



**WRITTEN TESTIMONY OF LISA ELLMAN,
EXECUTIVE DIRECTOR OF THE COMMERCIAL DRONE ALLIANCE,
BEFORE THE SENATE SUBCOMMITTEE ON
AVIATION SAFETY, OPERATIONS AND INNOVATION**

September 28, 2022
Committee Hearing Room, Russell 253

Chairwoman Sinema, Ranking Member Cruz, and other members of the Subcommittee on Aviation Safety, Operations and Innovation:

Thank you for the opportunity to share my thoughts with you at this important hearing today on how we can promote aviation innovation safely, for the benefit of the American public. My name is Lisa Ellman, and I am the Executive Director of the Commercial Drone Alliance (CDA) and Chair of the Uncrewed Aircraft Systems (UAS, or Drone) Practice at the global law firm Hogan Lovells. I am honored to provide remarks on behalf of the CDA and help inform your work on the upcoming Federal Aviation Administration (FAA) Reauthorization and integrating new entrants into the National Airspace System (NAS).

The CDA is an independent non-profit organization made up of leaders in the commercial drone and advanced air mobility industries. Our Board is comprised of Wing, Skydio, Zipline, NUAIR, Choctaw Nation, Amazon Prime Air, Aloft, Percepto, SkySafe, Dedrone, Florida Power & Light, American Robotics, and Southern Company. The CDA works with all levels of government to collaborate on policies for industry growth and the safe and secure integration of UAS into the NAS. The CDA also seeks to educate the public on the safe and responsible use of commercial drones to achieve economic benefits and humanitarian gains.¹

¹ The CDA brings together commercial drone end-users, manufacturers, service providers, advanced air mobility companies, drone security companies, and vertical markets including oil and gas, precision agriculture, construction, security, communications technology, infrastructure, newsgathering, filmmaking, and more. Learn more about the CDA at www.commercialdronealliance.org.

Commercial drones offer significant life-saving, economic and societal benefits—from creating jobs and enhancing worker safety, to protecting the environment and revolutionizing inspections of critical infrastructure, to expanding equitable and efficient access to medicines, to generating tremendous economic value and facilitating commercial deliveries, to enhancing public safety and fighting wildfires. Additional details about these benefits are included in Section IV below.

There are exciting efforts underway around the country to bring the benefits of UAS to the American people. For example:

- In Texas, BNSF Railway is working with Skydio to inspect our nation’s railroads while Wing and Amazon Prime Air are bringing the benefits of commercial drone deliveries to the Dallas region and College Station community, respectively.
- In Arizona, the Navajo Nation is exploring using drones to deliver medicine and critical supplies to rural homes.
- In Kansas, the state Department of Transportation is working to demonstrate the capabilities of drones for infrastructure inspections and disaster response.
- The Choctaw Nation of Oklahoma is using drone technology to bridge the inequities between rural and urban communities, and is working with the University of North Texas to plan a next generation Advanced Regional Mobility Corridor to provide new opportunities and improve the quality of life for rural tribal communities.
- In New York, NUAIR is seeking to enable advanced research and development along a unique fifty mile corridor to enable our nation’s continued leadership in aviation.

Although these and other efforts are promising, the vast benefits of UAS cannot yet be truly realized here in the United States. That is because regulatory paralysis and undue regulatory burdens have prevented scalable UAS operations and limited the integration of UAS into the NAS.

Congress led the way in 2012 with a legislative mandate for UAS integration. But in the decade since, that mandate has remained unfulfilled. Despite the best efforts of the FAA’s UAS Integration Office and other supporters, the FAA continues to view civil UAS integration into the NAS as, in its own words, a “long road ahead” and a “significant challenge.”² The National Academy of Sciences, the Department of Transportation’s Office of the Inspector General, and the Government Accountability Office have all criticized the FAA’s progress in UAS integration,

² FAA, Integration of Civil Unmanned Aircraft Systems (UAS) in the National Airspace System (NAS) Roadmap, 3rd Edition (2020) at 4, 5.

describing it as “indefensible,”³ and have highlighted how the UAS industry continues to be held back by the application of incongruous approaches designed for crewed aircraft.⁴ This mismatch results in disjointed regulation that suppresses the industry’s progress by making it too slow and too difficult to secure the necessary approvals.

In the meantime, many countries around the world are progressing ahead of the United States in achieving scalable UAS operations and bringing the economic and societal benefits to their citizens and communities. As a result, the United States is at significant risk of losing its global leadership in this new era of aviation.

Bold and innovative congressional leadership is therefore necessary once again to spur progress for scalable UAS operations and their integration into the NAS for the benefit of the American public. While there is much that can be done in the interim to advance policy and enable scaled commercial operations, the FAA Reauthorization provides an excellent opportunity for Congress to demonstrate that leadership. The CDA urges the Congress to take decisive action to drive the full integration of commercial drones into the NAS. Congress should not allow the budding American UAS industry to continue languishing in a regulatory limbo that prevents the industry from scaling and deprives our country of massive economic and societal benefits.

I. THE NEED FOR DECISIVE CONGRESSIONAL ACTION

The use of zero-emission UAS to save lives, provide rural medical access, and maintain our nation’s aging infrastructure has been a bipartisan policy priority since 2012. Policy has lagged behind technology, and integration efforts have lagged behind the pace of innovation in America. For example, drone operations continue to be almost exclusively limited to line of sight, meaning that drone operators must follow every drone flight with a human on the ground watching the aircraft at all times. Approvals to fly beyond visual line of sight (BVLOS) are limited and rare.

