TESTIMONY OF

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BEFORE

U.S. House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Aviation

"Eliminating Bottlenecks: Examining Opportunities to Recruit, Retain, and Engage Aviation Talent."

ON

July 10, 2024
Washington, DC

Introduction

Thank you, Subcommittee Chairman Graves, Subcommittee Ranking Member Cohen, Full Committee Chairman Graves, Full Committee Ranking Member Larsen, and distinguished members of the Committee and Subcommittee. My name is Michael Robbins, and I am the President & CEO of the Association for Uncrewed Vehicle Systems International (AUVSI), the world's largest industry association representing the uncrewed systems, robotics, and autonomy industry. Our members create systems that operate in the air, on the ground, and in the water across the civil, commercial, and defense domains. Today, I am honored to appear before the Aviation Subcommittee representing our members in the Uncrewed Aircraft Systems (UAS or drones) and Advanced Air Mobility (AAM) industries.

The topic of today's hearing – recruiting, retaining, and engaging aviation talent – is of tremendous importance to the long-term resiliency of the aviation industry, and specifically the advanced aviation industry and the future of U.S. aviation leadership. To safeguard our position as the global aviation leader, and to build the aviation workforce of the future, we must continue to advance the policy and regulatory frameworks that integrate advanced aviation technologies into the National Airspace System (NAS), which will ensure the U.S. remains the gold standard for aviation safety.

The United States Congress, led by the tremendous bipartisan leadership of this Subcommittee, and the full Transportation and Infrastructure Committee, put the nation on the right path with the recent passage of the Federal Aviation Administration (FAA) Reauthorization Act of 2024 (P.L 118-63). The law contains dozens of critical provisions in support of aviation safety and will ensure the regulatory pathway for drones and AAM is based on fundamental risk-based safety principles. This will guarantee continued U.S. leadership in the decades ahead and help to build the aviation workforce of the future. AUVSI and our members are tremendously grateful to the Members of this Committee, and your staffs, for your years of investment into this foundational legislation. On behalf of AUVSI and our members, thank you.

We are at a pivotal moment in aviation history, with drones and AAM aircraft unlocking significant benefits in both safety and technology leadership. With those benefits will come tremendous economic activity and workforce opportunities. Drones offer a cost-effective solution for critical operations including public safety, package delivery, precision agriculture, utilities maintenance, infrastructure inspections, and much more. AAM is revolutionizing propulsion systems, battery technology, and flight controls, unlocking new areas not served by traditional aviation and enhancing workforce productivity and safety. Companies are opening high-rate production facilities and creating thousands of high-quality manufacturing jobs at an increasing rate.

The true potential for workforce growth, however, will only be realized when the regulatory frameworks are in place for aircraft certification and operations. Two important and time sensitive rulemakings are underway at the FAA which will help to determine the future path of the drone and AAM industries, respectively. The forthcoming Part 108, or Beyond Visual Line of Sight (BVLOS) rulemaking for drones, and the Powered-Lift Special Federal Aviation Regulation (SFAR) for electric vertical takeoff and landing (eVTOL) aircraft, are required for the U.S. to remain the world leader in aviation and aviation safety and to build the workforce of the future. Without these regulatory frameworks in place, innovation will be stifled, operations will remain limited, and the drone and AAM industries will not be able to scale in the near term in the United

States and will likely look for opportunities to expand outside the U.S. – something we have already seen happen. Industry stands ready to work with the FAA to get these rules done right, and to get them done on a timeline that unlocks the full potential of advancing aviation safety, workforce growth, and U.S. economic opportunity.

At this pivotal moment, the need to modernize and expand our industry and government workforce has never been more urgent. AUVSI highlights four areas where Congressional action will have an impact:

First, the FAA's future hinges on real dollar increases, not just a reshuffling of existing staff. New funds are needed for the Agency to hire subject matter experts capable of tackling the unique challenges of AAM and UAS integration. Congress has mandated that the Agency integrate new entrants into the NAS, and we stand ready to support them in doing so. Industry can attest that, while the current civil workforce is highly dedicated and skilled, it is rooted in legacy aviation technologies. The FAA must invest in a workforce comprised of experts in new aviation technologies, including advanced automation and autonomy, who embrace safety modernization and risk-based regulations, and who do not default to applying traditional aviation ideologies to the UAS and AAM segments of the industry, which are anything but traditional. Further, FAA should implement continuous education and training programs for FAA employees to ensure they remain current with the latest advancements in aviation technologies and safety protocols, including advanced avionics, autonomy, and electric propulsion.

Second, there is significant unrealized opportunity to address the pilot and skilled worker shortages by leveraging automation, artificial intelligence (AI), and autonomy. AUVSI member companies are focused on making the most out of what technological evolutions can provide to the development of human skills. To this effect, an adequate and skilled use of automation, AI, and autonomy are undeniably tools to develop advance flight safety and operational efficiency and to support the training of the highly sought after workforce in the aviation industry. Autonomy is becoming a tool to provide support to crew members in situations where human factors reportedly impacted flight safety. This idea of complementing human skills can naturally be transferred to enhance the training of human crews and be transferred to other essential domains of the aviation industry such as manufacturing and maintenance. Furthermore, drones and AAM aircraft can perform specific, repetitive tasks, such as delivering medical supplies to hospitals and providing shuttle services to offshore oil rigs, that free up the availability of pilots for more complex aviation operations and keep human beings safer.

Third, full funding of the workforce development programs included in the FAA Reauthorization Act of 2024 is critical. The law establishes a new aviation manufacturing workforce development program and other grant programs to support education and recruitment, which Congress must now fund. The UAS industry specifically requests Congress' support for the Drone Infrastructure Inspection Grant (DIIG) Act and the Drone Education and Workforce Training Grant Program. Similarly, the AAM industry specifically requests that Congress fully fund the Electric Aircraft Infrastructure Pilot Program and the AAM Infrastructure Pilot/Grant Program at the authorized levels in the legislation.

