



**WRITTEN TESTIMONY OF LISA ELLMAN,
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**BEFORE THE U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY**

“Advanced Air Mobility: The Future of Unmanned Aircraft Systems and Beyond”

March 23, 2023

Committee Hearing Room, 2318 Rayburn House Office Building

Chairman Lucas, Ranking Member Lofgren, and Members of the Committee on Science, Space, and Technology:

Thank you for the opportunity to share my thoughts with you at this important hearing on how we can safely integrate uncrewed aircraft systems (UAS), advanced air mobility (AAM), and related innovations into our aviation system, 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 Global UAS practice at Hogan Lovells law firm. I am honored to provide remarks on behalf of the CDA and help inform your exploration of the vast societal benefits provided by UAS as well as your consideration of how the United States can maintain its role as a global leader in advanced aviation, including through federal government investment in research and development.

The CDA is an independent non-profit organization made up of leading entrepreneurs and innovators in the commercial drone and AAM industries. The CDA Board is comprised of Wing, Skydio, Zipline, NUAIR, the Choctaw Nation of Oklahoma, Amazon Prime Air, Percepto, SkySafe, Dedrone, Florida Power & Light, American Robotics, Southern Company, Hidden Level, and Honeywell. The CDA collaborates with the federal government and promotes policies for industry growth and the safe and secure integration of UAS into the National Airspace System (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.

SOCIETAL BENEFITS OF UAS

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

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

- In Oklahoma, the Choctaw Nation 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 California, the National Aeronautics and Space Administration (NASA) is utilizing drones and UAS Traffic Management (UTM) systems to help firefighters battle wildfires from above, which will prove useful in other states including Colorado and Oregon. And the California Department of Transportation is using Skydio drones to inspect bridges and evaluate mudslides on roads, enabling crews to reopen roadways more quickly and allow commerce to flow.
- In Texas, BNSF Railway is working with Skydio to inspect our nation’s railroads while Wing is bringing the benefits of commercial drone delivery to the Dallas region.
- In California and Texas, Amazon Prime Air is offering its drone delivery services to communities in Lockeford, California and College Station, Texas.
- In Florida, the city of Coral Gables has launched a program to deploy drones to quickly respond to 911 emergency calls before first responders are able to arrive.
- In Alabama, the University of Alabama in Huntsville is working to coordinate drone responses to natural and human-made disasters.
- In North Carolina, Arkansas, Utah and soon Washington and Michigan, Zipline is using lightweight, electric drones to deliver medicine and retail products directly to customer homes, reducing traffic and pollution.
- 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, despite Congress defining an interim regulatory pathway for

operations, regulatory paralysis and undue regulatory burdens have limited even low volume expanded UAS operations into the NAS.

IMPORTANCE OF GLOBAL LEADERSHIP IN ADVANCED AVIATION

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.

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. Today in the United States, commercial aviation supports 10 million jobs, generates 5% of Gross Domestic Product, enables millions of Americans to travel domestically and globally, and acts as an essential artery for supply chains across economic sectors. 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 peers – 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.

Competitors like China have invested extraordinary resources in an attempt to surpass the United States, capturing the vast majority of the UAS market share in the United States. Indeed, China’s Made in China 2025 policy sets an objective to achieve global leadership in aerospace by 2025. According to the Director of National Intelligence, China pursues its objectives using military-civil fusion, a strategy that leverages “technological development among commercial companies in order to use the fruits of that research for broad national aims.”²

Here at home, 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 Federal Aviation Administration’s (FAA) UAS Integration Office and other supporters, the FAA continues to view civil UAS integration as, in its own words, a “long road ahead” and a “significant challenge.”³ 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, describing it as “indefensible,”⁴ and have highlighted how the UAS industry continues to be held back by the application

² Patrick Tucker, “FBI Opens a Case on Chinese Activity ‘Every 10 Hours,’ Intel Chiefs Say,” April 14, 2021, found at <https://www.defenseone.com/threats/2021/04/fbi-opens-case-chinese-activity-every-10-hours-intel-chiefs-say/173376/>.