³ National Academies of Sciences, Engineering, and Medicine, 2018. *Assessing the Risks of Integrating Unmanned Aircraft Systems (UAS) into the National Airspace System*. Washington, DC: The National Academies Press. Found at <https://doi.org/10.17226/25143>; GAO, *FAA Could Strengthen Its Implementation of a Drone Traffic Management System by Improving Communication and Measuring Performance* (2021); DOT OIG, *Opportunities Exist for FAA To Strengthen Its Review and Oversight Processes for Unmanned Aircraft System Waivers* (2018). *See also* Letter from Chair of House Committee on Transportation and Infrastructure Peter DeFazio (D-OR), Ranking Member Sam Graves (R-MO), Chair of the Subcommittee on Aviation Rick Larsen (D-WA), and Subcommittee Ranking Member Garret Graves (R-LA) to Comptroller General Gene Dodaro, Feb. 24, 2021 (noting concern that “[T]he FAA faces a range of challenges to successful and timely integration”) (found at <https://transportation.house.gov/news/press-releases/committee-leaders-call-on-gao-to-review-status-of-faas-efforts-to-integrate-drones-into-the-nations-airspace>).

⁴ As the GAO noted, one test site’s waiver request took three years for the FAA to approve. *See* GAO, *FAA Could Better Leverage Test Site Program to Advance Drone Integration* (2020) at 24. Similarly, it took one CDA member company five years of sustained R&D and interactions with the FAA to receive an experimental approval to operate on three rural sites. From the time of formal application, it took two years to receive this limited approval.

Just as crewed aviation operations would be hamstrung if airplanes were unable to leave sight of the control tower, such restrictions severely limit the utility of UAS. Notwithstanding the valiant efforts of certain staff at the FAA, progress toward safe and scalable UAS operations integrated into the NAS has been slow and halting, and America is being left behind.

Congressional action is necessary to secure U.S. leadership in a new era of aviation. The United States dominated the first century of flight, from Kitty Hawk to the Moon and beyond, to the great benefit of our society and economy. But U.S. leadership in the second century of flight – defined not by crewed operations, but by uncrewed and, increasingly, autonomy-enabled operations – is in jeopardy. Other nations are working hard to establish leading roles in a new era of flight. Democratic peer nations – such as Australia, Canada, Japan, the United Kingdom and the European Union – have taken significant steps to enable advanced drone operations and capture the societal and national security benefits associated with aviation leadership. Many U.S. companies have invested heavily to pursue opportunities in those markets, even if they would prefer to invest here at home. This trend will only accelerate so long as there remains skepticism regarding the U.S. Government’s ability to deliver on its promise to integrate UAS into the NAS and enable scalable UAS operations. At the same time, competitors like China have invested extraordinary resources in an attempt to surpass the United States.

The White House has recognized the benefits of UAS, as evidenced by its August 2022 Summit on advanced air mobility. While that attention is welcomed, Congress needs to ensure that it translates to concrete action. Without strong and timely congressional action, U.S. leadership in aviation hangs in the balance, as does the future of the commercial drone industry.

II. SUMMARY OF CDA PRIORITIES FOR THE 2023 FAA REAUTHORIZATION

The CDA firmly believes that Congress can help ensure American leadership in the next century of aviation, relieve the regulatory paralysis and undue burdens that have so far constrained UAS operations in the United States, and reinvigorate efforts toward scalable UAS operations and integration into the NAS. To achieve those objectives, the CDA strongly urges Congress to take the following decisive actions as part of the 2023 FAA Reauthorization.

- A. Policy and Resourcing.** Congress should reorganize the FAA to better align responsibility for UAS integration with authority over UAS approvals, which is a critical weakness in the FAA’s current UAS framework. In addition, Congress should require the FAA to consider the positive aggregate safety gains and environmental impact of UAS use, as compared to other transportation options, in conducting safety and environmental analyses.

- B. Enabling Expanded UAS Operations and Promoting Safety and U.S. Competitiveness.** Congress should direct the FAA to issue a notice of proposed rulemaking enabling BVLOS operations in alignment with the recommendations of the BVLOS Aviation Rulemaking Committee (BVLOS ARC) within 180 days of enactment.
- C. Helping America Win the 21st Century by Enabling Research and Development at Home.** Congress should streamline research and development processes to enable test sites and public-private partnerships to move UAS integration forward and promote U.S. leadership in aviation.
- D. Supporting UAS Manufacturing Capabilities and the Supply Chain System.** Congress should take action to support the growth of UAS/AAM manufacturing in the United States. Among other measures, Congress should enhance and expand the successful Blue UAS program, and require a report on the extent to which DOD and other agencies can replicate the Army’s experience of rapidly procuring UAS systems in large numbers. The best way to ensure U.S. leadership in the second century of aviation is to build the future in the United States, creating domestic jobs and boosting U.S. competitiveness.
- E. Delivering on Infrastructure Investment.** Congress should promote infrastructure resilience, including by appropriating funds to the FAA and by requiring the DOT and the FAA to promote the use of drones for infrastructure applications, as well as working with state, local, and tribal governments to advance infrastructure inspection operations applications at scale. In particular, Congress should enact the DIIG Act, which recently passed the House. We applaud Senators Rosen, Blumenthal, and Bozeman for introducing the DIIG Act in the Senate and urge its swift passage.

