at https://www.congress.gov/bill/117th-congress/senate-bill/516/text.
[3] Sec. 2(b) of the Act.

automated, unpiloted aircraft flying at lower altitudes with smaller areas of separation than in current operating environments. Given the importance of safety and security to the success of a future AAM system, the DOT requests comments on safety challenges and related subjects in response to this RFI. The DOT seeks comments specifically addressing public acceptance of AAM operations and the appropriate means of public engagement necessary to enable AAM operations in the future. The FAA will also continue to share information with industry and stakeholders to produce and iterate upon an AAM Concept of Operations for the national airspace. The AAM IWG will produce a comprehensive national strategy with a focus on interagency, multi-modal, global leadership, and intergovernmental cooperation issues, with the objective of identifying challenges that must be overcome by federal agencies for a successful AAM system to develop in the United States.

For general awareness, the IWG has created subgroups with more specific sets of responsibilities and issues to explore:

Automation Strategy, led by the National Aeronautics and Space Administration (NASA): Focused on understanding the acceleration of the desired transition from initial AAM operations with conventionally qualified, onboard pilots through advanced capabilities proposed by the AAM industry, such as simplified vehicle operations, remotely piloted operations, autonomous operations, and remotely supervised flight operations. This group is considering automation strategy with a comprehensive view related to vehicle, airspace, and enabling communication, navigation, and surveillance (CNS) capabilities to enable various automation/autonomy stages.

Security Requirements, led by the Transportation Security Administration (TSA): Focused on resolving security concerns related to the introduction and expansion of AAM

operations into the existing interconnected transportation domain, preventing the errant or malicious use of AAM systems, and identifying and mitigating potential security risks to AAM aircraft, operations, ground support systems, and other critical infrastructure.

Air Traffic Federation, led by the FAA: Focused on identifying the requirements and operations management needed to ensure continued safety of the national airspace system (NAS).

Infrastructure Development, led by the Federal Communications Commission and the FAA: Focused on understanding the aviation facilities needed to support AAM operations, including ground infrastructure; services, including emergency services; accessibility and competition; telecommunications; weather observation and prediction; utility resources; maintenance of vertiports; sensory systems needed for communications, navigation, and surveillance; and multimodal compatibility.

Community Roles, led by NASA and the FAA: Focused on understanding the need for good public planning for these new technologies and issues such as land governance, transportation equity and accessibility, economic impacts, environmental issues, and workforce development.

The IWG is aware that a national strategy for AAM may describe programs or plans that affect the equities of other aviation stakeholders and business models, including drone operators, who may use portions of the same airspace and may be undertaking some similar missions, such as transportation of cargo. While the Act focuses on AAM, the IWG welcomes comments from drone stakeholders insofar as a national AAM strategy should be aligned to achieve positive and consistent outcomes for all users of the national airspace. We further note that Section (d) of the

Act requires the IWG to coordinate with a variety of external stakeholders including:[4] AAM manufacturers, commercial air carriers, potential AAM operators, labor representatives, state and local governments, and others.

II. Request for Information

The DOT, working with its federal interagency partners, wishes to hear from the public and any stakeholders on the critical issues of importance in drafting a national AAM strategy. DOT will share and discuss this information with the other federal agencies participating in the IWG. Respondents may provide information for any topic or question below. There is no requirement to address any particular issue or question. Through this RFI, DOT primarily seeks information regarding:

- what should be addressed in the AAM national strategy,
- what respondents believe are existing barriers to success of AAM implementation; and
- what steps should the federal government focus on in the short (2-3 years), medium (4-8 years), and long term (8+ years) in order to maximize the potential for successful AAM implementation in the United States. Commenters may wish to identify specific steps for specific federal agencies.

Comments on ongoing rulemaking actions at DOT or other federal agencies should be made to those respective dockets. This request for information will support the AAM IWG's high-level efforts to draft a national AAM strategy.

In addition to the above, DOT welcomes further and more detailed input on all subjects outlined in Section (e) of the Act[5], as well as the more specific subjects listed below. The topics

[4] See Pub. L. 117-203.

[5] Sec. 2(e) Review and Examination.--Not later than 1 year after the working group is established under subsection (a), the working group shall

below were identified by the AAM IWG subgroups as important, although many of them, such as cybersecurity, overlap between more than one subgroup.

1. *Most Likely Use Cases*: Descriptions of the most likely use cases for AAM in the short, medium, and long term along with high-level estimations of when these use cases may come to market. Also, what government actions could enhance or inhibit those market timelines? Are there use cases that are a national priority? Please include descriptions of the operating areas, other transportation options available in the operating area, the supporting infrastructure for the conceptual ecosystem, and the roles and expected involvement that private industry as well as the federal, state, local, tribal, and territorial governments would have in AAM integration.