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

⁴ 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

of incongruous approaches designed for crewed aircraft.⁵ 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.

Many U.S. companies have therefore invested heavily to pursue opportunities in international 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.

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. Research and development has a critical role to play in enabling implementation of future UAS capabilities and in advancing AAM and drone security technologies. Notably, the UAS community has rapidly evolved beyond the initial exploratory stage with unprecedented technological advances and is primed for scaled operations, if only the regulatory regime would enable such operations. Although UAS technology is already mature enough to have begun commercial deployment, research and development efforts to promote the continued advancement of aviation technology should proceed concurrently as the federal government enables UAS companies to expand and scale their operations to unlock the substantial benefits that UAS can provide to the American people.

CURRENT STATE OF R&D FOR THE UAS INDUSTRY IN THE UNITED STATES

Before discussing how Congress can lead, it is helpful to examine the status quo: in particular, the steps a U.S. company designing a UA that would operate outside the scope of the FAA’s Part 107 rule – for example, a vehicle that weighs 55 lbs. or more – must take in order to perform R&D at its own property. Generally speaking, the regulatory approvals needed to conduct R&D with a UA weighing 55 lbs. or more fall into one of three buckets: (1) airworthiness; (2) operational; and (3) airspace.

First, unless an appropriate exemption has been obtained, all civil aircraft operated in the U.S. must have an airworthiness certificate. As with traditional crewed aircraft, a U.S. company designing a UAS can obtain a Special Airworthiness Certificate in the Experimental Category (SAC-EC) for the purpose of

System by Improving Communication and Measuring Performance (2021) and “Drones: FAA Should Improve Its Approach to Integrating Drones into the National Airspace System” (2023); 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/uploadedfiles/2021-02-24_pad_sg_rl_gg_ltr_to_gao_re_uas_integration_update.pdf).

⁵ 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.

conducting R&D operations. Unlike for crewed aircraft, however, a SAC-EC on its own is almost never sufficient for conducting UAS R&D operations in the U.S.

Uncrewed aircraft operators conducting R&D flights need to comply with the same general operating rules applicable to crewed aircraft in Part 91 of the Federal Aviation Regulations, but it is generally impossible to comply with these requirements which were not designed to accommodate uncrewed aviation.⁶ Most UAS operators therefore need to obtain one or more exemptions from various provisions of Part 91 that (due to the uncrewed nature of the operation) are impossible or impractical to comply with. Obtaining exemptions requires a lengthy rulemaking process that takes months – *or more often years* – to complete.

Finally, even after obtaining the necessary exemptions, UAS operators still need to obtain a separate airspace approval from the FAA in the form of a Certificate of Waiver or Authorization (COA), which adds additional time and complexity to the overall approval process.

The end result is that this U.S. company must wait years to even begin conducting R&D activities, notwithstanding the fact that the vast majority of these operations occur over private property, at low altitudes and in low-risk rural environments.

While innovative programs like BEYOND and FAA-designated test sites may offer alternative pathways to conducting some UAS R&D activities, these routes are also plagued by similarly lengthy administrative processing times.

Congress has the opportunity to fix these excessive legal and regulatory barriers to entry into the American marketplace as the United States attempts to re-gain its global leadership in this sector. A robust and appropriately tailored R&D program is an important piece of this effort.

THE ROLE OF RESEARCH AND DEVELOPMENT TO SUPPORT ADVANCED AVIATION INTEGRATION

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.

The CDA appreciates this Committee’s focused attention on ensuring the viability of the UAS and AAM industries and commends the co-sponsors of the “National Drone and Advanced Air Mobility Initiative Act” for their commitment to accelerate the development and deployment of UAS and AAM technologies. The CDA is encouraged that Congress recognizes the vast benefits of the drone industry and is prioritizing advancing this technology.