III. DISCUSSION OF SPECIFIC CDA PROPOSALS

A. Policy And Resourcing

Aligning UAS Responsibilities and Authorities. Congress should reorganize the FAA to better align responsibility for UAS integration with authority over UAS approvals, which is a critical weakness in the FAA’s current UAS framework. Today, the FAA’s UAS Integration Office has no authority to actually integrate UAS. Instead, responsibility for UAS integration is diffused and splintered across many different offices, each with its own existing set of traditional aviation responsibilities and mandates. To address this systematic misalignment, Congress should:

- Create a position of Associate Administrator to oversee UAS integration and thereby empower the FAA's UAS Integration Office with the resources and authorities to fulfill the mandate of UAS integration into the NAS. This office should have the dual mandate of ensuring the safe integration of UAS into the NAS and encouraging and promoting a commercially viable UAS industry and American leadership in UAS.
- Provide the Associate Administrator with the authority to approve UAS rulemaking, certification and operational approvals for specific categories of UAS that:
 - Have 25k ft/lbs. or less of transferred kinetic energy, consistent with the recommendations of the BVLOS ARC, and
 - Operate at an altitude of 400 feet above ground level (AGL) or less and at least three miles from airports.
- Require the FAA to consider the positive aggregate safety gains and environmental impact of UAS use on other modes of transportation and methods of inspection/operation in conducting safety and environmental analyses.

B. *Enabling Expanded UAS Operations And Promoting Safety And U.S. Competitiveness*

Implement BVLOS Rulemaking Expeditiously. Broadly enabling UAS flights BVLOS in a safe and secure manner is critical to unlocking the aggregate safety, security, equity, and sustainability benefits of using drones for many commercial and public safety tasks. Congress should direct the FAA to issue a notice of proposed rulemaking enabling BVLOS operations in alignment with the recommendations of the BVLOS ARC within 180 days of enactment. In accordance with BVLOS ARC recommendations, Congress should include language in the 2023 FAA Reauthorization that:

- Adopts an Acceptable Level of Risk: Require the FAA to adopt a quantified acceptable level of risk for UAS operations that is modeled upon and consistent with existing accepted general aviation risks.
- Encourages and Incentivizes Equipage: Encourage and incentivize the very small number of crewed aircraft that routinely operate below 500 feet AGL to equip with Automatic Dependent Surveillance-Broadcast (ADS-B) or TABS technology to provide conspicuity, enhance the overall safety of the NAS, and ensure that UAS can avoid them;

- Enables New Technology Solutions: Direct the FAA to explore the authorization and use of non-technical standard order (TSO) devices where risk analysis deems them to be sufficient, such as for installation and use in non-certified aircraft.
- Establishes a Risk-Based Framework for UAS Airworthiness: Direct the FAA to adopt industry-based standardized airworthiness compliance standards, modeled after the FAA’s light-sport aircraft certification process, to provide manufacturers with clear guidance on how to obtain FAA airworthiness approval. Consistent with the recommendations of the BVLOS ARC, compliance should be declared by U.S. manufacturers, with the FAA retaining ultimate oversight over the safety of each submission. In addition, Congress should require the FAA to work with the European Union Aviation Safety Agency (EASA) to harmonize UAS/Vertical Take-Off and Landing (VTOL) aircraft certification criteria and report back to Congress on progress.
- Implement Tailored and Risk-Appropriate Qualification Criteria for UAS Pilots and Certificated Operators: Require the FAA to enact streamlined, risk-appropriate certification criteria tailored specifically for commercial drone operators and air carriers. These criteria should recognize the substantial improvements in automation, safety and risk-reduction of drone operations when compared to traditional aviation. For UAS BVLOS pilots, direct the FAA to create and implement knowledge-based crew qualification/training standards to add a BVLOS rating for UAS pilots.
- Enables Shielded Operations: Direct FAA to immediately implement BVLOS ARC recommendations that do not require rulemaking, including enabling low-altitude “shielded” operations that permit drones to fly above and within very close proximity to structures and terrain where crewed aircraft are unlikely to operate. Shielded operations provide high levels of value—enabling more efficient inspection of critical infrastructure like long linear infrastructure and power plants, in addition to public safety missions such as search and rescue—with low levels of risk, given the low altitude and close proximity to structures and the ground. Other countries, including the European Union and Australia, have already established frameworks to enable shielded operations at scale. Congress should direct the FAA to issue guidance, such as standard scenarios or pre-defined risk assessments common with other civil aviation authorities, providing accelerated pathways to enable low-altitude operations under the current rules, within 90 days of enactment. That guidance can and should be issued before a rulemaking on BVLOS is issued, as noted by the BVLOS ARC.
- Advances Network Remote Identification: Require that the FAA accept internet-based network identification as an acceptable means of compliance with rules requiring UAS to be equipped with technology to allow for remote identification.

Improve the Airworthiness Process for UAS. Congress should direct the DOT and the FAA to improve and expedite the airworthiness approval process for UAS technologies. For several years, the FAA has tried and failed to adapt the existing and burdensome airworthiness process to UAS. The FAA recently issued a UAS standard airworthiness certificate to Matternet, and that was a positive step forward.⁵ Now that the FAA has done this successfully once, the agency should expeditiously process additional approvals, and incorporate lessons learned and streamline and improve the process for the agency and the broader industry. UAS are the safest form of aviation today in terms of serious injuries or fatalities. Improving these critical processes will promote UAS innovation while ensuring that technological, safety and security advances are implemented efficiently. Congress should also provide adequate resources to implement advanced aviation certification programs. In particular, Congress should provide additional funding for FAA’s “Operations” appropriation, specifically designated for the Aircraft Certification Service’s review and certification of UAS.

To facilitate the timely issuance of airworthiness approvals for small UAS in the near-term, Congress should exempt low-risk small UAS from noise certification requirements. Under the current regulatory process, the FAA may only issue an original type certificate for an aircraft after the FAA determines that the aircraft meets prescribed noise standards. There are no prescribed noise standards for small UAS, which means the FAA needs to undertake a lengthy (years-long) and resource-intensive rulemaking process for every individual small UAS going through the type certification process to establish custom noise standards on a case-by-case basis. Rather than requiring the FAA to establish unique noise standards for every single different type of small UAS going through the certification process, Congress should direct the FAA to gather data necessary to establish generally applicable noise standards for small UAS. This represents a straight-forward and immediate opportunity to streamline and modernize our regulatory system in a manner that can yield significant short-term gains for society. For the longer term, Congress should require the FAA to implement the recommendations of the BVLOS ARC.

