STATEMENT OF THE
NATIONAL BUSINESS AVIATION ASSOCIATION

ED BOLEN
PRESIDENT AND CEO

BEFORE
THE UNITED STATES SENATE
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
SUBCOMMITTEE ON AVIATION SAFETY, OPERATIONS, AND INNOVATION

REGARDING

"FAA REAUTHORIZATION: INTEGRATING NEW ENTRANTS INTO THE NATIONAL AIRSPACE SYSTEM"

SEPTEMBER 28, 2022

Chair Cantwell, Ranking Member Wicker, Subcommittee Chair Sinema, Subcommittee Ranking Member Cruz and members of the Subcommittee on Aviation Safety, Operations, and Innovation, thank you for holding this hearing to address the integration of new entrants into the national airspace system (NAS). On behalf of the National Business Aviation Association's (NBAA's) 11,000-member companies and our Advanced Air Mobility Roundtable, I am honored to testify at this hearing.

NBAA's members, many of which are small businesses, rely on general aviation aircraft to meet some portion of their transportation needs. These aircraft provide connectivity to communities in every state and nearly every congressional district, many of which do not receive airline service. While those airlines serve only around 500 airports, business aviation can reach 5,000 airports, located in places some people have never heard of. This unique American idea of connecting each other–no matter where we live and work–doesn't make headlines, but it supports 1.2 million American jobs and $247 billion in economic output.

As the Subcommittee knows, general aviation is an essential American industry that has long led the way in innovations that generate new technologies and new ways of thinking. We led the way with GPS, a transformative navigation and safety technology. We led the way with winglets and other technologies that drive safety and efficiency. We are leading the way in the next revolution in aviation, Advanced Air Mobility (AAM). These and other advancements make aviation safer, more secure and sustainable, and ensure that our country will remain the world's leader in aviation five, 10 and 25 years from now.

With the current authorization of the Federal Aviation Administration (FAA) expiring a little more than a year from today, this hearing comes at a crucial time, when the United States is on the cusp of a new and exciting era of aviation. We appreciate the work this Subcommittee is already doing to engage with all stakeholders on priorities for a long-term FAA reauthorization bill in 2023, and we look forward to a robust discussion about new entrants into the NAS.

As this committee knows, the U.S. has been at the forefront of aviation leadership and innovation for decades. Modern aviation was born on America’s shores with the first powered flight in Kitty Hawk, North Carolina. We led the transition from piston engines to the jet age. We pioneered air traffic control technology and airspace policies that created the safest, most efficient and most diverse air traffic system in the world. Our robust aviation infrastructure is unparalleled and our workforce, while greatly affected by the COVID pandemic, remains the most agile, innovative and sought-after in the world.

We have the potential to continue to lead the next phase in the evolution in aviation with AAM, but competition with other nations is fierce and rapidly advancing. Among other considerations, this means the FAA will need to keep pace with its promised regulatory schedule, so that the first

AAM commercial operations can occur as soon as 2024. This is a critical milestone if we are to fully scale this promising new technology.

In short, we stand at a critical juncture–the investments and policy decisions we make today will determine whether we harness the full economic, environmental and national security potential of AAM and maintain our position as a global leader in aerospace.

Advanced Air Mobility: A Pioneering Promise for Communities and Commerce

Advanced Air Mobility is an emerging form of on-demand air transportation powered by electric vertical takeoff and landing (eVTOL) technology. It can safely, securely, and successfully deliver people and cargo between locations, making connections that are not easily achievable by existing aviation technologies, such as delivering healthcare in remote rugged terrain, providing affordable transportation options within a congested metropolitan area, offering relief in the aftermath of a natural disaster, increasing access to rural or mid-sized communities, or linking the remote spokes of a cargo distribution network to shorten the supply chain.