⁶ A common example is the minimum safe altitude requirement in 14 C.F.R. § 91.119(c), which generally prohibits flights below 500 feet above ground level (AGL) over other than congested areas except for takeoff and landing. A key benefit of UAS is their ability to safely operate at lower altitudes than traditional crewed aircraft, and for this reason, the majority of UAS operations need to occur at altitudes below 500 feet AGL.

In addition, the CDA appreciates the spirit of interagency coordination and cooperation that is central to this bill and agrees that such coordination is required to move the UAS and AAM industries forward.

Furthermore, the CDA agrees that a strong and competitive domestic manufacturing base is critical to national security and supports Congress' efforts to bolster domestic supply chains and develop innovative manufacturing processes to secure U.S. leadership.

While an excellent start, the CDA believes the legislation can be refined and improved, in line with the spirit and intent of the legislation. We have several ideas here, outlined below.

1. Avoid Duplication of Existing Efforts

First, the CDA agrees with the legislation that in order to remain competitive in a tight global marketplace, the United States must have accelerated pathways to conduct advanced operations. However, the CDA urges Congress to focus on leveraging existing resources and programs to avoid duplicative efforts. Both the federal government and industry stakeholders have made significant investments in existing initiatives such as the Alliance for System Safety of UAS through Research Excellence ("ASSURE"), which is the FAA's Center of Excellence for UAS Research, the BEYOND program, and research infrastructure available at existing FAA-designated test sites. Indeed, these programs and facilities have already developed and validated rigorous risk mitigation strategies to support advanced research activities.

And while federal interagency coordination is vital, the current DOT Interagency Working Group formed from the AAM Coordination and Leadership Act enacted in October 2022 should serve as a convening mechanism to discuss these important topics.

2. Codify and Expand BEYOND Program

Instead of developing a new framework for research and development, Congress should codify and expand the FAA's BEYOND program for five years, tasking it to test safe and scalable frameworks for automated and ultimately autonomous operations, among other forms of operations. Congress earlier codified and funded the Integration Pilot Program, the BEYOND program's predecessor. The expanded BEYOND program could include collecting data that would accelerate rulemakings, developing model policy, and requiring regulatory enabling actions to flow from these partnerships. 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.

3. Extend and Expand Test Site Mandate

The FAA Modernization and Reform Act of 2012 directed the FAA to initiate a UAS test site program to support UAS integration efforts and Congress subsequently expanded and extended the test site program in the FAA Extension, Safety and Security Act of 2016 and the FAA Reauthorization Act of 2018.

Congress now has an opportunity to support the continued growth of the advanced aviation marketplace by extending and expanding the mandate of FAA-Designated UAS Test Sites, including to enable development and testing of AAM and counter-drone technologies.

4. Clarify Public Entity Ability to Collaborate With Industry

Congress should clarify the ability of FAA-designated UAS Test Sites and public agencies and universities to perform testing and validation in collaboration with industry. The FAA's flawed reading of the law effectively bans longstanding UAS aeronautical research and development "public aircraft operations" ("PAOs") and undermines the ability of public entities to collaborate with industry to conduct valuable UAS R&D activities. The FAA's needlessly restrictive legal judgment is disrupting state and local government UAS integration efforts and obstructing research and development that would bolster U.S. competitiveness. Congress should clarify that UAS, including associated elements of the UAS, operated for R&D purposes in collaboration with FAA-designated test sites and public agencies and universities 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.

5. Focus Validation Efforts on Future UAS Capabilities

The CDA believes that congressional UAS R&D priorities should focus less on early-stage R&D and more on future UAS capabilities, including supporting complex and increasingly automated UAS operations at scale, particularly over urban and suburban areas, in complex airspace.

For example, as companies prepare to scale their operations across the country, Congress should prioritize evaluating the transition from the current low volume approach to more complex operations with multiple operators. Relatedly, the federal government should focus on implementation of UTM systems to enable these complex UAS and AAM operations at scale.

Recognizing the sustainability benefits of these emerging transportation technologies, Congress should seek to quantify the environmental benefits of UAS and AAM technologies, particularly as compared with other forms of transportation.

