



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)¹ 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. With many countries around the world 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 to regulatory paralysis. Congress paved the way in 2012 with a legislative mandate for UAS integration; a decade later, congressional leadership is necessary to spur progress once again. Pioneering these innovative aviation technologies 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.

EXECUTIVE SUMMARY

Advances in hardware and information technology have prompted an aviation revolution, with drones as vital tools that create jobs, protect workers and the environment, inspect critical infrastructure, expand equitable and efficient access to medicines, strengthen our economy, and enhance public and worker safety and national security.

The use of zero-emission UAS to save lives, provide rural medical access, and maintain our nation's aging infrastructure has been a bipartisan policy priority since 2012, when Congress first directed the Federal Aviation Administration (FAA) to integrate UAS into the National Airspace System. Policy has lagged behind technology, and integration efforts have lagged behind the pace of innovation in America. Drone operations continue to be almost exclusively limited to line of sight, meaning that drone operators must follow every drone flight with a human on the ground watching the aircraft at all times. Like an aircraft unable to leave sight of its airport, such restrictions severely limit the efficiency and safety benefits of UAS, and would render any transportation mode non-viable. Ten years later, notwithstanding industry's best

¹ 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.

efforts, not a single UAS has received standard airworthiness certification due to FAA's failure to devise clear and precise methods for industry to follow, and approvals to fly beyond-visual-line-of-sight (BVLOS) are limited and rare.

Congressional action is necessary to secure U.S. leadership in a new era of aviation. The U.S. dominated the first century of flight, which began on the wind-swept sand dunes of Kitty Hawk and continued to the Moon and beyond. Our leadership role in aviation has provided untold value to our economy and society.

But U.S. leadership in the second century of flight – defined not by crewed operations, but by uncrewed and, increasingly, autonomy-enabled operations – remains in question. Other nations are working hard to establish leading roles in a new era of flight. Democratic peer nations – such as Australia, Canada, Japan, the United Kingdom and the European Union – have taken significant steps to enable advanced drone operations and capture the societal and national security benefits associated with aviation leadership. Many U.S. companies have invested heavily to pursue opportunities in those markets, even if they would prefer to invest here at home. This trend will only accelerate so long as there remains skepticism regarding the U.S. Government's ability to deliver on its promise to integrate UAS. At the same time, competitors like China have invested extraordinary resources in an attempt to surpass the U.S. Without strong and timely congressional action, U.S. leadership in aviation hangs in the balance.

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. As another example, the FAA Reauthorization Act of 2018 (at 49 USC 44803) required the FAA to issue broad waivers to designated FAA UAS Test Sites in a streamlined way; as research and development efforts struggle to take off in the U.S. due to regulatory barriers, the FAA has simply failed to implement this important initiative. These are just a few examples of regulatory failures that merit appropriate scrutiny to ensure the intent of Congress is implemented. Accordingly, the CDA urges Congress to exercise its essential oversight function to require relevant agencies to defend their continued inaction to implement previous congressional mandates and request a timeline from the FAA for immediate implementation of these provisions.

We provide below a summary of CDA's priorities for the 2023 FAA Reauthorization, in no particular order. We provide additional detail on each of these priorities below. 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. In addition, Congress should require the FAA to consider the positive aggregate safety gains and environmental impact of UAS use in conducting safety and environmental analyses.
- B. Enabling Expanded UAS Operations and Promoting Safety and U.S. Competitiveness.** Congress should direct the FAA to issue a notice of proposed rulemaking enabling beyond visual

line of sight (“BVLOS”) operations in alignment with the recommendations of the BVLOS Advisory Rulemaking Committee (“BVLOS ARC”) within 180 days of enactment. CDA further urges Congress to undertake various actions that will promote both safety and U.S. competitiveness.

- C. Helping America Win the 21st Century by Enabling Research and Development at Home.** Congress should streamline research and development processes to enable test sites and public-private partnerships to move UAS integration forward and promote U.S. leadership in aviation.
- D. Supporting UAS Manufacturing Capabilities and the Supply Chain System.** Congress should improve the Blue UAS program through continued evaluation of UAS for inclusion on the Blue UAS list and by requiring 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, which will create domestic jobs and boost U.S. competitiveness.
- E. Delivering on 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.