AAM has the potential to make aviation more accessible, more environmentally sustainable and more economically beneficial than at any time in history. According to a recent study by Deloitte, the AAM market in the United States is estimated to reach $115 billion annually by 2035, creating more than 280,000 high-paying jobs.[1]

The development, certification and use of AAM promises to deliver a host of benefits, including:

- Job Creation and Economic Growth. Analysts predict the AAM sector will generate hundreds of thousands of high-skilled jobs in manufacturing, design and infrastructure by 2040, centering around the 5,000 existing and underutilized airports in towns and cities across the country. AAM will also deliver huge commercial and economic benefits by increasing productivity and making it easier to move key employees and goods and provide services in locations across the country.

- Accessibility. AAM technologies provide passengers with a safe, affordable, flexible and efficient form of mobility, making AAM a valuable solution for cities struggling with road congestion. It offers the potential to close the gap between urban and rural communities by facilitating connections between areas separated by limited public transportation and difficult terrain. And it offers a critical solution for health care challenges such as time-critical organ transportation.

[1] https://www2.deloitte.com/us/en/insights/industry/aerospace-defense/advanced-air-mobility.html

- Sustainability. AAM is part of business aviation's many efforts to become more sustainable year over year. The aircraft are powered by hybrid electric systems, batteries and hydrogen fuel cells, making them a highly sustainable, carbon neutral form of air transport. The aircraft are also quiet, and less disruptive.

- National Security. AAM will benefit America's defense and national security interests. AAM vehicles are short range, runway independent and automated. These innovations have real national security applications, including enabling militaries to more easily pursue complex missions that are currently conducted using traditional modes of transport like ground vehicles and helicopters. AAM technologies also have the potential to elevate military use of unmanned aircraft systems for national defense.

In addition to the incredible opportunities contemplated by the introduction of AAM, Unmanned Aircraft Systems (UAS), often called drones, continue to demonstrate tremendous value and public acceptance in areas such as search and rescue, public safety and security, life-saving medical supply transport, package and cargo delivery and other innovative transportation needs. With the FAA's first UAS certification recently taking place, we're excited to see additional certificated UAS finding their way into U.S. operations.

Needed: A Coordinated Strategy to Propel the Next Generation of U.S. Aviation Leadership

The support of Congress and the administration, along with collaboration among industry leaders under a coordinated, transparent and predictable national strategy is essential to support the emergence of AAM and ensure all Americans can benefit from the economic, environmental, national security and connectivity benefits it can provide. Several analysts have looked at the best way to foster this coordination. Among them comes guidance from McKinsey, which has conducted a helpful study, highlighting the ways to address the new challenges related to technology, regulation, cost and customer acceptance to achieve higher adoption rates, and unlocking a market that could grow to $600 billion annually[2].

Unlocking this potential is the idea behind the Advanced Air Mobility Coordination and Leadership Act. Thanks to the leadership of Subcommittee Chair Senator Kyrsten Sinema (D-AZ) and Senator Jerry Moran (R-KS) in the Senate, as well as Vice-Chair Sharice Davids (D-KS) and Ranking Member Garret Graves (R-LA) in the House, the bill is on its way to the President's desk to be signed into law.

[2] Are Flying Taxis in Our Future?
https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/taxiing-for-takeoff-the-flying-cab-in-your-future

For AAM to succeed, we need coordination at the federal, state and local levels, and that's what the Advanced Air Mobility Coordination and Leadership Act calls for, requiring collaboration through a working group of stakeholders at all levels. This first-of-its-kind working group will review policies and programs to help advance the maturation of AAM aircraft operations and create recommendations regarding the safety, security and federal investments necessary for the development of AAM.

As a stakeholder organization, NBAA supports the work of congressional leaders to foster the growth of this promising technology. That's why last year, NBAA established the Advanced Air Mobility Roundtable, which serves as a forum for high-level policy planning with sector leaders to chart a course for the integration of AAM technologies into the nation's airspace system. This group provides a voice for original equipment manufacturers and others who are developing electric vertical takeoff and landing transport (eVTOL) vehicles and other systems, with regard to airport access, airspace management, local community engagement and other critical priorities.