Reauthorize and Expand Section 44807. To cover the near-term gap between current authorizations and a streamlined airworthiness approval process, Congress should immediately extend the timeline for Section 44807 authorities. Such an effort would be even more impactful if Congress opted to also expand and re-imagine this authority. In particular, the FAA has interpreted Section 44807 very narrowly, contrary to Congress’s original intent to provide a pathway to enable advanced operations that can be conducted safely, even when those operations do not fit neatly within an existing rule. By reinforcing the original intent to implement this rule, Congress will provide a pathway to advance innovation while ensuring safety and address those interpretations that have to date substantially limited the utility of this provision. Finally, until the FAA publishes

⁵<https://www.prnewswire.com/news-releases/matternet-m2-drone-delivery-system-first-to-achieve-faa-type-certification-301619827.html>.

a BVLOS rule, Congress should require the FAA to a) develop and publish within 180 days of enactment clear guidelines for commercial BVLOS operations and b) to use the 44807 special authority to enable such operations.

Support UAS Traffic Management and LAANC Modernization. Congress has recognized the importance of Uncrewed Traffic Management (UTM), including most recently in Section 342 of the 2018 FAA Modernization Act. UTM is important for the safe and secure expansion of UAS operations and integration of UAS into the NAS – both of which are congressional objectives. Without UTM, the countless benefits of expanded, scalable, and complex UAS operations (e.g., long-range BVLOS flights to deliver packages and medical supplies) for Americans and American businesses may be more difficult to reach. As a precursor to a UTM system, Congress should direct the FAA to permit approved UAS Service Suppliers (USSs) to utilize application program interfaces (APIs) and deep linking with the software products of third parties. This modernization of the Low Altitude Authorization and Notification Capability (LAANC) system will enhance safety by increasing compliance among airspace users, and avoid a chilling effect on innovation in the U.S.

Enable Expanded Use of Drones for First Responders. Congress should direct the FAA to establish a streamlined approval process for “Public Safety Drone as a First Responder” BVLOS Waivers. Such waivers allow public safety agencies and First Responders to have “eyes on the scene” in a timely manner when emergency strikes. For this reason, drones serve as one of the best de-escalation tools for police departments and have been demonstrated to save lives and protect both First Responders and the public.

Promote Pathways for Increasingly Automated and Autonomous Operations Safely. Maintaining U.S. global leadership in aviation hinges on our collective ability to design and deploy safe, effective automated and autonomous systems in a way that protects the safety of the NAS. In order to lead the way, the U.S. must create streamlined pathways for increasingly autonomous operations – first for smaller drones inspecting infrastructure or delivering packages in relatively close proximity to the ground, and then for larger vehicles delivering cargo and transporting people at higher altitudes and over greater distances. To achieve that objective, Congress should direct the DOT and the FAA to develop and report to Congress within 270 days of enactment on pathways to enable UAS and advanced air mobility (AAM) operations with increasing levels of automation. As discussed below, Congress should also codify and expand the FAA’s BEYOND program, tasking it to test safe and scalable frameworks for automated and ultimately autonomous operations, among other forms of operations.

Modernize the DOT Hazardous Materials Framework. The existing DOT hazardous materials (HAZMAT) framework was designed for large, crewed, commercial operations at high altitudes. Congress should direct the DOT to modernize the existing framework by promulgating

rules tailored to the movement of HAZMAT by UAS. These regulations should be more aligned with the HAZMAT regulations for ground transportation than those for air transportation given UAS delivery will occur at low altitudes.

Streamline Operational Approval Processes. As described below, UAS can offer environmental benefits and emissions reductions far beyond any other transportation mode yet developed. Unfortunately, to date, environmental review processes related to UAS have lacked resourcing and regulatory clarity, hindering industry’s ability to scale and, paradoxically, impeding the realization of environmental benefits. To aid the scaling of new technologies, Congress should direct the FAA to develop National Environmental Policy Act (NEPA) Implementation Procedures for UAS operational approvals, including programmatic approaches to enable scaled operations where operating parameters are similar. Clear, right-sized procedures will help both communities and operators assess the potential environmental resource impacts within different operating contexts (whether a limited scale operation within a small community or a broader network of drone delivery or other AAM services across a region or operations over industrial sites closed to the public with high levels of ambient noise). Congress should also consider what additional staffing and/or resources are needed to move processes forward in a streamlined way.

Modernize DOT Economic Authority Requirements. Congress should reform aviation citizenship laws applicable to UAS operators to minimize barriers to entry and promote investment in U.S. companies. Laws defining aviation citizenship were defined for a different industry and different era. Due to how aviation citizenship laws are currently drafted, certain BVLOS operators (air carriers) will require “economic” authority from the DOT to operate, including a requirement that the operator meet a narrowly tailored definition of “citizen of the United States.” Foreign civil aircraft operators conducting operations other than air carrier operations in the U.S. will also need DOT authorization. The application of these aviation citizenship laws to the UAS industry often leads to absurd results where American companies are not able to prove U.S. citizenship. Aviation citizenship laws should be updated to facilitate, rather than hinder, this emerging industry in the modern era.