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:

- Create a position of Associate Administrator to oversee UAS integration and thereby empower the FAA’s UAS Integration Office with the resources and authorities to fulfill the mandate of UAS integration into the NAS. This office should have the dual mandate of ensuring the safe integration of UAS into the NAS and encouraging and 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 that:
 - Have 25k ft/lbs. or less of transferred kinetic energy, consistent with the recommendations of the UAS Beyond Visual Line Of Sight (BVLOS) Aviation Rulemaking Committee (ARC), and
 - Operate at an altitude of 400 feet above ground level (AGL) or less and at least three miles from airports.

- Require the FAA to consider the positive aggregate safety gains and environmental impact of UAS use on other modes of transportation and methods of inspection/operation in conducting safety and environmental analyses.

B. ENABLING EXPANDED UAS OPERATIONS AND PROMOTING SAFETY AND U.S. COMPETITIVENESS.

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

- Encourages and Incentivizes Equipage: The very small number of crewed aircraft that routinely operate below 500 feet AGL should be encouraged and incentivized to equip with ADS-B or TABS technology to provide conspicuity, enhance the overall safety of the NAS, and ensure that UAS can avoid them;
- Enables New Technology Solutions: Direct the FAA to explore the authorization and use of non-technical standard order (TSO) devices where risk analysis deems them to be sufficient, such as for installation and use in non-certified aircraft.
- Adopts an Acceptable Level of Risk: Require the FAA to adopt a quantified acceptable level of risk for UAS operations that is modeled upon and consistent with existing accepted general aviation risks.
- Establishes a Risk-Based Framework for UAS Airworthiness: Direct the FAA to adopt industry-based standardized airworthiness compliance standards, modeled after the FAA’s light-sport aircraft certification process, to provide manufacturers with clear guidance to achieve FAA airworthiness approval. Compliance should be declared by U.S. manufacturers, with the FAA retaining ultimate oversight over the safety of each submission. In addition, Congress should require the FAA to work with the European Union Aviation Safety Agency (EASA) to harmonize UAS/Vertical Take-Off and Landing (VTOL) aircraft certification criteria and report back to Congress on progress.
- Advances Network Remote Identification: Require that the FAA accept internet-based network identification as an acceptable means of compliance with rules requiring UAS to be equipped with technology to allow for remote identification.
- Enables Shielded Operations: Direct FAA to immediately implement ARC recommendations that do not require rulemaking, including enabling low-altitude “shielded” operations that permit drones to fly above and within very close proximity to structures and terrain where crewed aircraft are unlikely to operate. Shielded operations provide high levels of value--enabling more efficient inspection of critical infrastructure like long linear infrastructure and power plants, in addition to

public safety missions such as search and rescue--with low levels of risk, given the low altitude and close proximity to structures and the ground. Other countries, including the European Union and Australia, have already established frameworks to enable shielded operations at scale. Congress should direct the FAA to issue guidance, such as standard scenarios or pre-defined risk assessments common with other civil aviation authorities, providing accelerated pathways to enable low-altitude operations under the current rules, within 90 days of enactment. That guidance can and should be issued before a rulemaking on BVLOS is issued, as noted by the BVLOS ARC.

Improve the Airworthiness Process for UAS. Congress should direct the DOT and the FAA to improve and expedite the airworthiness approval process for UAS technologies. For nearly three years, the FAA has tried and failed to adapt the existing and burdensome airworthiness process to UAS. To date, the FAA has yet to approve a single UAS standard airworthiness application even though UAS are the safest form of aviation today in terms of serious injuries or fatalities. Improving these critical processes will promote UAS innovation while ensuring that technological, safety and security advances are implemented efficiently. Congress should also provide adequate resources to implement advanced aviation certification programs. In particular, Congress should provide additional funding for FAA's "Operations" appropriation, specifically designated for the Aircraft Certification Service's review and certification of UAS.

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

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 critically important for the safe and secure expansion of UAS operations and integration of UAS into the NAS – both of which are congressional objectives. Without UTM, the countless benefits of expanded, scalable, and complex UAS operations (e.g., long-range BVLOS flights to deliver packages and medical supplies) for Americans and American businesses may remain out of reach. As a critical precursor to a robust 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 LAANC system will enhance safety by increasing compliance among airspace users, and avoid a chilling effect on innovation in the U.S.