NBAA also collaborates closely with the Congressional Advanced Air Mobility (AAM) Caucus, established in June of this year, which will be critical in helping to educate Members of Congress about this revolutionary emerging technology. Caucus members will work to identify policies that will stimulate the industry, promote safety, address infrastructure needs, and engage in advanced air mobility's modernization of existing transportation networks.

We encourage Congress to continue to fund essential programs that create partnerships between government agencies, the military and stakeholders to bring AAM to fruition. In particular, the U.S. Air Force's AFWERX/Agility Prime and NASA's AAM National Campaign greatly aid in expediting the certification process and testing of AAM operations, traffic management systems, infrastructure, and capabilities as validating system-level concepts and solutions. NBAA's AAM Roundtable members including Archer Aviation, Beta Technologies, Joby Aviation, Supernal, and Wisk are successfully utilizing these programs.

Joby Aviation and NASA collaborated with the FAA to develop five use cases for operations in the Dallas-Fort Worth (DFW) region. The report demonstrated AAM aircraft could navigate in the current National Airspace System between vertiports through high-volume conventional air traffic, and that more work should be done to develop ways to scale operations. In March, Beta Technologies' aircraft, Alia, became the first manned electric aircraft flown by U.S. Air Force pilots as part of its Agility Prime technology acceleration program. This paved the way for Alia's groundbreaking journey from New York to Arkansas, which covered 1,403 miles, made seven stops and spanned six states. And, most recently, Wisk released its Concept of Operation, citing years of collaboration with Boeing, the FAA and NASA.

Congress and agency leaders understand the importance of government-industry partnerships to foster the development of AAM. Earlier this year, the FAA amended the charter for the Drone Advisory Committee to include AAM integration and renamed it the Advanced Aviation Advisory Committee (AAAC). The AAAC will serve as a valuable forum to advance AAM policy and advise the FAA; however, the committee must bring on board more AAM members to honor equal representation reflected in the charter, and be most effective in charting the future for this emerging sector.

In Focus: Certification Challenges for Emerging Aircraft Technologies

With the electrification of aviation leading to the introduction of new entrants, long-established safety oversight concepts will need updates that reflect the latest technology, design and operations on the horizon. And while the pace of technological change often outruns the ability of regulatory standards for compliance to adjust, the safety of the traveling public must always remain our North Star.

The FAA's rigorous processes for aircraft certification have long been a model for international acceptance of U.S. aviation products. Additionally, regulations set forth by the Department of Transportation (DOT) and FAA ensure that companies seeking to provide air transportation to the public comply with comprehensive operational safety standards. Together, these aircraft and operational approvals create a framework for the safe introduction of new aircraft and new operations. That said, regulators will need to think in new ways about the certification of new technologies with implications for aviation safety.

That evolving shift in perspective appears to be underway: As this committee knows, the FAA recently changed the certification process for AAM aircraft. As part of that decision, the agency committed to introduce a Special Federal Aviation Regulation (SFAR) by 2024 to coincide with the planned introduction of the first advanced air mobility (AAM) commercial operations. This is a critical step in the path to enable commercial AAM operations and pilot licensing, and we welcome the agency's declaration that this change preserves consistency in certification for safety without introducing cumbersome delays to the necessary processes for marketplace introduction.

We ask that this Subcommittee closely monitor the agency's stated goal of completing the process for AAM introduction into the NAS by 2024. Transparency and certainty from the FAA are important. For example, the first aircraft type certification for an AAM aircraft is expected shortly, and companies are progressing toward operational certification, so the timely completion of an SFAR with engagement from industry stakeholders is crucial for the successful launch of commercial service.

Adherence to the FAA's stated timetables must be viewed as a top agency imperative. Although operators of AAM aircraft have not yet sought FAA commercial operational certification, the moment is at hand to begin testing operational approval concepts now with FAA safety leaders. New aircraft and new operations frequently take a significant amount of time to safely evaluate, and we cannot wait until 2024 to begin evaluating AAM operational safety needs.

While aircraft and operational certification are a major priority, we must also acknowledge the significant work happening in parallel to address other critical components of this new entrant capability, including air traffic operations and heliport and vertiport design considerations. Each of these work streams must integrate seamlessly if we hope to realize the potential benefits of our efforts.