C. *Helping America Win The 21st Century By Enabling Research And Development At Home*

Empowering UAS Test Sites to Promote R&D. UAS R&D activities help support the safe and efficient integration of UAS into the NAS. However, current R&D processes do not enable broad testing in the U.S. in a timely way. The FAA-designated UAS Test Sites were established for the purpose of facilitating valuable UAS R&D necessary to fully integrate UAS into the NAS, but achieving this objective has been limited by a recent change in the FAA’s interpretation of R&D activities that qualify for public aircraft operation (PAO) status. While FAA-designated UAS Test Sites are most acutely affected by this change in the ability to conduct

UAS research and development as PAO, the change also affects other public entities, including, but not limited to, public agencies and public universities that conduct crucial UAS research and development activities. To assist the FAA in carrying out the objectives of the UAS Test Site program, Congress should clarify that UAS operated for R&D purposes at UAS Test Sites meet the definition of “public aircraft” in 49 U.S.C. § 40102(a)(41) and qualify for PAO status under 49 U.S.C. § 40125. Additionally, Congress should direct the FAA to encourage the continued use and expansion of technology innovation zones and support communities that are eager to embrace new technologies such as UAS. Congress also should renew or extend the test site mandate from the FAA Modernization and Reform Act of 2012. And Congress should request a timeline for immediate implementation of 49 U.S.C. § 44803.

Leveraging Public-Private Partnerships to Accelerate Advanced Operations. The CDA supports strong federal preemption to enhance safety and avoid a patchwork quilt of regulations. However, the CDA also believes that states, localities and tribes play an important role in the UAS ecosystem. CDA therefore urges Congress to leverage and expand existing public-private partnerships to advance safe and effective advanced drone operations. In order to remain competitive in a tight global marketplace, the U.S. must have accelerated pathways to conduct advanced operations. The BEYOND program, and the Integration Pilot Program (IPP) before it, were designed to play that critical role. Congress earlier codified and funded the IPP. In the next FAA Reauthorization, Congress should rebrand, codify, and expand the BEYOND program for five years to include the full spectrum of uncrewed aircraft. This expanded program could include collecting data that would accelerate rulemakings, developing model policy, and requiring regulatory enabling actions to flow from these partnerships. Congress can bring together UAS Test Sites and BEYOND sites under a common umbrella to support safe scaling of emerging aviation technologies. In addition to enabling the FAA and industry to conduct and learn from advanced operations in the real world, the program enables state, local, Tribal, and territorial governments to play an important role, working in partnership with the federal government and industry to use technology to solve pressing local needs. In its next iteration, the re-imagined BEYOND program should focus on the central challenge confronting the U.S. and the industry: enabling and refining operational and regulatory constructs for highly automated and autonomous UAS operations.

D. Supporting UAS Manufacturing Capabilities And The Supply Chain System

Congress should take action to support the growth of UAS/AAM manufacturing in the United States. The best way to ensure U.S. leadership in the second century of aviation is to build the future in the United States, creating domestic jobs and boosting U.S. competitiveness. Among other measures, Congress should enhance and expand the successful Blue UAS program.

Enhance and Expand the Blue UAS Program. The conflict in Ukraine has demonstrated the strategic national security importance of small civilian drone technology. In the U.S., the Defense Innovation Unit’s Blue UAS program has been a valuable tool designed to identify, test, and publish a consolidated list of UAS suitable for use by the Department of Defense. Given the importance of supporting the growth of a strong and competitive domestic manufacturing base, and the Congressional requirements outlined in Section 848 of the FY20 NDAA, the Blue UAS list must remain current, relevant, and inclusive. The Blue UAS list provides a platform on which to expand the use of drone technology by the federal government.

The Army’s Short Range Reconnaissance (SRR) program helped to generate the initial Blue UAS list. The SRR program provides a model of efficient and dynamic procurement and demonstrates how the list can benefit government end users and industry alike. In its first tranche, the SRR program identified and procured a Blue UAS system UAS using Other Transaction Authority, rapidly transitioning a capability from the prototype phase to program of record in a short period of time. That is a model other military services and other federal departments could follow when procuring small UAS (and larger UAS and AAM systems). Congress should commend the work of the Blue UAS program and encourage continued evaluation of UAS for inclusion on the Blue UAS list. Further, Congress should require a report on the extent to which DOD and other agencies can work together to expand the Blue UAS program and replicate the Army’s experience of rapidly procuring UAS systems in large numbers – providing the government with a critical tool on a rapid timetable while creating domestic jobs and boosting U.S. competitiveness. In addition to supporting the Blue UAS program, Congress should consider additional measures to support domestic drone manufacturing in a market historically dominated by companies based in countries of concern.

E. Delivering On Infrastructure Investment

Promoting Infrastructure Resilience. With the passage of the Infrastructure Investment and Jobs Act (IIJA), Congress provided \$550 billion in new funding to address infrastructure needs across the country, including \$40 billion over five years to repair, replace, and rehabilitate our crumbling bridges. Inspections of our aging infrastructure are key to successful implementation of the investments Congress has already made. Drones can play a critical role in ensuring safe, accurate inspections are carried out to ensure responsible use of taxpayer dollars. The use of drones for infrastructure inspections has several benefits when compared to traditional inspection protocol. Drones are easier and safer to operate – protecting workers from large equipment and from entering dangerous areas when inspecting assets. Moreover, drones can capture automated data and aerial insights, and stakeholders can perform inspections more regularly, quickly, and efficiently, which increases the safety of our infrastructure and supports higher levels of worker safety. Given the major influx of federal dollars for investment in our crumbling infrastructure, the FAA and the DOT should work expeditiously to ensure the use of drones to increase the

efficiency of those investments. To capture and expand on these benefits, Congress should include language within the 2023 FAA Reauthorization appropriating \$5 million to the FAA and requiring the DOT and the FAA to promote the use of drones for infrastructure applications and work with state, local, and tribal governments – as well as private sector critical infrastructure and utility stakeholders – to advance infrastructure inspection operations applications at scale. Congress should also direct the FAA to encourage interagency collaboration to promote the use of drones for infrastructure inspections across all modes of transportation.