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

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

Modernize the DOT Hazardous Materials Framework. The existing DOT hazardous materials (Hazmat) framework was designed for large, crewed, commercial operations. Movement of small quantities of HAZMAT in the UAS context has a distinct set of considerations. Congress should direct the FAA to modernize the existing framework by promulgating rules tailored to the movement of HAZMAT by UAS.

Streamline Operational 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 absurd results where American companies are not able to prove U.S. citizenship. Aviation citizenship laws should be updated to facilitate, rather than hinder this emerging industry in the modern era.

C. HELPING AMERICA WIN THE 21ST CENTURY BY ENABLING RESEARCH AND DEVELOPMENT AT HOME

Empowering UAS Test Sites to Promote R&D. UAS R&D activities help support the safe and efficient integration of UAS into the NAS. 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; however, 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. To assist the FAA in carrying out the objectives of the UAS Test Site program, Congress should clarify that UAS operated for R&D purposes at UAS Test Sites meet the definition of “public aircraft” in 49 U.S.C. § 40102(a)(41) and qualify for PAO status under 49 U.S.C. § 40125. Additionally, Congress should direct the FAA to encourage the continued use and expansion of technology innovation zones and support communities that are eager to embrace new technologies such as UAS. Congress also should renew or extend the test site mandate from the FAA Modernization and Reform Act of 2012. And as noted above, Congress should request a timeline for immediate implementation of 49 USC 44803.

Leveraging Public-Private Partnerships to Accelerate Advanced Operations. The CDA supports strong federal preemption to enhance safety and avoid a patchwork quilt of regulations. However, the CDA also believes that states, localities and tribes play an important role in the UAS ecosystem. CDA therefore urges Congress to leverage and expand existing public-private partnerships to advance safe and effective advanced drone operations. In order to remain competitive in a tight global marketplace, the U.S. must have accelerated pathways to conduct advanced operations. The BEYOND program, and the Integration Pilot Program (IPP) before it, were designed to play that critical role. Congress earlier codified and funded the IPP. In the next FAA Reauthorization, Congress should rebrand, codify, and expand the BEYOND program for five years to include the full spectrum of uncrewed aircraft, from small UAS to UAM/AAM aircraft capable of carrying large amounts of cargo and people. 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 and AAM operations.

D. SUPPORTING UAS MANUFACTURING CAPABILITIES AND THE SUPPLY CHAIN SYSTEM

Enhance and Expand the Blue UAS Program. The conflict in Ukraine has demonstrated the strategic national security importance of civil 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.

E. DELIVERING ON INFRASTRUCTURE INVESTMENT

Promoting Infrastructure Resilience. With the passage of the Infrastructure Investment and Jobs Act (IIJA), Congress provided \$550 billion in new funding to address infrastructure needs across the country, including \$40 billion over five years to repair, replace, and rehabilitate our crumbling bridges. Inspections of our aging infrastructure are key to successful implementation of the investments Congress has already made. Drones can play a critical role in ensuring safe, accurate inspections are carried out to ensure responsible use of taxpayer dollars. The use of drones for infrastructure inspections has several benefits when compared to traditional inspection protocol. Drones are easier and safer to operate – protecting workers from large equipment and from entering dangerous areas when inspecting assets. Moreover, drones can capture automated data and aerial insights, and stakeholders can perform inspections more regularly, quickly, and efficiently, which increases the safety of our infrastructure and supports higher levels of worker safety. Given the major influx of federal dollars for investment in our crumbling infrastructure, the FAA and the DOT should work expeditiously to ensure the use of drones to increase the efficiency of those investments. To capture and expand on these benefits, Congress should include language within the 2023 FAA Reauthorization appropriating \$5 million to the FAA and requiring the DOT and the FAA to promote the use of drones for infrastructure applications and work with state, local, and tribal governments – as well as private sector critical infrastructure and utility stakeholders – to advance infrastructure inspection operations applications at scale. Congress should also direct the FAA to encourage interagency collaboration to promote the use of drones for infrastructure inspections across all modes of transportation.