For example, in addition to AAM operations that focus on passenger-carrying operations, UAS aircraft continue to demonstrate growing value in critical areas such as search and rescue, public safety and security, package and cargo delivery, life-saving medical supply delivery and other innovative transportation models. Proof-of-concept projects in the U.S. have shown public acceptance and desire for these services. We strongly believe these projects should set the stage for more predictable aircraft and operational certifications.

As part of the upcoming FAA Reauthorization, we look forward to a continued dialogue on how the agency can utilize the existing regulatory structure and innovative operational and aircraft certification concepts to facilitate the safe introduction of these technologies. Providing general aviation with certainty for certification, airspace integration, operational approvals, airport investment and infrastructure standards development will all be critical for the United States to remain a global leader in aviation.

A Top Priority: New Ways of Thinking About Safe, Efficient Airspace Management

With the evolution of multiple transformative technologies, ensuring the NAS is ready and able to facilitate the safe integration of operations is critical to maintaining America's global leadership in safe, efficient air traffic management.

This exciting future is one that we fully embrace. Emerging entrants are planning to operate within the existing airspace infrastructure and environment to the greatest extent possible, without placing an additional burden on the air traffic control system. As we have with all operations, over many decades, we will readily integrate these entrants into the NAS, under the fundamental principle that the public airspace welcomes all users. That said, it must be understood that, as operations scale, we will need regulatory changes to facilitate growth and above all, safety.

For example, UAS have paved a new regulatory path for "beyond visual line of sight" (BVLOS) operations. We welcome the changes the agency is making to allow this segment of the industry to integrate safely, and we know it will speed our progress across the board in realizing the safety and operational benefits of emerging technologies, so we can bring them online.

We can learn some lessons from the safe integration of UAS into the NAS. Over the past several years, initiatives, including the UAS Integration Pilot Program and several other test sites around the country, have allowed the industry and the FAA to collect data regarding BVLOS operations and demonstrated these operations can operate safely.

Successful public-private partnerships involving new entrants are coming together every day. Hillwood's Alliance Texas planned community is centered around the world's first industrial airport, which hosts a Mobility Innovation Zone (MIZ). The MIZ brings together public and private stakeholders in suburban and urban settings to safely integrate UAS technologies and autonomous freight solutions. Bell Textron and NASA's Systems Integration have utilized the MIZ to demonstrate breakthroughs in "Detect and Avoid" and "Command and Control" flight capabilities, two components needed to safely scale and commercialize Advanced Air Mobility vehicles.

It's now time to do the same with AAM through the establishment of local, state, tribal and government partnerships to advance the data collection and collaboration needed to facilitate initial and scaled AAM operations across the country.

That dialogue has begun through the FAA's AAAC, but it will take additional representation from the AAM community on the AAAC, and some very specific AAM pilot programs established between the FAA, state and local entities, working collaboratively, to ensure continued and shared outcomes.

AAM's Promise in Building the Workforce of the Future

The important dialogue about AAM integration into our nation's aviation system should not overlook the technology's role in supporting a major industry priority: the development and support of a world-leading workforce. By some estimates, we're looking at an astonishing 280,000 new jobs coming online, in twenty-first century positions, meaning those in Science, Technology, Engineering and Mathematics.

The subcommittee is aware that we need these jobs because we face significant workforce challenges, including the shortage of qualified pilots and technicians. According to the Boeing company, more than 600,000 new pilots and technicians are needed to address projected growth

in the next 20 years[3]. Meeting this projected demand is dependent upon the investment in a steady pipeline of newly qualified personnel to replace those who have left, or will soon leave the industry.

The growth of the AAM sector will offer the high-skill, high paying jobs people want - and the FAA will need the support of Congress in making that happen, through workforce initiatives to focus on hiring people with the right technical skills to ensure the safety of these evolving technologies.