Enacting the Bipartisan Drone Infrastructure Inspection Grant (DIIG) Act, H.R. 5315. To the extent the bipartisan DIIG Act, which was recently passed by the U.S. House of Representatives (and was introduced in the Senate last month by Senators Rosen, Blumenthal, and Bozeman), is not enacted in 2022, we encourage Congress to ensure this critical program is enacted in the 2023 FAA Reauthorization. This Program would have two fundamental pillars, each administered by the DOT:

- (1) \$100 million to enable States, cities, and tribal governments to inspect America’s aging infrastructure with drone technology (including by funding program management capacity or drones), thereby making workers safer, inspections more efficient, and infrastructure more resilient, while supporting high-paying jobs in inspection and U.S. drone manufacturing; and
- (2) \$100 million for grants to community colleges and universities to train new and existing workers on drone technology and to prepare them for careers in aviation and STEAM, building on unfunded programs established in the 2018 FAA Reauthorization Act.

Providing Necessary Congressional Oversight. The Congress should also require that the FAA follow through on previous legislative directives which remain unfulfilled. For example, the FAA Extension, Safety, and Security Act of 2016 required the FAA to designate fixed site facilities to promote security and innovation; several deadlines have come and gone, and six years later Section 2209 has not yet been implemented. As another example, the FAA Reauthorization Act of 2018 (at 49 USC § 44803) required the FAA to issue broad waivers to designated FAA UAS Test Sites in a streamlined way; as research and development efforts struggle to take off in the U.S. due to regulatory barriers, the FAA has simply failed to implement this important initiative. These are just a few examples of regulatory failures that merit appropriate scrutiny to ensure the intent of Congress is implemented. Accordingly, the CDA urges Congress to exercise its essential oversight function to require relevant agencies to defend their continued inaction to implement previous congressional mandates and request a timeline from the FAA for immediate implementation of these provisions.

IV. EXPANDING AND ENABLING THE UAS INDUSTRY UNLOCKS SIGNIFICANT BENEFITS FOR ALL AMERICANS

The UAS industry can deliver significant societal and economic benefits for all Americans, but only if Congress takes action needed to overcome regulatory and policy hurdles that prevent scalable commercial drone operations in the United States. A few examples of these significant benefits will demonstrate why enabling UAS operations and eliminating regulatory paralysis and undue burdens is so critically important.

Boosting Safety for Workers and the Public. A major benefit of UAS is the immediate and aggregate safety enhancement that can be achieved in comparison to the traditional alternatives. For example, tower inspections traditionally have subjected workers to the hazards and risks of climbing a tower (with an average height across the country of about 280 feet). UAS operations, by contrast, can allow the inspector to remain on the ground, improving worker safety and reducing injury and death. Similarly, many types of safety inspections require crewed helicopters that involve extra risk, in addition to serious environmental consequences.⁶ UAS operations can reduce helicopter flight hours by 44,000 hours per year, which can statistically eliminate 1.6 helicopter accidents.⁷ Another sobering example of the potential for UAS to save lives is the aerial agricultural industry. Analysis of National Transportation Safety Board (NTSB) reports shows that, in 2020 alone, there were 54 aircraft accidents involving agricultural operations, including 12 fatal accidents resulting in 13 deaths.⁸ The use of UAS to perform these potentially hazardous aircraft operations will significantly reduce the number of pilot fatalities that occur each year in the aerial agricultural industry. On the ground, expanded UAS delivery operations can lead to 1.5 billion fewer road mile deliveries by freight in 2025, and 29 billion fewer road miles by 2030, reducing road accidents.⁹ Modeling by Virginia Tech suggests that at scale, UAS delivery could help to avoid 580 road accidents per year in a single U.S. city such as Austin, TX, or Columbus, OH.¹⁰ Furthermore, due to their ease of use compared with traditional means

⁶ <https://rotormedia.com/unmanned-systems-save-lives-in-high-risk-manned-operations/>. See “Identifying How UAS OPA Can Reduce Fatal Accidents in High Risk Manned Helicopter Operations” prepared by Mark Colborn, Scott Burgess, Ph.D., and Wayne M. Keeton – H-SE 90 SME Team, United States Helicopter Safety Team (USHST), Feb. 2, 2019.

⁷ Levitate Capital White Paper, Enterprise Market 2020, at 19, available at <https://levitatecap.com/levitate/wp-content/uploads/2020/12/Levitate-Capital-White-Paper.pdf>.

⁸ <https://agairupdate.com/2021/02/23/ntsb-final-report-2020/>. Among other state data, the report included documentation of three accidents each in Texas and Colorado, two accidents in Georgia, and one accident in Illinois, Nevada, South Dakota, Missouri and Kansas.

⁹ Levitate Capital White Paper, Enterprise Market 2020 at 19.

¹⁰ <https://wing.com/resource-hub/articles/why-do-we-need-drone-delivery/>.

of inspection, UAS can significantly increase the frequency and depth of inspections, boosting and aggregating the total benefits to safety.

Supporting the Economy and Putting Americans Back to Work. If the regulatory framework can keep pace with this rapidly evolving industry, UAS will unlock billions of dollars in economic growth over the next few years. There are many varying estimates of market potential, but the numbers are all large. The size of the commercial drone market—the fastest growing segment—is expected to reach \$16 billion by 2025 and \$29 billion by 2030.¹¹ Those figures represent only baseline estimates; other figures estimate a market size of \$21 billion and \$36 billion by 2025 and 2030, respectively. There also is significant potential for broad economic savings as a result of enterprise UAS operations. For example, the U.S. economy could save up to \$920 million annually using drones to inspect energy utility infrastructure.¹² Economic benefits also can flow to local small businesses participating in UAS delivery programs. One study of UAS local delivery programs found that local participating retailers could each experience more than \$200,000 a year in increased business opportunities, and local restaurants could generate up to \$284,000 in additional sales, by expanding the footprint of serviceable customers.¹³

Relatedly, to ensure adequate food supply and equitable food prices for Americans, drones can enable the next generation of precision agriculture. With fewer entrants into the agricultural labor force each year, the agriculture industry is looking to increase its use of technology and automation to keep pace with a growing population's demand for food. There are over 900 million acres of farmland in the United States, and UAS operation is the most efficient way to routinely monitor this land.