Enacting the Drone Infrastructure Inspection Grant (DIIG) Act, HR 5315. To the extent the DIIG Act is not enacted in 2022, we encourage Congress to ensure this critical program is enacted in the 2023 FAA Reauthorization. This Program would have two fundamental pillars, each administered by the DOT:

- (1) \$100 million to enable States, cities, and tribal governments to inspect America’s aging infrastructure with drone technology (including by funding program management capacity or drones), thereby making workers safer, inspections more efficient, and infrastructure more resilient, and 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.

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APPENDIX

Expanding and Enabling the UAS Industry Unlocks Significant Benefits for All Americans

Around the world, advances in hardware and information technology have prompted a UAS revolution, with drones as vital tools that create jobs, protect workers and the environment, inspect critical infrastructure, expand equitable and efficient access to medicines, generate tremendous economic value, and enhance public safety.

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 of about 280 feet in the U.S.). 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.² UAS operations can reduce helicopter flight hours by 44,000 hours per year, which can statistically eliminate 1.6 helicopter accidents.³ In addition, 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.⁴ 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.⁵ 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. The size of the commercial drone market—the fastest growing segment—is expected to reach \$16 billion by 2025 and \$29 billion by 2030.⁶ Those figures represent only baseline estimates; progressive 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.

² <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.

³ 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>.

⁴ *Id.*

⁵ <https://wing.com/resource-hub/articles/why-do-we-need-drone-delivery/>.

⁶ Levitate Capital White Paper, Enterprise Market 2020 at 28.

economy could save up to \$920 million annually using drones to inspect energy utility infrastructure.⁷ 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.⁸

Relatedly, to ensure adequate food supply and ensure 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 use increased 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. The promotion of innovative aviation technologies aligns closely with 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.⁹ 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 and up to 580 car crashes per year; which is equivalent to taking 25,000 cars off the road, and which reduces carbon emissions by up to 113,900 tons per year. This reduction of carbon emissions is the equivalent of planting 46,000 acres per year of new forest.

The use of UAS as a substitute for ground vehicle trips leads to a sustainability impact orders of magnitude greater than what can be achieved through any other method. Light electric drones generate only 2-3% of the carbon emissions compared to an electric vehicle, meaning that substituting UAS trips for ground vehicle trips has an unprecedented decarbonization impact. In particular, UAS often substitute for the least efficient and most carbon-intensive transportation tasks. For example, state departments of transportation

⁷ Levitate Capital White Paper, Enterprise Market 2020, at 6.

⁸ 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).

⁹ 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).

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.¹⁰

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. International NGOs also rely on drones to seed hundreds of thousands of mangrove trees each day, a task impossible for traditional ground vehicles.

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) and to 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 vulnerable populations that are mobility challenged or lack access to a vehicle¹¹ and difficult-to-reach populations.¹² For example, Secretary of State Blinken recently presented an American company with the State Department’s Award for Corporate Excellence for using drones to provide COVID-19 vaccines to rural and remote communities in foreign countries.¹³ 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,

¹⁰ 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/>.

¹¹ 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).

¹² 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>.

¹³ U.S. Department of State, [Secretary of State's Award for Corporate Excellence - United States Department of State](#) (2021).

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 Congress strives to restore and build sustainable infrastructure, UAS can play a critical role. 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 depth 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.¹⁴

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. Indeed, 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 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 to scale and commercial viability, those countries are able to attract investment and jobs in this emerging sector. By contrast, regulatory uncertainty in the United States has forced many American UAS companies to shut down. In fact, due in part to the regulatory barriers here in the United States and foreign government subsidization of private companies, roughly 70-90% of the drone market is controlled by non-U.S. companies. 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, they are unlikely to shift their investments back to the U.S. without regulatory certainty, leaving the U.S. unable to leverage such insights in a timely way to support the UAS industry at home.

Enhancing Homeland Security and Emergency Response. UAS have homeland security benefits. They are frequently utilized in emergency situations, including helping communities recover after hurricanes and other natural disasters by providing internet connectivity and assisting 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.

¹⁴ <https://www.skydio.com/blog/BVLOS-for-remote-drone-operations/>.

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, and this year passing legislation that would extend those restrictions to other federal agencies. 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.