Fourth, investing in Science, Technology, Engineering, Aerospace, and Math (STEAM) education is crucial for our country's future. We need more affordable higher education options in the U.S., as the current system is unsustainable for most American students. Integrating a curriculum from elementary school through community college and four-year universities that supports the UAS and AAM industries is essential. Drone and AAM-specific training must include innovative, cost-effective, and safe certification methods. AUVSI is proud to partner with numerous Collegiate Training Initiative (CTI) schools as part of our drone training program, Trusted Operator, which provides advanced training beyond the minimally prescriptive operating regulations, such as the FAA's Part 107. Working together, AUVSI and CTIs provide higher level of drone knowledge, flight proficiency, and safety and risk management practices that are valued by employers and customers of commercial UAS operators. The certification is administered by public and private universities, and for-profit training providers that are accredited by AUVSI to ensure a consistent level of training for students while allowing institutions to adapt the program to fit their educational needs.

Finally, I want to highlight that industry recognizes its own responsibility for workforce development. Industry leaders are engaging the future of the workforce through initiatives like Youth Fly Days, "Learning by Doing" programs, scholarships, apprenticeship and mentorship programs, partnerships with key organizations like the Girl Scouts of the USA and various high schools around the nation, hosting youth internship programs, veteran focused programs and hiring initiatives, and much more. Drones and AAM are also opening aviation careers to a broader and more diverse workforce, including workers with physical disabilities, those without advanced technical degrees, and rural workers who do not live near economic centers of legacy aviation.

To ensure the continued growth and safety of the aviation industry in the U.S., we must invest in a diverse, skilled, and adaptable workforce. This includes expanding funding, developing innovative training programs, and supporting accessibility across the board. AUVSI appreciates the Committee's and Subcommittee's leadership in these efforts, and we look forward to working together to build a strong future for aviation.

FAA Reauthorization Provisions

The FAA Reauthorization Act of 2024 includes multiple provisions that will positively impact the aviation workforce writ large, including ensuring the regulatory framework required for the UAS and AAM industries is in place to allow the industries to scale and grow. The Reauthorization also contains key provisions focused on workforce recruitment and retention both at the FAA and within the broader industry. We are encouraged that the Subcommittee keenly focused on directly investing in workforce development and training, while also enacting commonsense policy to remove certain barriers that consistently stand in the way of attracting more talent into the aviation ecosystem.

Beyond Visual Line of Sight (BVLOS) Rulemaking

Industry delivered to the FAA the FAA-chartered UAS BVLOS Aviation Rulemaking Committee (ARC) report in March of 2022 – twenty-eight (28) months ago – however, we do not yet have a draft rule from the FAA.[1] Accordingly, AUVSI appreciates the oversight of Congress on the BVLOS/Part 108 rulemaking, specifically Section 930 of the FAA Reauthorization Act of 2024,

[1] https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information/documentID/5424

which directs the FAA to issue a notice of proposed rulemaking (NPRM) within four (4) months of enactment to establish a performance-based regulatory pathway for UAS to operate BVLOS. That means we should have a draft rule no later than September 16, 2024.

Section 930 also directs the FAA to issue a final rule sixteen (16) months thereafter. That mandate is certainly welcome, but with that timeline a rule is still approximately eighteen (18) months away from today, and twenty (20) months after enactment. Accordingly, while the rulemaking is underway, the FAA must continue issuing waivers and exemptions to enable BVLOS operations on a risk-based and performance-based basis. This is essential to unlocking the positive economic impact of drone operations, including the corresponding growth in drone-related jobs and the advancement of aviation safety.

AUVSI urges Congress to hold the FAA accountable to the key timelines on releasing the BVLOS rule enacted as part of the FAA Reauthorization Act of 2024. We urge the FAA to release the NPRM, or draft BVLOS rule, now, so that all interested stakeholders can study and comment on the draft rule and continue moving the regulatory rulemaking process forward. For a draft rule, perfect should not the enemy of the good, nor the enemy of forward progress. Further, we need not take the full twenty (20) months mandated by Congress to get the rule finalized. AUVSI and our members stand ready to work with the FAA and others in industry to ensure a timely rule that enhances safety and unlocks the full economic and workforce potential of drones.

AUVSI further emphasizes the requirement of an approval process for associated elements, which is mandated by Section 932 of the FAA Reauthorization of 2024. As defined in the legislation, a third-party service supplier means an "entity other than the FAA that provides a distributed service that affects the safety or efficiency of the national airspace system." This includes safety-critical communications, such as command and control (C2) links, UAS Traffic Management (UTM), ground-based surveillance, and other critically important infrastructure and service providers.

As the BVLOS ARC Final Report describes in depth, BVLOS operations will enhance safety, provide sustainable transportation options, reduce carbon emissions, enhance access to life-saving medicines and critical supplies, save taxpayer resources, contribute to economic and workforce growth, and so much more. Let's get the process moving. Let's keep America as the gold standard for aviation safety and technology.

Powered-Lift Special Federal Aviation Regulation (SFAR)

Similarly, we urge the FAA to issue the Powered-Lift SFAR as soon as possible, which takes into consideration industry feedback on the initial approach the FAA took in the NPRM. It is imperative that Congress maintain oversight of the SFAR's timeliness and content. Section 955 of the FAA Reauthorization Act of 2024 requires the FAA to publish a special final rule for the operations of, and pilot requirements for, powered lift aircraft within seven (7) months and applies specific requirements and considerations to such rulemaking. This section supports type-specific training and qualification for pilots – something that is essential for safety in the early years – and requires alignment with International Civil Aviation Organization (IACO) type-rating frameworks.

