RIN: 2120-AL82
Rule Title: Normalizing Unmanned Aircraft Systems Beyond Visual Line of Sight Operations
Executive Order 12866 Meeting, White House Office of Information and Regulatory Affairs
Drone Package Delivery and Healthcare Sector
December 5, 2024 – 2:30 PM EST

CDA/AUVSI Member Company Participants

Amanda	Armistead	Amazon
Mary	Barnicle	Amazon
Eric	Bergesen	UPS Flight Forward
Benjamin	Berlin	Zipline
Adam	Brady	Xelevate
Richard	Brasel	PteroDynamics Inc.
Jonathan	Daniels	DroneUp
Nick	Devereux	Wing Aviation
Ibrahima	Diallo	United Therapeutics Corporation
Todd	Graetz	Aerolane
James	Grimsley	Choctaw Nation of Oklahoma
Grant	Guillot	DroneUp
Grant	Guillot	DroneUp
Thomas	Jimenez	Kongsberg Geospatial
Okeoma	Moronu	Zipline
Margaret	Nagle	Wing Aviation
Jim	O'Sullivan	Matternet, Inc.
Peter	Sachs	Zipline
Matt	Sloane	SkyfireAI
Rolando	Tapanes	Ferrovial Vertiports
Andy	Thurling	DroneUp
Christine	Tysor	Virginia Tech

AUVSI/CDA Participants

Max Rosen, Michael Robbins, Scott Shtofman, Anna Dietrich	Association for Uncrewed Vehicle Systems International (AUVSI)
Lisa Ellman, Gretchen West, Hanson Causbie, Emily Kimball, Allisa Newman	Commercial Drone Alliance (CDA)

Introduction:

We represent the world's leading drone delivery and drone technology companies operating in thirteen countries, spanning five continents, and having completed over 1.7 million deliveries to date. These deliveries span time-sensitive delivery of blood and lifesaving medical items to consumer products to food. Without a regulatory framework for scalable beyond visual line-of-sight (BVLOS) operations, Americans are deprived of the economic and health benefits enjoyed by many in other countries. Publishing the "Normalizing Unmanned Aircraft Systems Beyond Visual Line of Sight Operations" (also known as "Part 108") Notice of Proposed Rulemaking (NPRM) is a critical step in bringing those benefits to the United States. This group urges you to act before the end of this year to publish the NPRM.

While many of us are Part 135 operators and beginning to operate in a meaningful way, the current regulatory framework is still one of operation by exception versus operation by rule and remains uncertain and takes time to work through. This is not the path to unlocking the benefits this technology can deliver at scale. Instead, the industry needs a rule to create the framework to allow companies to meaningfully scale, accounting for highly automated operations, streamlined and risk appropriate airworthiness approvals, and true BLVOS operations.

In this submission we provide data demonstrating the overall economic impact of BVLOS drone delivery operations on the American economy. We provide specific data demonstrating the benefits of healthcare delivery operations and how these operations have already benefited other countries. Finally, we discuss how consumers, small businesses, and society will benefit from standardized BVLOS operations at scale. This data highlights the importance of Part 108 progressing forward in the rulemaking process.

Overall Economic Impact:

Virginia Tech researchers conducted a study to look at the economic and environmental effects of drone delivery. Our team looked at delivery metrics realized at the first commercial drone delivery site in the United States, operated by Wing and extrapolated the benefits there to explore the impacts it would have in larger cities, cities the size of Austin, TX, and Columbus, OH. The study found that moving delivery operations to drones operating under the new BVLOS rule rather than traditional delivery methods would provide congestion relief to these areas. Doing so in these representative cities that are close to a million residents had the potential to:

- Eliminate 294M driving miles / prevent 580 car crashes a year.[1]
- Eliminate up to 113,000 tons of CO2 emissions per year, the equivalent of 46,000 acres of new forest.[2]
- Boost local business sales by 250%.[3]
- Increase access to prescription medication for 22,000 people with mobility challenges.[4]

In all, we would expect nearly half the population of a large city to utilize drone delivery, which would make our streets safer, our air cleaner, our residents healthier and local economies more fruitful.

[1] 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, vi (Sept. 2020), https://cece.vt.edu/content/dam/econdev_vt_edu/projects/technology/Virginia%20Tech%20%20Measuring%20the%20Effects%20of%20Drone%20Delivery%20in%20the%20United%20States_September%202020.pdf.