Enhancing Sustainability. Promoting innovative aviation technologies such as UAS furthers sustainability and environmental priorities. A wide variety of industries are counting on UAS to help decarbonize their operations, particularly those that currently rely on larger, louder gas-powered vehicles (whether aerial or surface-based) to inspect infrastructure or deliver goods or services.

Existing commercial drone deployments have already demonstrated a net positive impact on the environment—including reductions in overall noise levels and CO₂ greenhouse gas

¹¹ Levitate Capital White Paper, Enterprise Market 2020 at 28.

¹² Levitate Capital White Paper, Enterprise Market 2020, at 6.

¹³ Sarah Lyon-Hill, et. al., *Measuring the Effects of Drone Delivery in the United States*, Virginia Tech Office of Economic Development and the Grado Department of Industrial & Systems Engineering (Sept. 2020), https://www.newswise.com/pdf_docs/160018187481745_Virginia%20Tech%20%20Measuring%20the%20Effects%20of%20Drone%20Delivery%20in%20the%20United%20States_September%202020.pdf (hereafter, Virginia Tech Drone Delivery Study).

emissions. For example, two 2021 studies found that drone-based delivery reduced delivery carbon emissions and energy usage by 96-98% compared to cars, a significantly larger reduction than switching to EVs.¹⁴ The Virginia Tech Drone Delivery Study indicated that enabling drone delivery in a single U.S. metropolitan area could avoid up to 294 million miles per year in road use; that is equivalent to taking 25,000 cars off the road, and reducing carbon emissions by up to 113,900 tons per year. This reduction of carbon emissions is the equivalent of planting 46,000 acres per year of new forest.

The use of UAS as a substitute for ground vehicle trips leads to a sustainability impact orders of magnitude greater than what can be achieved through any other method. Light electric drones generate only 2-3% of the carbon emissions compared to an electric vehicle, meaning that substituting UAS trips for ground vehicle trips has an unrivaled decarbonization impact. In particular, UAS often substitute for the least efficient and most carbon-intensive transportation tasks. For example, state departments of transportation have begun to use drones to inspect bridges. In some cases, inspection crews can use electric drones instead of sending large semi-trucks known as snooper trucks, which often have a gas mileage lower than 5 mpg.¹⁵

Additionally, UAS play a key role in supporting and encouraging the transition from fossil fuels to renewable energy. UAS enable increased efficiencies in both the construction and operation phases of renewable energy plants – such as solar, wind, nuclear, and hydro. In short, UAS make renewable energy projects more economically viable and cost-effective by facilitating less-costly inspections of such infrastructure.

Commercial UAS also are used to reduce GHG emissions in the oil & gas industry through early detection of loss of containment (e.g., oil leaks) and fugitive emissions (e.g., methane gas leaks). UAS also reduce the carbon footprint associated with in-field time dedicated to historical monitoring, inspection and maintenance operations in industrial markets. There are over 900,000 well pads and 500,000 miles of pipeline in the United States. Every inch of those assets needs to be continually monitored for defects and leaks to properly assure safety and reduce GHG emissions.

¹⁴ Rodrigues et al, “Drone flight data reveal energy and greenhouse gas emissions savings for small package delivery” (Cornell Univ. arXiv.org, Nov. 2021); Zipline, “A First-Ever Look at the Sustainability of Autonomous Aerial Logistics” (Zipline Blog, Nov. 2021).

¹⁵ Last year, for example, North Carolina DOT and CDA member Skydio worked together to secure a first-of-a-kind statewide waiver from the FAA enabling the use of drones BVLOS to inspect bridges. *See* <https://www.ncdot.gov/news/press-releases/Pages/2020/2020-10-05-drone-bridge-inspection-waiver.aspx>. If North Carolina DOT could use drones to inspect 5,000 of its approximately 14,000 bridges, the environmental impact would be equivalent to taking 1,000 cars off the road. *See also* Brendan Groves, How Drones Can Unlock Greener Infrastructure Inspection, World Economic Forum, August 10, 2021, <https://www.weforum.org/agenda/2021/08/how-drones-unlock-greener-infrastructure-inspection/>.

Industries are counting on UAS to help decarbonize their operations, and integrating UAS into the supply chain and the American economy can play a central role in helping achieve climate and sustainability goals.

Promoting Equity. Supporting the UAS industry provides Congress with a unique opportunity to advance equity initiatives and ensure expanded access for underserved or remote communities. Drones have the potential to play a key role in delivering essential goods and medical supplies to difficult-to-reach populations¹⁶ and to vulnerable populations that are mobility challenged or lack access to a vehicle.¹⁷ For example, an American company recently received the State Department’s Award for Corporate Excellence for using drones to provide COVID-19 vaccines to rural and remote communities in foreign countries.¹⁸ There is no reason such benefits cannot be brought to American communities as well. An appropriately tailored regulatory framework would enable the delivery of medical, lifesaving and other critical supplies to remote, rural and tribal areas, and the millions of Americans living in so-called “pharmacy deserts” or struggling to get health care in the face of mounting rural hospital closures. Similarly, use of UAS to inspect critical infrastructure across the country offers economically hard-hit localities with limited budgets the opportunity to enhance safety at a fraction of the cost.