As with drones, the United States has the ability, capacity, and know-how to be the world leader in Advanced Air Mobility operations utilizing eVTOL aircraft. Ensuring a risk-based, safety-

based, SFAR is essential for the U.S. to maintain global leadership. Unfortunately, the draft language proposed in the NPRM fails to do so. Despite having set expectations that this SFAR would align with ICAO, by moving away from that type rating approach, FAA is both reversing a perceived commitment to the industry and international community and adding unnecessary barriers for U.S. operators, which do not advance aviation safety. AUVSI applauds section 955 and urges Congress to ensure the provision is implemented properly to meet Congressional intent, which aligns with industry's needs, and which will be in the best interest of advancing aviation safety.

Additionally, we urge FAA to expeditiously implement and Congress to fully fund the Electric Aircraft Infrastructure Pilot Program. Section 745 in the legislation establishes a five-year pilot program allowing up to ten (10) eligible airports to acquire, install, and operate charging equipment for electric aircraft and to construct or modify related infrastructure to support such equipment. These early projects will serve as a framework for safe integration and scaling of AAM operations in an airport environment, and will open tremendous job opportunities, creating direct and indirect job opportunities in operations, maintenance, and support services.

Aviation Workforce Provisions

The Subcommittee's work on aviation workforce issues is best represented in Title IV, which is entirely focused on improving the aerospace and aviation workforce. We are encouraged to see the FAA Reauthorization Act of 2024 prioritize bringing more qualified individuals into the aviation industry, an industry that fosters high paying, high tech, and high demand jobs. AUVSI wants to continue to build from the momentum in the legislation and work hand in hand with Congress and the Executive Branch to bring more people from various communities into aviation professions, including women, minorities, people with disabilities, those in rural areas typically disconnected from the aviation industry, and people from underserved, disadvantaged communities. The UAS and AAM industries are at the forefront of technology that can better the lives of all Americans and we are proud of the work of our member companies whose efforts consistently yield sustained interest in our segment of the industry.

AUVSI applauds Section 440 of the FAA Reauthorization Act of 2024, the Aviation Workforce Development Program, which authorizes grants to support education and recruitment in the areas of aircraft pilots, maintenance workers, and technical workers and engineers. Specifically, the section seeks to strengthen aviation workforce pipelines by broadening the reach of training programs to include populations that are underrepresented in the aviation industry, including in economically disadvantaged geographic areas and rural communities. AUVSI applauds the direction to construct programs at various stages of the educational curriculum, including high schools, secondary schools, and higher education programs with a mix of apprenticeship, internship, and scholarship programs. Section 440 also authorizes money for various existing workforce development programs housed within the FAA, in addition to giving program oversight to the Secretary of Transportation. Section 440 also sensibly notes the opportunity to support the transition to UAS operators for members and veterans of the U.S. armed forces.

Congress should fully fund the Drone Education and Workforce Training Grant Program in the FAA Reauthorization Act of 2024, Section 913, which directs the Department of Transportation (DOT) to establish a program to make grants available to educational institutions for small UAS

workforce training. In addition, this section authorizes $5 million for each of fiscal years 2025 through 2028 to be appropriated from the Operations account of the FAA. Unfortunately, the program is not funded in the House Transportation, Housing and Urban Development, and Related Agencies appropriations bill, which is something we urge action on to correct.

Congress should fully fund the DIIG Act grant program, Section 912 of the FAA Reauthorization Act of 2024, which would afford grants to local, state, and tribal governments to purchase and use U.S.-made drones for critical infrastructure inspection and construction projects. The current House Transportation, Housing and Urban Development, and Related Agencies appropriations bill funds the DIIG Act for fiscal year 2025 at the $10 million level with an additional $1 million appropriated for administrative expenses. While this is positive, we urge you to consider fully funding it in fiscal year 2025 at the $12 million level authorized in Section 912. The DIIG Act also provides grant funding for workforce development programs, working with community colleges and four-year institutions, to enable the future workforce required for the U.S. to remain a global aviation leader. Lastly, the DIIG Act will spark investment in the U.S. industrial base, with a particular emphasis on manufacturing job growth, to meet the demands for new drones to fulfill the Act's infrastructure inspection mission.

Collegiate Training Initiative (CTI) Program for UAS

Section 914 of the FAA Reauthorization Act of 2024 directs the Government Accountability Office (GAO) to study the effectiveness of the CTI Program for UAS that Congress established in the FAA Reauthorization Act of 2018. Launched on April 30, 2020, the UAS-CTI is a program designed for the FAA to recognize institutions that prepare students for UAS-focused careers. Today there are more than 140 participating colleges and universities, including four minority serving institutions to ensure diversity in the workplace. CTIs engage with the FAA, industry, local governments, law enforcement, and regional economic development entities to address labor force needs in the UAS industry. This collaboration ensures that UAS-CTI school graduates have the knowledge and skills needed to pursue a successful career in a UAS-related field. The efforts, certifications, and programs have been crucial for advancing industry standards and overall progress with workforce development for this industry. By aligning regulatory demands with industry needs, these initiatives establish initial benchmarks for pilot proficiency and operational safety. This foundational work not only meets present industry demands but also sets the stage for future innovations in drone and AAM technologies.