2. *Safety Enhancements*: Understanding that safety must be the key component of any future AAM operations, provide information on how new concepts in aviation, such as third-

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complete a review and examination of, at a minimum--

(1) the steps that will mature AAM aircraft operations, concepts, and regulatory frameworks beyond initial operations;

(2) the air traffic management and safety concepts that might be considered as part of evolving AAM to higher levels of traffic density;

(3) current Federal programs and policies that could be leveraged to advance the maturation of the AAM industry;

(4) infrastructure, including aviation, cybersecurity, telecommunication, multimodal, and utility infrastructure, necessary to accommodate and support expanded operations of AAM after initial implementation;

(5) steps needed to ensure a robust and secure domestic supply chain;

(6) anticipated benefits associated with AAM aircraft operations, including economic, environmental, emergency and natural disaster response, and transportation benefits;

(7) the interests, roles, and responsibilities of Federal, State, local, and Tribal governments affected by AAM aircraft operations; and

(8) other factors that may limit the full potential of the AAM industry, including community acceptance or restrictions of such operations.

party service providers, automation, and new forms of navigation-enabling infrastructure, provide for, or even enhance, the level of safety of operations.

3. *Expected Customer Experience*: Information about AAM regarding scheduling and ticketing a flight, arrival at a vertiport, passenger and baggage screening, flights boarding, and flight and postflight experience. This information should include procedures passengers should expect to encounter prior to boarding; assistance available for passengers (either on board the aircraft or on the ground); how passengers communicate problems in the cabin; expected levels of comfort in terms of vibration, transition phases (in/out of hover), cabin noise, heat ventilation and air conditioning air quality; how stowage of cargo is achieved including essential items such as wheelchairs; and divisions of responsibility between vertiport and operations personnel. Any comments specific to cargo or other types of AAM operations are also welcome.

4. *Research, Development, and Testing Environment*: Information about the current status, accessibility, and adequacy of policies and institutions to promote research and development that enable a world-class AAM industry in the United States. Please comment on the adequacy and suitability of existing, congressionally directed test sites. The AAM IWG is also interested in the processes for enabling testing of these technologies and systems, and suggested expansions or improvements of testing locations, platforms, or other suggestions to better enable testing of emerging aviation technologies and highly automated systems. As part of the comprehensive testing options, the AAM IWG is interested in understanding simulation, demonstrations, and validation capabilities that must be available to conduct demonstration and validation activities to accelerate maturity.

5. *Statutory and Regulatory Scheme*: Information about specific statutes, federal regulations, or other legal authorities that could be created or updated to support AAM in the United States and maintain the regulatory agility necessary to safely enable this new form of transportation.

6. *Role of State, Local, Tribal, and Territorial Governments*: Information about the role that state, local, tribal, and territorial governments should play in enabling AAM in the United States.

7. *Anticipated Power Requirements*: Information about the anticipated demand on power grids by AAM, the ability of municipal power grids to accommodate this anticipated demand, and improvements or investments in power infrastructure needed to enable such operations. This also includes information on how AAM could generally assist in achieving long-term energy sustainability and efficiency goals, such as using alternative forms of energy for propulsion (e.g., hydrogen), and the infrastructure requirements that would accompany these alternative power structures.

8. *Supply Chain*: Information about existing or planned supply chain requirements for current AAM manufacture, including traceability of components and potential vulnerabilities in the event of possible international supply chain disruptions such as what occurred during the COVID pandemic. To ensure that the AAM industry at large will be supported in the entire life cycle without causing undue security risks and ensuring U.S. competitiveness, the original equipment manufacturers (OEMs) as well as suppliers, are encouraged to provide inputs related to the challenges and gaps they may experience in future AAM supply chains. This includes supply chain challenges related to the entire life cycle, from mining, materials, processing,

manufacturing capabilities, and limited/few suppliers. In particular, dependencies on foreign entities that could cause security risks must be clearly understood.

9. *Privacy*: Information about the technologies, data systems, software, or other products that can be used in conjunction with emerging technologies that potentially impact the privacy of the public.

10. *Workforce Development*: Information about the knowledge, skills, and abilities needed in the working population to accelerate AAM in the United States, including federal labor policies that could assist or expand the populations available to support the AAM industry. What can federal agencies do, working together, to build a skilled labor force in the United States to support the growth of this industry? This inquiry also includes information about educational pathways and training programs necessary to produce a workforce competent to operate, manage, fix, improve, and regulate emerging aviation technologies, associated infrastructure, and underlying policies.