Drones also democratize aviation, providing a gateway to aviation in a manner far less expensive and far easier to access than traditional aviation, which has high barriers in the form of aircraft rentals, traditional pilot certification, and access to airports. Drones are helping to inspire a new and more diverse generation of Americans to study STEM and embark on careers that span the spectrum in aviation, from engineering and design, to maintenance and operations.

Promoting Infrastructure Resilience. As our country makes massive investments in infrastructure, UAS can play a critical role in making those investments go farther. In terms of scale, the current number one commercial use case for UAS is the inspection of critical infrastructure. UAS promote infrastructure resilience by enabling unprecedented awareness of infrastructure health, including the creation of digital twins to track changes and damage over time. Due to their ease of use compared with traditional means of inspection, UAS can significantly increase the frequency and efficiency inspections – helping to preserve existing infrastructure and expedite construction times on new infrastructure. For example, drones help to reduce the odds of

¹⁶ Recently, Ghana began using drones to provide COVID-19 vaccine delivery to rural hospitals nationwide, ensuring that rural doctors and nurses have equal access to these lifesaving vaccines as their urban counterparts. See <https://www.gavi.org/vaccineswork/covax-vaccines-take-air-drone>.

¹⁷ Virginia Tech Drone Delivery Study, at vi (noting that drone delivery could benefit up to 66,000 people in a single metropolitan area who lack access to a vehicle).

¹⁸ U.S. Department of State, [Secretary of State's Award for Corporate Excellence - United States Department of State](#) (2021).

a train derailment and increase the uptime of train systems across the nation's 140,000 miles of rail track.¹⁹

Ensuring Global Competitiveness. American competitiveness in the global economy and U.S. leadership in global aviation is at risk due to a lack of regulatory certainty and risk-appropriate oversight for UAS. Global competitors--including countries like China--are determined to win the next century of aviation and capture the jobs and societal benefits that accompanied America's leadership in the first century of flight. Due in part to the regulatory barriers here in the U.S. and Chinese-state subsidized companies, roughly 70-90% of the drone market is controlled by non-U.S. companies. The Civil Aviation Administration of China has just published a detailed plan outlining how China will enable the use of drones for use cases such as inner-city logistics and long-haul goods transport to be a "global civil aviation power."²⁰ The plan also buttresses China's continued commitment to lead the world in the development of small drones for inspection and situational awareness--a sector in which Chinese state-subsidized companies already control the vast majority of the U.S. and global markets.²¹

Many U.S.-based companies have invested heavily in, and in some cases moved, operations to allied countries (including to Australia, Japan, Africa, Europe and the United Kingdom) as foreign regulatory bodies have taken proactive steps to enable the UAS marketplace, such as the comprehensive operational and Uncrewed Traffic Management (U-SPACE) regulations implemented by the European Union. For example, Zipline and Wing have each performed hundreds of thousands of BVLOS deliveries around the world, flying tens of millions of miles autonomously. Not only do those operations provide significant immediate benefits to those countries, but by providing a clear pathway from drone companies to scale and achieve commercial viability, those countries are able to attract investment and jobs in this emerging sector. By contrast, regulatory uncertainty in the U.S. has forced many American UAS companies to shut down. If companies can iterate new models of aircraft and operations and scale their businesses in other countries, the U.S. will continue to experience a loss of UAS investment, innovation, and competition. Once a company is operating abroad, it is unlikely to shift its investments back to the U.S. without regulatory certainty, and the American UAS industry falls behind.

Enhancing Homeland Security and Emergency Response. UAS can provide significant homeland security and emergency response benefits. They are frequently utilized in emergency

¹⁹ <https://www.skydio.com/blog/BVLOS-for-remote-drone-operations/>.

²⁰ "China drafts roadmap to boost its civilian drone industry," August 23, 2022, found at <https://eandt.theiet.org/content/articles/2022/08/china-drafts-roadmap-to-boost-its-civilian-drone-industry/>.

²¹ Cate Cadell, Drone Company DJI Obscured Ties to Chinese State Funding, Documents Show, Washington Post, February 1, 2022, available at <https://www.washingtonpost.com/national-security/2022/02/01/china-funding-drones-dji-us-regulators/>.

situations, including helping communities recover after hurricanes and other natural disasters by providing internet connectivity and providing data that assists with cleanup efforts. UAS are frequently employed for public safety to assist first responders with situational awareness in the context of criminal investigations, firefighting, and more.

Supporting National Security. A thriving domestic UAS industry that stays at the forefront of innovation is important for economic security, driving investment and creating jobs. It also is important for national security. In recent years, U.S. federal agencies have issued warnings about systems made by companies connected to countries of concern and expressed a need to deploy secure, domestically produced drones. Congress has also taken action, banning the Defense Department from buying certain foreign-made drones.²² As UAS technology increasingly revolves around network-connected operations, data security is important, especially for use cases involving sensitive data. Maintaining a strong and secure domestic UAS industry promotes competitiveness and protects national security.

Upgrading Our U.S. Agricultural Supply Chain. The benefits of drones can be leveraged to enhance the U.S. supply chain particularly in the context of precision agriculture and bulk materials. As the world population grows from 7 billion to an estimated 9 billion by 2050, agricultural consumption is predicted to increase by 69 percent. Drones can play a vital role in helping the agriculture industry meet this growing demand.

V. CONCLUSION

The opportunity cost of inaction continues to grow as the gap between technology and policy in the United States continues to widen. Congress has the opportunity in the next FAA Reauthorization to close this gap and bring the benefits of commercial drones to the American public. The CDA appreciates the opportunity to appear before you today to provide our perspective in support of your work. We look forward to continuing to collaborate with you and your staffs to ensure that America is able to maintain and enhance our global leadership in advanced aviation in years to come.

²² National Defense Authorization Act for Fiscal Year 2020, Section 848 (P.L. 116-92).