AUVSI is engaged with numerous CTI schools as part of our drone training program, Trusted Operator, which provides advanced training beyond the minimally prescriptive operating regulations, such as the FAA's Part 107. Working together, AUVSI and CTIs provide higher level of drone knowledge, flight proficiency, and safety and risk management practices that are valued by employers and customers of commercial UAS operators. The certification is administered by public and private universities, and for-profit training providers that are accredited by AUVSI to ensure a consistent level of training for students while allowing institutions to adapt the program to fit their educational needs. Many of the public universities engaged as Trusted Operator Training Providers that administer AUVSI's Trusted Operator Certification also hold the designation of approved CTI schools, including Clemson University, Embry Riddle, Fullerton College, NC State University, Northland Community and Technical College, Virginia Tech, and Warren Community

College. To date, AUVSI's training providers have issued over 1,600 Trusted Operator certificates to drone pilots.[2]

AUVSI applauds the FAA's recent launch of the Youth Drone Initiative under the UAS-CTI, targeting leaders, coaches, and educators of students aged 11-18.[3] This initiative aims to promote collaboration and disseminate safety information and best practices within the youth drone community, with a goal of reaching 200 schools by year-end. The Know Before You Fly (KBYF) initiative, established in 2020 through a partnership between the FAA, AUVSI, the Academy of Model Aeronautics (AMA), and the Consumer Technology Association (CTA), is a Congressional Directive authorized by the FAA Reauthorization Act of 2018.[4] KBYF supports educational initiatives by providing drone kits and lesson plans to teachers for classroom and extracurricular use, fostering a culture of safety and innovation from a young age to ensure future generations are proficient in safe drone operations. KBYF-funded activities also focus on Public Service Announcements (PSAs), education, and outreach concerning safety topics such as drone registration, the Recreational UAS Safety Test (TRUST), and drone participation in the Aviation Safety Reporting System (ASRS). We are encouraged that the FAA Reauthorization Act of 2024 extends the KBYF program through 2028.

It is imperative for stakeholders to continue supporting, enhancing, and aligning these efforts to ensure a skilled workforce ready to navigate and lead in this evolving field. CTI programs, and more broadly, university apprenticeship programs, are a promising avenue for recruitment for both industry and the FAA. Many universities are offering comprehensive aviation programs. These programs not only provide technical skills but also expose students to the real-world flying experience. One program unique to the drone space is the federally registered apprenticeship program at Fullerton College. This program provides not only education and certification for commercial drone operations, but also funnels students into paid on-the-job training and a journeymen certification. We need to encourage more universities to offer such programs and ensure they are accessible to all.

AUVSI thanks Congress for directing GAO to study the program for its effectiveness, and along with our members and training partners, look forward to providing GAO with feedback on this study, and recommendations for Congress and the FAA on improvements to the program.

Impacts on FAA Workforce

AUVSI welcomes Section 424 of the FAA Reauthorization Act of 2024, which expresses the sense of Congress that the FAA should leverage the UAS-CTI to address any staffing challenges and skills gaps within the FAA to support efforts to facilitate the safe integration of UAS and other new airspace entrants (which AUVSI interprets to include eVTOL and AAM aircraft) into the NAS.

Congress further recognized this skills gap within the FAA by specifically calling out unmanned systems and other new airspace entrants (which AUVSI interprets to include eVTOL and AAM aircraft) in Section 428 of the FAA Reauthorization Act of 2024, which authorizes the FAA

[2] https://www.auvsi.org/trusted-operator
[3] https://www.faa.gov/uas/educationalusers/youth-drone-initiative
[4] https://knowbeforeyoufly.org/home

Administrator to utilize direct-hire authority for positions related to aircraft certification and aviation safety. AUVSI applauds this recognition by Congress and urges the FAA Administrator to use the direct-hire authority swiftly to enhance the aircraft certification and safety teams within the FAA.

As Congress urges, the FAA should partner with UAS-CTI schools to ensure they are recruiting individuals with direct knowledge of how UAS and AAM are designed, manufactured, flown, and maintained. Additionally, there is a significant gap in knowledge, broadly speaking, within the FAA on advanced automation and autonomy, which will deliver enormous leaps in aviation safety, but are not yet widely understood within the FAA. This gap is reflected in recent FAA actions, such as the FAA's proposed Powered-Lift rule, which would require "technically advanced powered-lift aircraft" to be equipped with a specific set of legacy displays which may not be appropriate to the actual operation of the aircraft and may inadvertently negatively impact aviation safety by creating more display clutter. In the same draft rule, the FAA prohibits safety-enhancing autoflight systems from being able to be used during some phases of flight most susceptible to pilot error accidents, whereas autonomous takeoff and landing are being routinely and safely demonstrated by eVTOL and other aircraft today. These short-sighted and safety-limiting proposals are examples of the FAA lacking the workforce and knowledge to apply advanced aviation rationale, and instead defaulting to legacy aviation methods, which are often inappropriate for drones and AAM and potentially detrimental to the safety benefits our industry offers.

Beyond the sense of Congress and direct-hire authority, however, we must recognize a crucial need: the FAA requires real dollar increases to meet its staff challenges, not merely a reshuffling of existing staff. New funds are essential to hire the subject matter experts capable of tackling the unique challenges of AAM and UAS integration. As Congress notes, the UAS-CTI program is an excellent source of talent the FAA can and should tap to address the skills gap. The FAA's current workforce, though dedicated and skilled, and respected by AUVSI and its members, is deeply rooted in traditional methods. To navigate the future of aviation, the FAA needs to bring in fresh minds, innovative thinkers, and a willingness to embrace a new paradigm. Further, FAA should implement continuous education and training programs for FAA employees to ensure they remain current with the latest advancements in aviation technologies and safety protocols, including advanced avionics, autonomy, and electric propulsion. Only by making these investments can we ensure that the FAA is equipped to guide the industry safely and efficiently.

FAA Data Analytics to Advance Aviation Safety

The potential to advance the FAA's safety mission through the vast collection and analysis of UAS and AAM data is significant. There is an urgent need within the FAA workforce to assimilate and apply insights derived from this data to progress across various initiatives. The pressure on the workforce to formulate and disseminate industry guidance based on these insights is immense. This task exceeds the capacity of any single FAA Line of Business (LOB). Therefore, the FAA should prioritize developing an enterprise solution that alleviates the burden on staff offices, providing a scalable and integrated approach to managing and utilizing UAS and AAM data effectively.