Finally, Congress should prioritize R&D to support the integration of counter-drone technologies into a diverse array of civil environments, including around busy airports, mass gathering events, and in populated areas.

6. Explicitly Enable and Resource Virtual Testing

Congress has the opportunity now to leverage advances in technology to enable and fund virtual testing and R&D to support and streamline regulatory approval processes. Congress should require the federal government to work with industry to make virtual testing programs available across the country.

7. Leverage Existing Industry Consensus Standards

The CDA agrees that the development of performance-based industry standards is critical. The legislative text should clarify, however, that there are many consensus standards that already exist or are well into development, in particular through ASTM International. Efforts should be directed towards encouraging the FAA to adopt those standards as a means of compliance and to amend the regulations as necessary to allow for their use in operational deployment.

8. Bolster Domestic Manufacturing Base

Congress should support the growth of UAS and AAM manufacturing capabilities in the United States including by ensuring the timely availability of essential domestic industrial resources to support our national security. This could take the form of direct support to the domestic marketplace, such as through Title III Defense Production Act funding, or indirect support for the marketplace, such as through funding mechanisms identified in the bipartisan DIIG Act, which passed the House in 2022.

9. Congressional Priority Must Be Legal and Regulatory Reform

Finally, the absence of a viable regulatory framework for UAS continues to be the most significant barrier to scaled UAS operations in the U.S. A robust R&D program will only succeed if accompanied by a reasonable regulatory environment for companies to operate, including broadly enabling operations with vehicles heavier than 55 pounds, beyond visual line of sight (BVLOS) and for commercial package delivery. Industry requires criteria and a clear path to implement and operationalize actual, scalable commercial UAS operations. To this end, Congress should require the federal government to develop streamlined mechanisms to use data collected through R&D to enable complex operations and support rulemaking and policy setting.

Moreover, legal and regulatory reform is necessary to enable R&D on drone security issues. Various criminal law and federal regulatory provisions may, depending on the nature of the technology, prevent even testing of counter-drone technologies outside of the context of a few federal agencies. For example, current Federal Communications Commission rules and policies inhibit the testing of many mitigation systems, limiting testing in many cases to Department of Defense test ranges under specific government contract.

We have attached the CDA's FAA Reauthorization priorities as Appendix B to this testimony, and we have attached CDA's Support for Counter-Drone Legislation as Appendix C to this testimony. We would encourage the House Science Committee, the House Transportation & Infrastructure Committee, and the House Committee on Homeland Security to work closely together on legislative priorities for FAA Reauthorization. The CDA would be happy to continue to serve as a resource to this Committee as you develop this important UAS and AAM legislation.

CONCLUSION

The opportunity cost of inaction continues to grow as the gap between technology and policy in the United States continues to widen and the United States loses ground to other countries in this sector. Congress has the opportunity to close this gap, ensure U.S. leadership and competitiveness in the next era of advanced aviation, and bring the benefits of commercial drones and AAM to the American public. This requires enabling U.S. companies to perform research and development here at home.

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 by implementing scalable UAS and AAM operations and integration into the NAS.

APPENDIX A – SOCIETAL BENEFITS

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.⁷ UAS operations can reduce helicopter flight hours by 44,000 hours per year, which can statistically eliminate 1.6 helicopter accidents.⁸ Another sobering example of the potential for UAS to save lives is the aircraft agricultural spraying 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.⁹ 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 spraying 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.¹⁰ 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.¹¹ Furthermore, due to their ease of use compared with traditional means 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.

⁷ <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.

⁸ 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>.

⁹ <https://agairupdate.com/2021/02/23/ntsb-final-report-2020/>. Among other state data, the report included documentation of seven accidents in Arkansas, six accidents in California, five accidents in Nebraska, three accidents each in Texas and Colorado, two accidents each in Georgia, Oklahoma, North Carolina and Florida, and one accident each in Illinois, Alabama, and Oregon.

¹⁰ Levitate Capital White Paper, Enterprise Market 2020 at 19.