The industry is ready to do its part as well. We recognize these new opportunities provided by UAS and AAM will require us to bridge the gap between technical aviation skills and technology. New types of training will remove significant barriers to entry into aviation, making it affordable and scalable, and opening doors for individuals who previously were unable to get started in aviation because of the expense of education, flight training, and certification. This new technology offers different ways to think about UAS and AAM flight operations, including unique pathways to employment and education that have not been seen before.

This is the imagination behind the Promoting Service in Transportation Act, passed into law through the Infrastructure Investment and Jobs Act (IIJA), within DOT. We appreciate Chair Sinema's leadership on the legislation and the support of this Subcommittee for this measure.

Moving toward the upcoming FAA Reauthorization, we look forward to building on programs from the 2018 FAA bill, including grant programs to support the education of future pilots, the recruitment of much-needed aviation technicians and the introduction of other much-needed professionals into our sector. The careful review and adoption of the recommendations of the Youth Access to American Jobs in Aviation Task Force, and the Women in Aviation Advisory Board, will provide excellent starting points along these lines.

Effective Planning from Congress Has Laid the Groundwork for the Next Phase in Aviation's Evolution

More than 70 percent of passengers utilize only 30 of the nation's airports. The nearly 5,000 local and regional airports will be the launching pad for AAM. A number of airports are collaborating with electric aircraft manufacturers to install AAM charging infrastructure, and many airports are actively planning for the arrival of electric aircraft, understanding the importance of supporting these new entrants. Airports are looking for innovative ways to adapt their business model and take advantage of their geographic location to provide the most value to

[3]Pilot and Technician Outlook 2022-2041:
https://www.boeing.com/commercial/market/pilot-technician-outlook/

leverage this fast-growing segment of the aviation industry. We encourage Congress to continue to find ways to support airports in this mission, so we can ensure regulations and lack of funding are not impediments to the critically needed growth of the sector at this crucial time.

As the result of our already robust network of general aviation airports, which are located in urban centers as well as suburban and rural areas, many communities are ready to benefit from AAM and reap the benefits of decades-long federal, state, and local investment that has been made in this vital infrastructure. Nearly 90 percent of the population lives within 30 minutes of a regional airport. Due to lower projected travel costs, AAM will enable many more people to utilize their local airport for air transportation, significantly growing the advantages of having an airport in proximity to them.

However, a number of communities are being shortsighted about the value of their airport, seeking to limit access and in some cases vying to shutter what is unarguably their most valuable community asset. As we stand on the brink of Advanced Air Mobility taking flight, with quieter, zero emissions electric aircraft, cities should be encouraged to preserve and invest in infrastructure that could be the cornerstone of economic revitalization and community accessibility. We urge Congress to continue to protect and invest in the federal aviation infrastructure that is the foundation of our nation's air transportation system.

We applaud Congress for supporting the Airport Improvement Program (AIP) and numerous airport relief and investment packages it has recently championed, and we encourage future investment. Without Congressional support and leadership, many local municipalities would not be able to maintain the infrastructure that links their community to the rest of the country and to the world.

Along these lines, we commend this committee for favorably reporting S. 4246, The Advanced Aviation Infrastructure Modernization (AAIM) Act sponsored by Senator Alex Padilla (D-CA) and Senator Jerry Moran (R-KS). The AAIM Act authorizes funding to plan for new AAM infrastructure by leveraging existing public transportation facilities to support AAM operations and fostering engagement programs to introduce the latest technologies to diverse communities. This legislation will position the United States to maintain its global leadership in aviation while providing the tools to create thousands of new green jobs for our skilled aviation workforce. We applaud House Aviation Subcommittee Chair Rep. Rick Larsen, and House Committee on Transportation and Infrastructure Ranking Member Rep. Sam Graves for moving the companion bill H.R. 6270, through the House of Representatives. We look forward to collaborating with this committee to advance the AAIM Act through the Senate.

Expanded aviation charging infrastructure will be another crucial element to achieve the benefits AAM can bring to diverse communities. Without the necessary charging infrastructure in place, it is difficult for private businesses and individuals to be confident enough to switch to cleaner,

electric aviation. We have seen a similar dynamic with the transition to electric vehicles (E.V.) in automobiles, and policymakers have responded appropriately by providing tax incentives for businesses and individuals and grants and formula funding for state and local governments to install E.V. charging stations.