Advancing UAS Operations: Workforce Needs, Economic Impact, and Future Innovation

Today, across the nation, drone operations, including for infrastructure inspection, agriculture, delivery, and other missions, offer Americans a wide variety of good paying job opportunities as drone pilots, operations managers, engineers, ground support personnel, and much more. The expansion of UAS operations will necessitate an increased demand for pilots, operators, package loaders, maintenance technicians, and other job categories. Notably, the barriers to entry in these fields are significantly lower than those in traditional aviation. This reduction in barriers facilitates the inclusion of individuals from diverse backgrounds, thereby broadening the pool of qualified candidates. AUVSI member companies are universally committed to equal employment opportunities and engage in robust training and mentorship programs to attract and retain the best talent.

Drones are compact yet powerful devices that have emerged as a pivotal component of the future of aviation, ushering in a new era of aerial services. They have proven to be a cost-effective and efficient solution for a myriad of tasks, from public safety operations to surveying and inspections to package delivery, including for emergency response. Their unique ability to access areas that were previously unreachable and to capture high-resolution data has fundamentally altered our interaction with our environment. They are not merely an incremental addition to our industry; they represent a significant leap forward in aviation technology and an opportunity to grow and build the next generation of our aviation workforce, and to utilize existing workforces in more efficient and safer ways. For example, drones conducting inspections can inspect large areas and hard-to-reach locations quickly, reducing the time required for manual inspections. This allows workers to focus on analyzing data and making informed decisions rather than spending time on physical inspections. Drones can cover expansive fields, long line linear power lines, railroads and pipelines, and tall structures in a fraction of the time it would take for a human inspector to do so manually. By taking over hazardous inspection tasks, drones significantly reduce the risk of accidents and injuries among the workforce. Workers can operate drones from safe locations, avoiding potential exposure to dangerous environments like high-voltage areas, toxic chemical sites, or unstable structures.

Drone Operators

In the context of the aviation workforce, the competencies required for successful drone operation in highly automated systems differ markedly from those needed for traditional crewed aircraft piloting. Certification requirements for "Pilot in Command" ratings in these automated systems should be tailored to each specific operation. These requirements may vary between companies but must consistently demonstrate the operator's competence to meet FAA-defined safety standards and acceptable risk levels as mandated by agency regulations.

A drone operator engaged in advanced UAS operations must possess skills in monitoring weather conditions, other aircraft in the vicinity, and potential anomalies. However, certain restrictions and requirements that apply to conventional pilots may not be pertinent to highly automated drone operations. Autonomy is fundamental to drone services, enabling significant scalability. Consequently, the future aviation workforce must include engineers proficient in the intersection of autonomy and aviation, as these skills are driving innovation and will remain in high demand as the industry progresses. This emerging cadre of aerospace engineers and innovative thinkers will develop solutions for safely scaling small drone operations and augmenting pilot capabilities

in crewed aviation, thereby contributing to enhanced safety and the ongoing effort to reduce aviation fatalities to zero.

Drone Maintenance Personnel
Presently, most advanced UAS operations, including package delivery companies, often use company-trained repairmen as well as Airframe & Powerplant (A&P) mechanics, when necessary. It is important to recognize that most drone operations, including most package delivery companies, are utilizing simple, small, low-risk drones that do not involve complex systems. Accordingly, most maintenance tasks can be safely performed by trained personnel that are neither certificated repairpersons nor A&P certificated mechanics, which as noted, reduces barriers to entry into this growing workforce, and which facilitates the inclusion of individuals from diverse backgrounds, thereby broadening the pool of qualified candidates. AUVSI encourages the FAA to recognize the low-risk nature of UAS systems and to not simply to default to traditional aviation methods of always requiring certified maintenance personnel. This is not an appropriate risk-based approach, nor does it recognize the unique opportunity to grow the aviation workforce with new individuals.

Wider Economic Impact of Drone Operations
Allowing UAS operations to scale, as the BVLOS rule would allow, has broad positive economic benefits for the United States. Drone operations open new economic activity, and sources for job creation, outside of core aviation jobs. One study of the Dallas-Fort Worth area, where the FAA is allowing for drone delivery operations to occur BVLOS through waivers and exemptions, indicates that drone package delivery can help participating businesses increase annual sales by $26,000 per business or generate roughly $197 million in new economic activity for the Dallas-Fort Worth Metroplex overall.[5]

Advancing the AAM Industry: Workforce Development, Infrastructure Utilization, and Economic Impact
Alongside drones, we have seen the AAM industry design, build, test, and scale novel propulsion systems, battery technology, composites, and flight controls. Electric propulsion is revolutionizing aviation, as jet population did sixty years ago. Advanced avionics will enhance safety by improving situational awareness, enhancing communication, automating complex tasks, and providing better data analysis. Developing the workforce that can meet the growing demands of the AAM industry, prioritizing aviation safety above all else, is a core mission for AUVSI and its member companies.

Many of our AAM member companies' aircraft have flown enough miles to go around the world, and for some companies, more than once. They are demonstrating how AAM operations can stimulate local economies with increased cargo and delivery capacity and enable reliable medical transport services to address urgent patient care. The AAM industry, in particular, can take advantage of underutilized, existing infrastructure and create a point-to-point network for transportation that can unlock access for a diverse set of communities and geographies across the U.S. The AAM industry can leverage existing but underutilized infrastructure at regional airports to establish new routes and services. This revitalization can transform these airports into bustling

[5] https://storage.googleapis.com/wing-static-us/us/Dallas%20Impact%20Report.pdf

hubs of activity, creating direct and indirect job opportunities in operations, maintenance, and support services.