¹¹ <https://wing.com/resource-hub/articles/why-do-we-need-drone-delivery/>.

The size of the commercial drone market—the fastest growing segment—is expected to reach \$16 billion by 2025 and \$29 billion by 2030.¹² 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.¹³ 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.¹⁴

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 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.¹⁵ 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

¹² Levitate Capital White Paper, Enterprise Market 2020 at 28.

¹³ Levitate Capital White Paper, Enterprise Market 2020, at 6.

¹⁴ 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).

¹⁵ 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).

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.¹⁶

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.

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 populations¹⁷ and to vulnerable populations that are mobility challenged or lack access to a vehicle.¹⁸ 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.¹⁹ There is no reason such benefits cannot be brought to American communities as well. An appropriately

¹⁶ 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/>.

¹⁷ 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>.

¹⁸ 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).

¹⁹ U.S. Department of State, [Secretary of State's Award for Corporate Excellence - United States Department of State](#) (2021).

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 of inspections – helping to preserve existing infrastructure and expedite construction times on new infrastructure. For example, drones help to reduce the odds of a train derailment and increase the uptime of train systems across the nation’s 140,000 miles of rail track.²⁰

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 authoritarian 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 foreign government subsidization of private companies, roughly 70-90% of the drone market is controlled by non-U.S. companies. For example the Civil Aviation Administration of China has published a detailed plan outlining how China will enable use of drones for inner-city logistics and long-haul goods transport to be a “global civil aviation power.”²¹ 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 overseas (including to Australia, Asia, Africa, Europe and the United Kingdom, as well as to other regions) 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

²⁰ <https://www.skydio.com/blog/BVLOS-for-remote-drone-operations/>.

²¹ “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/>.

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 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 Domestic 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 will play a vital role in helping the agriculture industry meet this growing demand. Frequent, high-resolution data collected via autonomous drones, and the analysis derived from it, are critically important to enabling the next generation of high-efficiency precision agriculture. This data helps farmers more efficiently manage their land. This increased efficiency is required to both produce more food and to have better visibility into the global food supply chain. For bulk materials, current stockpile and mining inspections involve teams that manually estimate volumetrics, either with hand-held cameras or the naked eye, typically resulting in low-accuracy data. These incorrect measurements – which can often produce errors up to 40% - put a strain on operations and drastically reduce the industry's visibility and control over the bulk materials supply chain. With automated BVLOS, commercial UAS can generate hyper-accurate volumetric analysis of stockpiles and mines every day, reducing the likelihood of global supply chain disruptions across a variety of industries.

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

APPENDIX B – CDA FAA REAUTHORIZATION PRIORITIES



FAA REAUTHORIZATION 2023 PROPOSALS OF THE COMMERCIAL DRONE ALLIANCE

*The Time is Now for Congress to
Unlock the Benefits of Commercial Drones for All Americans*

The Commercial Drone Alliance (CDA)²³ has worked for years with federal government officials, industry stakeholders and others to promote solutions that enable the safe and secure integration of uncrewed aircraft systems (UAS or drones) into our National Airspace System (NAS). The time is now for decisive congressional action to expand and enable commercial drones to scale for the benefit of all Americans. 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. With many countries around the world, including competitors like China, progressing ahead of the United States in this new era of flight, our country is at risk of losing our global leadership in aviation due, in part, to regulatory paralysis. Congress paved the way in 2012 with a legislative mandate for UAS integration; over a decade later, congressional leadership is necessary to spur progress once again. Enabling these innovative aviation technologies at scale is important for safety, the economy, global competitiveness, national security, the environment, equity, and more. These benefits are detailed in the Appendix to the CDA’s proposals.

Our focus in this paper is on the 2023 FAA Reauthorization. However, it is important to note that the FAA still has not followed through on previous congressional mandates. 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. This is just one instance 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.

²³ The CDA is an independent non-profit organization led by key leaders in the commercial drone and advanced air mobility industries. 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. The CDA works with all levels of government to collaborate on policies for industry growth and seeks to educate the public on the safe and responsible use of commercial drones to achieve economic benefits and humanitarian gains. Learn more at www.commercialdronealliance.org.