The Alternative Fuel Vehicle Refueling Property Tax Credit (section 30C of the Internal Revenue Code) allows for a 30 percent tax credit for the cost of any qualified alternative fuel vehicle refueling property, which includes electric vehicle charging stations and hydrogen refueling stations. Recognizing the challenges posed by climate change and the need to accelerate the transition to a decarbonized future, the Administration and Congress have released proposals to enhance and extend the section 30C tax credit for E.V. charging stations.

NBAA and our AAM Roundtable support a simple technical change to modernize the section 30C tax credit to ensure that the critical investments necessary for AAM, or electric aviation, charging infrastructure are similarly covered and deployed. Leveraging private investment with an expanded Sec. 30C tax credit is key to the successful rollout of charging stations for electric aviation across our network of more than 5,000 public-use airports.

Earlier, I mentioned that this committee hearing comes at an appropriate moment, given the imminent consideration of the next FAA reauthorization. For NBAA, another milestone is at hand: our association's annual Business Aviation Convention and Exhibition will occur in Orlando, Florida, next month where we will have on display the latest advancements in AAM technology. Just a few miles away from the event, the community of Lake Nona has partnered with our AAM Roundtable member, Lilium, to create the first hub location for a high-speed electric air mobility network in America to be launched by 2026. Described as the "Future of Cities" by Fortune Magazine, Lake Nona provides an ideal location contiguous to the Orlando International Airport, the origination site of more than half of the region's 75 million annual visitors, with a robust economy and infrastructure ready to support the launch of electric air mobility.

We commend the FAA Office of Airports for its recent efforts in developing interim guidance and standards for vertiports and updating the standards for heliports. The FAA has released Engineering Brief (EB) 105 titled "Vertiport Design" targeted to specifically support Advanced Air Mobility vertical take-off and landing (VTOL) aircraft with the goal to ultimately develop a future Advisory Circular on the subject, to be released in 2024-2025 timeframe. The agency plays an important role in the process of developing this new type of infrastructure that will be critical to connecting more cities, towns, and small communities by air with the ability to leverage eVTOL aircraft.

While much work in this area remains ahead, the aviation industry looks forward to continued partnership and collaboration with the FAA, Congress and other branches of the federal, state,

local and tribal governments, and remains optimistic that together we continue to move aviation infrastructure forward at a pace that keeps up with developing technologies and community needs.

The Flight Plan for AAM as Part of America's Aviation Leadership

In conclusion, as Congress prepares to reauthorize the Federal Aviation Administration, the NBAA recommends the following priorities to ensure the safe integration of AAM and help scale the new technology:

- Provide transparency and certainty in the regulatory process, including a commitment to deliver the powered lift Special Federal Aviation Regulation by 2024.
- Develop a national strategy to coordinate AAM integration at the federal, state and local levels to include AAM demonstration cities modeled after the UAS Pilot Program.
- Continue to invest in the infrastructure and other assets that will promote the manufacture, availability and use of these world-leading technologies. We applaud Congress for the work done in this area, but more will need to be done. We urge passage of S. 4246, or HR 6270, The Advanced Aviation Infrastructure Modernization (AAIM) Act.
- Preserve congressional oversight of the nation's aviation system. Having Congress serve as the board of directors for the NAS has always ensured that all stakeholders are represented; as we introduce new technologies, oversight from Congress will remain critical to ensuring America's aviation leadership across the world.

This hearing and similar discussions with policymakers in the coming months will serve as the building blocks for successfully integrating new entrants into the NAS. Our industry looks forward to continued engagement as we develop policy solutions that safely embrace new aviation technologies and maintain the role of the United States as the world leader in aerospace. General aviation is witnessing historic technological advancements that will connect communities to sustainable transportation options. NBAA, our AAM Roundtable, and our members appreciate this Subcommittee's continued leadership, and we welcome the opportunity to testify at this critical hearing.