To demonstrate this potential, a 2023 report from California State University studied the economic impact of an Urban Air Mobility (UAM) network covering the city of Long Beach and the greater Los Angeles-Orange County region. The construction of a twenty-vertiport network would generate 2,133 jobs and $174 million in labor income.[6] By introducing new transportation options, AAM operations can stimulate local economies. Enhanced connectivity can attract businesses that rely on efficient transportation of goods and people, thereby increasing regional economic activity. The ability to quickly transport medical supplies, cargo, and passengers can make these areas more attractive to a variety of industries.

To complement efforts to enhance the FAA's technical workforce, it is crucial to attract and retain a competent and capable workforce for the AAM industry. The industry currently faces challenges in filling technically skilled jobs needed to operate, maintain, and manufacture aircraft. This workforce challenge will become more acute as aviation evolves through innovation, requiring a more diverse workforce with broader competencies and new skill sets. We appreciate the leadership shown by the Committee in this area.

Through the FAA's Part 145 program, AAM companies are working to develop a skilled workforce by training and certifying maintenance technicians in specialized procedures. These experts gain holistic experience by rotating through real world operations and eventually become licensed line mechanics working on the company's aircraft in the field. As there are no existing training programs for mechanics on eVTOL aircraft or electric propulsion, companies are creating these programs internally.

The 2018 FAA Reauthorization Act empowered DOT to provide up to $10 million in grants to facilitate workforce development for pilots and maintenance providers. We thank the members of this Committee, and Congress as a whole, for the significant funding provided to date. Furthermore, AUVSI appreciates the modification to the program included in Section 440 of the 2024 Reauthorization which increases the allowable grant funding for a company in a single year from $500,000 to $1 million.

AUVSI believes that the scope and funding for AAM-related workforce programs should be significantly expanded, particularly given the high demand for this funding. Additionally, we believe programs should specifically include manufacturing workers to complement the previous focus on pilots and maintenance personnel.

We also encourage the Subcommittee to provide oversight over implementation of the FAA Reauthorization Act of 2024 provisions that measure results and gather feedback from participants, engage school counselors more directly in aviation workforce efforts, and train teachers on how to start and conduct successful aviation education programs. Furthermore, it is important to track how aviation workforce development program applicants will connect students with jobs or the next step in the education process (e.g., from high school to college or a technical school) to sustain a

[6] https://wisk.aero/wp-content/uploads/2023/10/The-Economic-Impact-of-Establishing-and-Expanding-Urban-Air-Mobility-Operations-in-Southern-California-online-version.pdf

long-term talent pipeline for the industry. Emphasis should be placed on activities that engage, educate, and equip participants to directly feed into the aviation sector, ensuring the next generation of safety-focused aviation professionals.

The FAA has awarded $13.5 million in grants to thirty-two (32) schools across the United States to attract and train future aviation professionals, including pilots and maintenance technicians.[7] These grants are divided into two programs:

1. The Aircraft Pilots Aviation Workforce Development Grants program, providing $4.5 million to 12 schools for developing curriculums to prepare high school students for careers in aviation and related fields.
2. The Aviation Maintenance Technical Workers Workforce Development program, distributing $9 million to 20 schools to address the shortage of maintenance professionals.

One of our member companies received a $1 million grant, authorized at $500,000 per year for two years, under the maintenance program. This grant supports their developing Part 145 Maintenance, Repair, and Operations (MRO) work on eVTOL aircraft and emphasizes their commitment to workforce development. The project aims to establish a new, accessible career path for aviation maintenance technicians. Trainees will begin a paid mechanic apprenticeship immediately after completing the Light Sport Repairman - Maintenance (LSRM) certification program. Upon completing the 30-month paid apprenticeship, trainees will qualify for an Airframe and Powerplant (A&P) certification, paving the way for further employment as certificated aviation maintenance technicians. This program, and others like it being established by other AUVSI members, aims to broaden access to aviation maintenance technician careers, particularly for women, people of color, veterans, and underserved populations.

Other grant recipients include universities, high schools, and technical colleges, such as Purdue University, Kent State University, and notably Louisiana State University in the Subcommittee Chairman's state. The grants offer flexibility for establishing educational programs, scholarships, apprenticeships, outreach initiatives, and support in economically disadvantaged areas. This initiative addresses the aviation industry's current challenges and technological advancements, aiming to ensure its long-term sustainability by fostering innovation and developing a skilled workforce.

Leveraging Automation, AI, and Autonomy for Enhanced Training and Operational Efficiency in Aviation

AUVSI member companies are focused on making the most out of what technological evolutions can provide to the development of human skills. To this effect, an adequate and skilled use of automation, AI, and autonomy are undeniably tools to develop advance flight safety and operational efficiency and to support the training of the highly sought after workforce in the aviation industry. Autonomy is becoming a tool to provide support to crew members in situations where human factors reportedly impacted flight safety. This idea of complementing human skills can naturally be transferred to enhance the training of human crews and be transferred to other essential domains of the aviation industry such as manufacturing and maintenance.

[7] https://www.faa.gov/about/office_org/headquarters_offices/ang/grants/awd/awards

Automation and autonomy can contribute as well to alleviating the pilot shortage by performing certain tasks where human factors increasingly contribute to the deterioration of flight safety. Drones can, for instance, serve in niche domains to perform very specific and repetitive tasks such as delivering parcels, medical supplies, and organs on regular, shorter routes. Drones and AAM aircraft can deliver medical supplies, parts, and eventually people, to offshore oil rigs and remote islands or rural areas. Further development and regulation of these technologies will not only spark increased interest in the aviation industry but will provide solutions to alleviate the pilot and skilled workers shortage by providing tools to the workforce that will valorize their expertise, enhance their safety, and thus encourage them to a continuous contribution and retention in the aviation workforce.