We provide below a summary of CDA’s priorities for the 2023 FAA Reauthorization, in order of significance, as well as additional detail on each of these priorities in the following section. We appreciate consideration of this input, and we look forward to supporting Congress in developing and passing legislation that advances UAS integration and helps ensure U.S. leadership in the second century of flight.

- 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. To address this concern, we urge Congress to adopt as part of the 2023 FAA Reauthorization the “Increasing Competitiveness for America Drones Act of 2023,” introduced by Senators Warner and Thune in February 2023 (“Increasing Competitiveness Act”). In addition, Congress should require the FAA to consider the positive aggregate safety gains and environmental impact of UAS.
- 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 Advisory Rulemaking Committee (“BVLOS ARC”) within 180 days of enactment, as set forth in the Increasing Competitiveness Act.
- C. Validation and Evaluation.** 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 through the evaluation and validation of new technologies.
- D. UAS Manufacturing and Supply Chain.** Congress should take action to support the growth of advanced aviation manufacturing in the United States. Among other measures, Congress should enact tax incentives to expand manufacturing in the United States, enhance and expand the Blue UAS program, and require a report on the extent to which DOD and other agencies can leverage and 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. Infrastructure Investment.** Congress should promote infrastructure resilience, including by appropriating funds 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 to advance infrastructure inspection operations applications at scale. In particular, Congress should enact the DIIG Act, which passed the House in 2022, by incorporating this bill into the 2023 FAA Reauthorization.

DISCUSSION OF SPECIFIC 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 adopt the Increasing Competitiveness Act, which would:

- Create a position of Associate Administrator to oversee UAS integration and empower that office with the resources and authorities to fulfill the mandate of UAS integration into the NAS. This office would have the dual mandate of ensuring the safe integration of UAS into the NAS and encouraging and facilitating 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.
- Create a UAS Certification Unit that would have the sole authority to issue all rulemakings, certifications, and waivers, thus creating a central rulemaking body for UAS, allowing for a more uniform process.

Consideration of Positive Safety Gains and Environmental Impacts. Congress should require the FAA to consider the positive aggregate safety gains and environmental impact of UAS use on other modes of transportation.

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 enact the Increasing Competitiveness Act as part of the 2023 FAA Reauthorization, which directs the FAA to issue an NPRM enabling BVLOS operations in alignment with the recommendations of the BVLOS ARC within six months of enactment and a final rule within two years of enactment. In addition, the this Warner-Thune legislation would require the BVLOS final rule to at a minimum do the following:

- Establish an Acceptable Level of Risk Methodology: Establish an applicable risk assessment methodology of BVLOS UAS operations that includes quantified measures of acceptable level of risk for UAS operations that is modeled upon and consistent with existing accepted general aviation risks.
- Establish a Risk-Based Framework for UAS Airworthiness: Establish a risk methodology, which will be used to determine what level of regulatory scrutiny is required.

- **Implement Tailored and Risk-Appropriate Qualification Criteria for UAS Pilots:** Establish remote pilot certification standards for remote pilots for BVLOS operations, taking into account varying levels of automated control and management of UAS flights.
- **Enable Shielded Operations:** Direct FAA to immediately enable 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.

Extend, Streamline, and Expand Section 44807. Congress should enact the provisions of the Increasing Competitiveness Act as part of the 2023 FAA Reauthorization which would extend, streamline, and expand Section 44807 to cover the near-term gap between current authorizations and a streamlined airworthiness approval process, while also expediting low-risk BVLOS operations such as certain package delivery operations and shielded operations within 100 feet of the ground or a structure. Congress should provide a pathway to enable advanced operations that can be conducted safely, even when those operations do not fit neatly within an existing rule.