11. *Global Leadership and International Practices*: Information about the steps that the United States needs to take to become a durable global leader in AAM and safe automated technologies, from establishing regulatory standards and practices that will enable the industry to safely develop the engagements necessary that support international AAM services in North America and beyond. In addition, the AAM IWG seeks information about the impact of foreign government approaches to regulate emerging airspace technologies, including recommended practices the U.S. government should consider adopting as well as practices the U.S. government should avoid.

12. *National Security and Aviation Security Implications:* Information about the national security implications of accelerating AAM in the United States, specifically how physical

security of passengers and cargo should be addressed and who should bear responsibility for security assurances, security and system resilience, and what threats exist in considering the growth of counter-drone capabilities that will operate in similar low-altitude airspace. Information on these and other security issues should include the dual-use nature of any emerging airspace technologies and any opportunities or vulnerabilities created by emerging technologies and associated risk mitigation recommendations.

13. *Vertiport Development and Operations*: Information about the expected role of governments and private industries at all levels as to the development, funding, and operation of vertiports. The term "vertiport" in this capacity is meant to describe a range of specialty landing, boarding, and takeoff areas designed for AAM operations, including single-operation vertiports, vertiports integrated into existing airports and heliports today, as well as sprawling, multi-operation, multi-purpose, and multi-transportation option vertiports that act as commercial and transportation hubs. The AAM IWG seeks information on whether system planning similar to the National Plan of Integrated Airport Systems[6] should exist for vertiports, and what level of coordination is required for effective vertiport planning and use.

14. *Electromagnetic Spectrum*: Information on the electromagnetic spectrum and telecommunications infrastructure needs of piloted and autonomous AAM applications in the near, medium, and long term, including what spectrum-using applications (e.g. communications, navigation, radar, command and control, payload, telemetry, or others) should be considered necessary components of an AAM ecosystem and what the state of development of such applications is in the near, medium, and long term; what spectrum bands are being considered or tested to support such applications; any specific spectral characteristics needed to support various

[6] Accessible at https://www.faa.gov/airports/planning_capacity/npias.

AAM applications (e.g. bandwidth, propagation characteristics, and reliability); network infrastructure deployment scenarios under development for functions such as command and control; network architecture needed for local/regional/nationwide flights; additional systems or capacities needed; forecasting of expected demand in the near, medium, and long-term for frequencies; risks associated with integrating AAM into existing navigation, communication, and other systems; and any statutory, legal or policy changes related to electromagnetic spectrum use that would facilitate AAM.

15. *System Resilience:* Information about how the AAM industry plans to secure critical systems by integrating cybersecurity and identifying critical systems in the design of overall architecture of the sector as it evolves. Furthermore, include what tools are available or must be developed to identify critical AAM systems and ensure that those systems have the necessary measures in place to identify, detect, and mitigate potential software intrusions. The government also seeks information about how overall transportation system resilience will be affected by AAM.

16. *Environmental Impacts and Public Involvement.* Information regarding the reasonably foreseeable environmental benefits and costs of integrating AAM operations into the U.S. airspace and broader transportation system, including the application of any standard methodologies to identify, investigate, and evaluate (either qualitatively or quantitatively) potential environmental impacts and available mitigation measures. Information regarding opportunities to synchronize, sequence, or coordinate applicable permitting/licensing and public involvement/consultation requirements or processes across Federal, State, local, or Tribal government to minimize duplication and improve efficiency and effectiveness.

17. *Alternative Means of Navigation Beyond GPS*: Given that these vehicles are expected to operate in urban, suburban, and remote places, reliable and persistent GPS may not be always available. Additionally, AAM are expected to operate in areas where today's radar arrays do not or cannot provide service. What are the most efficient, reliable, and readily available means to provide communication, navigation, and surveillance for AAM in a way that will not disrupt other modes of transportation? Please provide thorough information on alternative options to ensure continuity of navigation using alternative position, navigation, and timing capabilities.

18. *Overall Functional Architecture*: Given that AAM is an ecosystem consisting of aircraft, airspace, enabling communication, navigation, and surveillance technologies, as well as infrastructure, it is important to ensure consistency of assumptions about functions and requirements from each of these components. Please provide information regarding your assumptions about functional capabilities needed for infrastructure, communication, navigation, and surveillance technologies. This will enable the development of afunctional architecture consisting of comprehensive functional requirements and their performance, information exchanges, and various assumptions about roles and responsibilities.

19. *Automation Standards*: Information on needed consensus areas, standards, and design guidelines related to automation; critical integration challenges with the national airspace system; and data needed or available to inform standards, safety tools, and artificial intelligence/machine learning enabled systems.

20. *Other Areas of Interest*: Respondents are encouraged to identify areas that are not directly identified or not adequately expressed for which inter-governmental coordination is critical to the success of AAM ecosystem.

Issued in Washington, DC on May 11, 2023.

Carlos Monje,
Under Secretary for Policy, Department of Transportation.