Growing the Future Workforce and Promoting Inclusion in UAS and AAM: Democratizing Aviation for Underrepresented Groups

As this Subcommittee knows and appreciates, as demonstrated by Section 440 of the FAA Reauthorization of 2024, the aviation industry is currently facing significant workforce challenges, both in the immediate and long-term future. Accordingly, AUVSI member companies are taking extraordinary proactive measures to recruit, retain, and engage aviation talent. Our members are engaged in multiple partnerships with education institutes at all levels – starting as early as elementary school with drone academies, competitions, and clubs to build interest and excitement in advanced aviation careers. Drone and AAM companies are joining forces with high schools, community colleges, vocational schools, and four-year colleges across the U.S. to construct quality training, internship and apprenticeship programs, mentorship programs, scholarships, and more to get the future workforce real world training, experience, and mentorship.

Both because it is the right thing to do, and because the pool of available workforce must grow to meet current and future demands, AUVSI members are taking active steps to open aviation career opportunities to a broader workforce, including underserved communities, including workers with physical disabilities, those without advanced technical degrees, women, minorities, veterans, and rural workers who do not live near economic centers of legacy aviation. AUVSI appreciates that Congress agrees with this approach through its policy guidance in Section 440.

As a veteran-led organization[8], AUVSI fully supports America's service veterans getting more involved in UAS and AAM professions. Multiple AUVSI member companies have scholarship programs to provide veterans job opportunities in advanced aviation, including as pilots, mechanics, and in manufacturing.

AUVSI has also been involved in discussions on the best path for transitioning veterans who flew UAS in the U.S. military into operating aircraft, including eVTOLs, in commercial service. As it stands, credit for hours flown while on active duty do not transfer equally or consistently, and a deeper discussion is needed to unlock this potentially knowledgeable and skilled group for these workforce opportunities. Section 425 of FAA Reauthorization Act of 2024 calls for the establishment of a Joint Aviation Employment Working Group to evaluate and compare eligibility, training, and experience requirements for transitioning military aviation professionals to the

[8] The Chair, Vice Chair, and 50% of the members of the AUVSI Board of Directors are U.S. military veterans, and the AUVSI President & CEO presently serves in the U.S. Navy Reserve.

civilian workforce. AUVSI encourages this Working Group to consider military drone pilots, particularly of large UAS (Group 3-5), as part of this evaluation.

AUVSI applauds the inclusion of Section 403 in the FAA Reauthorization Act of 2024 which establishes the Bessie Coleman Women in Aviation Advisory Committee. The provision creates the Committee and directs it to advise DOT and the FAA on matters and policies related to the recruitment, retention, employment, education, training, career advancement, and well-being, of women in the aviation industry and in aviation-focused Federal civil service positions. Currently, less than 10% of licensed pilots are women and less than 3% are airline captains. The Committee created in the legislation satisfies the Women in Aviation Advisory Board's chief recommendation to focus on bringing more women into aviation careers and the entire industry.

Numerous AUVSI member companies have partnerships with organizations like the Girl Scouts of the USA, the Academy of Model Aeronautics, girls' academies, and other organizations to showcase opportunities in advanced aviation for women. AUVSI member companies work to introduce students to drone technology, from design and manufacturing to practical applications in public safety, energy utilities, and various sectors. These programs not only inspire young minds to pursue careers in aviation and technology but also provide hands-on experience and mentorship.

UAS and AAM industry jobs are highly accessible for people with disabilities, who may otherwise be precluded from pursuing professional opportunities in the more traditional aviation sector (i.e., becoming a commercial airline pilot). People with physical disabilities can obtain a remote pilot's license under the FAA's Part 107 rules, which govern the commercial use of drones. The licensing process for remote pilots focuses on knowledge and skills that do not require physical mobility, making it inclusive for those with disabilities. AUVSI members in the drone industry have made it possible to adapt control systems for drones to suit various physical limitations. Customized interfaces and assistive devices can enable individuals with disabilities to effectively operate drones and related equipment. Further, the UAS and AAM industries offer a wide range of job roles beyond piloting, such as data analysis, mission planning, maintenance, and software development. Many of these roles can be performed from accessible work environments, using standard or adapted computer equipment.

Once hired, retention of employees is also a top priority for AUVSI members. Accordingly, AUVSI members are investing in their employees with additional training and upskilling, which is teaching current employees new skills or enhancing their existing skills to keep up with changing job requirements and technological advancements.

Manufacturing Opportunities

The U.S. leads in commercial, business, and general aviation manufacturing and has a total aviation workforce of more than half a million people.[9] But there is one segment of the aviation industry that the United States does not lead: domestic drone manufacturing. While the U.S. has been content to maintain leadership of traditional segments in the aviation industry, the People's Republic of China (PRC) understood the tremendous economic and national security implications of uncrewed aviation and took aggressive measures to dominate the global UAS manufacturing and technology market.

[9] https://datausa.io/profile/naics/aircraft-parts-manufacturing

AUVSI believes that we must move away from being reliant on PRC companies and intellectual property for our drones, as the U.S. is doing with other critical technologies. A reasonable, common-sense transition is required to ensure that these critical lifesaving tools are available to public safety, while at the same time we move rapidly to diversify manufacturing and technology supply lines outside of China. AUVSI is advocating for a multi-pronged effort to support policies that would encourage investment, innovation, and ultimately scaled production of drone supply chains within the United States and its allied partners to lead us to a more balanced level of self-sustainment.

This is important because multiple U.S. government agencies – including the Departments of Defense[10], Treasury[11], Commerce[12], Homeland Security[13], and the FBI[14] – have made it quite clear that the continued reliance on PRC drones is a risk to national security. Nevertheless, despite a shift away from PRC-drones by some public safety departments, approximately 90% of public safety agencies nationwide with drone programs are still using at least some Chinese drones as part of their fleets, despite the U.S. government's warnings about the security threats these drones pose.[15]

Our objective is simple: To support a strong and competitive industrial base and to build global leadership in this critical industry that is relied on by so many agencies and enterprise organizations, including public safety.