Improve the Airworthiness Process for UAS before BVLOS Rule Goes Into Effect. Congress should direct the DOT and the FAA to improve and expedite the airworthiness approval process for UAS technologies. The current UAS airworthiness process is broken. For nearly five years, the FAA has tried and failed to adapt the existing and burdensome airworthiness process to UAS. In fall 2022, the FAA issued a UAS standard airworthiness certificate to Matternet.²⁴ 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.

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 due to their proportionally small profile. 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 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.

²⁴<https://www.prnewswire.com/news-releases/matternet-m2-drone-delivery-system-first-to-achieve-faa-type-certification-301619827.html>.

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 also should 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 that UAS delivery will occur at low altitudes.

Streamline Environmental Approval Processes. As described in the Appendix, 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 unrealistic 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.

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.

C. VALIDATION AND EVALUATION

Empowering UAS Test Sites to Promote R&D. UAS R&D activities help support the safe and efficient integration of UAS into the NAS through evaluation and validation of new technologies. 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, extend and expand the test site mandate from the FAA Modernization and Reform Act of 2012.

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. UAS MANUFACTURING AND SUPPLY CHAIN

Congress should take action to support the growth of UAS 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.

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.

Strengthening Domestic Manufacturing: CDA requests that Congress creates a tax incentive program for UAS manufacturing modeled after the Solar Energy Manufacturing for America Act (SEMA), or modeled after language included in the House’s Bioeconomy Research and Development Act of 2021 (America Creating Opportunities for Manufacturing, Pre-Eminence in Technology and Economic Strength (COMPETES) Act of 2022) and the Senate’s United States Innovation and Competition Act (USICA) on semiconductors and other technologies. This should be created in coordination with the House Ways and Means Committee for ultimate inclusion in the tax title that they produce for inclusion in the FAA Reauthorization.

E. 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 protocols. 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 authorizing \$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. We encourage Congress to ensure the bipartisan DIIG Act, which was passed by the U.S. House of Representatives last year, 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.

Encourage and Incentivize Equipage: Congress should direct the FAA to encourage and incentivize the very small number of crewed aircraft that routinely operate below 500 feet AGL or in populated areas 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 all aircraft can maintain adequate separation. In past years, the FAA established an ADS-B Out rebate program to assist aircraft owners in the purchase of ADS-B technology and in complying with equipage mandates. The program was successful and oversubscribed. Congress should direct the FAA to establish a new and well-funded ADS-B Out rebate program modeled on the prior programs that will further incentivize adoption of this equipment, thereby modernizing the airspace and enhancing safety of the NAS.

In addition, Congress should 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.

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 complex 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 out of 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 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. Congress should also require the FAA to issue a plan to enhance transparency and promote regulatory

certainty with industry to ensure the prompt operationalization of UTM consistent with globally recognized standards and best practices.

Advance Network Remote Identification: Network remote identification is a critical building block for UTM. In the short term, Congress should 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.

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 continued opportunity to work with you to ensure that America is able to maintain and enhance our global leadership in advanced aviation in years to come.

* * *

APPENDIX

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.²⁵ UAS operations can reduce helicopter flight hours by 44,000 hours per year, which can statistically eliminate 1.6 helicopter accidents.²⁶ 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.²⁷ 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.²⁸ Taking cars and trucks off the road can help meet Secretary Buttigieg’s recently announced goal of reducing traffic deaths. 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.²⁹ Furthermore, due to their ease of use compared with traditional means of inspection, UAS can significantly increase the frequency and depth of inspections, boosting and aggregating the total benefits to safety.

²⁵ <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.

²⁶ 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>.

²⁷ <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.

²⁸ *Id.*

²⁹ <https://wing.com/resource-hub/articles/why-do-we-need-drone-delivery/>.

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 2030.³⁰ 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.³¹ 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.³²

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. The commercial use of UAS provides extraordinary benefits to the environment. 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 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.³³ 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.

³⁰ Levitate Capital White Paper, Enterprise Market 2020 at 28.

³¹ Levitate Capital White Paper, Enterprise Market 2020, at 6.

³² 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).

³³ 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).

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.³⁴

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.