Grant programs for public safety, like the proposed Drones for First Responders (DFR) Act, H.R. 8416, would create, will ensure public safety has the tools they need to do their jobs, and demand is generated for platforms produced outside the PRC, which will kickstart the flywheel for innovators and manufacturers. This is vital to reduce risk, and to build the industrial base that is sorely lacking – for all users, including public safety.

Looking to the AAM industry, Congress made it clear in Section 952 of the FAA Reauthorization Act of 2024 that it wants the U.S. to be the world leader in AAM and the industry is moving forward rapidly, and safely, to achieve this goal. As AAM moves from the testing phases into offering commercial services for both cargo carrying and passenger travel, multiple companies are working to open high-rate production facilities. In October 2023, an AUVSI member company opened a production facility at an international airport that local officials expect to spur more trade schools in the area to feed the need for trained workers to fill the hundreds of jobs the company expects to create.[16] Additionally, another AUVSI member company recently acquired a facility to support their initial manufacturing with plans to invest up to $500 million, create up to 2,000 high-quality clean manufacturing jobs, and in a facility capable of producing up to 500 eVTOL aircraft per year.[17] A third AUVSI member company is on track to complete their initial phase

[10] https://www.defense.gov/News/Releases/Release/Article/2706082/department-statement-on-dji-systems/
[11] https://home.treasury.gov/news/press-releases/jy0538
[12] https://www.federalregister.gov/documents/2020/12/22/2020-28031/addition-of-entities-to-the-entity-list-revision-of-entry-on-the-entity-list-and-removal-of-entities
[13] https://www.cisa.gov/resources-tools/resources/cybersecurity-guidance-chinese-manufactured-uas
[14] Ibid
[15] Airborne International Response Team, 2024 Public Safety UAS Survey, Initial Analysis for Public Release, 11 May 2024
[16] https://www.beta.team/timeline/
[17] https://www.jobyaviation.com/news/joby-acquires-facility-ohio/

manufacturing facility by the end of the summer with a planned capacity of up to 650 eVTOL aircraft per year and a potential phased increase to over 2,000 aircraft per year.[18]

The U.S. has long been the world leader in aviation manufacturing and leadership. It is vital that the policy and regulatory frameworks being developed today enable U.S. leadership to continue in the advanced aviation segments of the industry, including drones, eVTOL, and other AAM aircraft.

Standard Occupational Classification Codes

The 2018 Standard Occupational Classification (SOC) system is a federal statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into one of 867 detailed occupations according to their occupational definition. These codes are critical for understanding labor market trends, guiding education, and training programs, and informing workforce policies. As the advanced aviation industry evolves rapidly, the lack of specific SOC codes for various occupations within the drone and AAM sectors is another barrier that presents considerable challenges for workforce development, policy-making, and economic planning.

These codes also impact educational planning and funding at the state and local level. High School, Technical, and College programs focus on growing job categories, and it is important that these new functions are effectively captured to spur curriculum development, faculty focus, and degree programs.

Challenges Posed by the Lack of Specific SOC Codes:

1. **Underestimating Growth & Impact** The current segmentation of uncrewed technologies occupations within general industry statistics lacks specific reference to the uncrewed industry, resulting in an underestimation of its growth and impact. By updating the SOC codes to include the unique job roles within this field, the Bureau of Labor Statistics (BLS) will capture accurate data on the industry's economic contribution, employment trends, and overall significance. This gap hinders the ability of policymakers and industry leaders to make informed decisions based on reliable labor market data. As a result, efforts to address skills gaps, training needs, and workforce shortages are currently hampered.

2. **Educational and Training Program Advancements** Universities and technical colleges rely on statistical data to justify investments in educational programs by aligning their programs with workforce demands and illustrating employability. Updated SOC codes related to the uncrewed technologies industry will enable universities to market their programs to students by displaying salary levels and industry growth. This alignment ensures that educational offerings remain responsive to the industry's needs and ensures the success of educational programs in the field.

[18] https://news.archer.com/archer-closes-previously-announced-financing-and-development-agreements-to-complete-worlds-highest-volume-evtol-aircraft-manufacturing-facility

3. **Deterrence of Funding** SOC codes are essential tools for economic planning and the development of workforce policies. Without accurate occupational classifications, it is difficult to allocate resources effectively, design targeted workforce development initiatives, and measure the economic impact of the drone and AAM industries. This lack of precise data can result in inefficient resource allocation and at times lock this industry out of potential funding opportunities such as Career and Professional Education Funding Programs and Grants.

AUVSI, in partnership with industry, government and academic partners have identified SOC codes that we recommend being added for the next SOC update, which heavily relies on industry and public input. The next opportunity for submissions is upon us now, and AUVSI is working to submit input that will address the industry gaps. The next opportunity to begin the process to add SOC codes will be in 2033, as SOC codes are only updated once every ten years.

Conclusion

To ensure the continued growth and safety of the aviation industry, we must invest in a diverse, skilled, and adaptable workforce. This includes expanding funding, developing innovative training programs, and supporting accessibility across the board. Further, the forthcoming BVLOS rulemaking for drones, and the Powered-Lift SFAR eVTOL aircraft, are required for the U.S. to remain the world leader in aviation and aviation safety and to build the workforce of the future.

Our industry's potential hinges on the strategic actions we take today, from legislative support to executive branch staffing and community engagement. By fostering a robust and dynamic workforce, we will not only meet the current demands but also pave the way for future advancements in aviation safety and technology.

AUVSI appreciates the Committee's leadership in these efforts and stands ready to collaborate in building a strong and resilient future for aviation.