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 populations³⁵ and to vulnerable populations that are mobility challenged or lack access to a vehicle.³⁶ For example, an American company recently received the State Department’s Award for Corporate Excellence

³⁴ 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/>.

³⁵ 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>.

³⁶ 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).

for using drones to provide COVID-19 vaccines to rural and remote communities in foreign countries.³⁷ 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 communities 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 a train derailment and increase the uptime of train systems across the nation’s 140,000 miles of rail track.³⁸

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 recently 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.”³⁹ 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.⁴⁰

³⁷ U.S. Department of State, [Secretary of State's Award for Corporate Excellence - United States Department of State](#) (2021).

³⁸ <https://www.skydio.com/blog/BVLOS-for-remote-drone-operations/>.

³⁹ “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/>.

⁴⁰ 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/>.

Many U.S.-based companies have invested heavily in, and in some cases moved, operations to allied countries (including to Australia, Japan, the United Kingdom, and others in Africa and Europe) 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 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.⁴¹ 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, aerial surveying, and expanded rural access. 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. Companies are exploring international agricultural use cases to support this vital work by delivering livestock vaccines, animal reproduction products, seeds, and other materials to hard-to-reach farming communities. These and other efforts are greatly enhanced through authorized BVLOS operations, and similar accessibility and equity gains can be made in the U.S. to better serve rural communities.⁴²

⁴¹ National Defense Authorization Act for Fiscal Year 2020, Section 848 (P.L. 116-92).

⁴² See e.g., <https://www.africanews.com/2022/07/31/in-rwanda-drones-used-to-boost-pig-breeding/>.

APPENDIX C – CDA SUPPORT FOR COUNTER-DRONE LEGISLATION

Commercial Drone Alliance Supports Congressional Renewal and Expansion of the Preventing Emerging Threats Act

The safety, security, efficiency, sustainability and equity benefits of commercial uncrewed aircraft systems (UAS or drones) are significant, and drones are already enhancing lives in communities around the world. However, here in the U.S., policymaking has lagged behind technology. Just like policy has lagged behind technology on the commercial drone “use” side, the same is true for drone security. Congress must update archaic laws that interfere with the ability of federal, state, local and private entities to protect sensitive airspace.

The Commercial Drone Alliance (CDA)⁴³ has worked for years with federal government officials, industry stakeholders, and others to promote solutions that enable the safe and secure integration of UAS into our National Airspace System. The CDA appreciates the common interest that the government, industry, and the general public all share in protecting against potential public safety and homeland security threats posed by rogue or unauthorized UAS. Indeed, the CDA considers innovation and security two sides of the same coin.

In that spirit, the CDA supports the “Safeguarding the Homeland from the Threats posed by Unmanned Aircraft Systems Act,” introduced by Senator Peters (“Safeguarding the Homeland Act”), which would expand detection authority and implement a pilot program extending counter-drone authority, under appropriate oversight and training, to certain state and local law enforcement officials. The CDA also supports expanding Counter-UAS authority to certain federal agencies, including the Department of State, National Aeronautics and Space Administration, and the Transportation Security Administration (the latter of which has limited authority now that would be expanded in the proposed renewal).

The CDA believes that any counter-UAS legislation must not interfere with lawful commercial UAS operations. To enable expanded commercial drone operations, we believe the Preventing Emerging Threats Act renewal and expansion efforts should consider incorporating a “trusted operator” system for drones similar to the Transportation Security Administration’s Pre-Check and Global Entry programs, which would enable the government to maintain a database of authorized commercial UAS operations and help the relevant agencies and public safety officials with threat assessment and threat discrimination.

The CDA appreciates the opportunity to work with Congress on these important provisions and issues, and we look forward to continued collaboration.

⁴³ The CDA is an independent non-profit organization led by key leaders in the commercial drone and advanced air mobility industries. 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. The CDA works with all levels of government to collaborate on policies for industry growth and seeks to educate the public on the safe and responsible use of commercial drones to achieve economic benefits and humanitarian gains. Learn more at www.commercialdronealliance.org.