[2] *Id.*

[3] *Id.*

[4] *Id.*

Drone Delivery in Healthcare:

Drone delivery has the opportunity to alleviate some of the key challenges facing healthcare in the US, including cost, access, staffing shortages, environmental impact, and quality of care.

Drones can be used to: safely and efficiently deliver prescriptions and critical supplies; facilitate organ transplantation and hospital-to-hospital deliveries of blood, lab samples, chemotherapy agents for infusion, and other supplies; and support virtual and home healthcare. Drones have the potential to play a key role in delivering essential goods, medical supplies, and medications to vulnerable populations that are mobility challenged or lack access to a vehicle.

UPS Flight Forward has operated more than 17,000 flights using the Matternet delivery drone, all in support of healthcare use cases. Data collected from those operations show that drone deliveries were 44% faster and had 98% lower carbon emissions than the ground-based couriers they replaced. Timely and efficient transportation of chemotherapy agents for infusion has improved patient care. Our hospital network customers anxiously await the ability to expand BVLOS operations and continue the patient care and efficiency improvements that drone deliveries enable.

United Therapeutics is developing a line of uncrewed aircraft aimed at solving the logistics challenges facing life-saving organ transplants. At scale, United Therapeutics anticipates transporting about 250 organs per day across the US.

In low-density population areas, one study estimates that drones can help approximately 1,340 people to obtain prescription medication and provide up to nearly $59.3 million in annual healthcare benefits.[5] In higher density population areas, these numbers increase to aiding 22,000 people to obtain medication and achieving up to $959 million in healthcare benefits.[6] Note that these numbers are for single metropolitan areas, thus the nationwide impact will be much greater. Drones can also alleviate prescription abandonment due to pharmacy inaccessibility and lack of transportation equity, estimated by one study to affect almost 20% of prescription users.

The health and economic benefits of drone delivery can't truly be unlocked until drone delivery companies can operate BVLOS at scale without the burdensome requirements of traditional passenger-carrying air carriers.

International BVLOS Healthcare Operations:

The benefits just described are not hypothetical. Zipline's international operations have had a significant impact in the countries that have authorized scaled BVLOS operations. Each Zipline distribution hub serves hundreds of delivery points within a 38,000 square kilometer area and can make more than 300 deliveries in a single day. Each drone can make a roundtrip of up to 250 km.

Here are just a few examples which highlight the impact of normalized BVLOS operations:

- Starting in 2016 in Rwanda, Zipline used its drones to deliver critical blood supply, and soon took over the majority of the country's blood supply chain outside of Kigali on behalf of the Ministry of Health. A Wharton School Study found that in just three years, this intervention reduced maternal mortality due to postpartum hemorrhage by 51%. Additionally, it found that transfusing facilities reduced the number of units destroyed or damaged by 40%.[7]

- In Ghana, Zipline has partnered with the Ministry of Health to deliver vaccines, blood, and pharmaceutical products to over 2,000 health facilities in the country. Zipline has since delivered more than 15 million vaccines across Ghana. Research published in the peer-reviewed Vaccine journal found between a 13 and 37 percent

[5] *Id.* at vii.
[6] *Id.*
[7] H. Jeon, C. Lucarelli, J. Mazarati, D. Ngabo, and H. Song, *Last-mile Delivery in Health Care: Drone Delivery for Blood Products in Rwanda* 15 (May 3, 2024), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4214918.

average increase in childhood vaccination rates in Zipline-served areas in Ghana.[8] A different study found that Zipline's drone delivery of vaccines led to the government of Ghana incurring a net cost of 66 cents per Fully Immunized Child (FIC), which is more cost effective than any other established intervention identified in peer reviewed literature.[9]

Zipline has partnerships with leading US healthcare systems like Michigan Medicine, Mayo Clinic, Memorial Hermann, Ohio Health, Memorial Hermann, Pfizer, Associated Couriers, Cleveland Clinic, and Intermountain Health. Delaying the publication of the Normalizing BVLOS operations NPRM necessarily delays the promulgation of the final rule as well as Zipline's ability to provide these healthcare systems and the Americans they serve with the benefits of drone delivery.

Consumer Delivery:

BVLOS delivery drone operations have the potential to provide substantial benefits to both individual consumers, small businesses, and society at large.

Individual Benefits

Drones have the potential to play a key role in delivering essential goods, medical supplies, and medications to difficult-to-reach populations and to vulnerable populations that are mobility challenged or lack access to a vehicle. We saw an exponential increase in interest by consumers in drone deliveries during the COVID-19 pandemic due to the need for social distancing and contactless deliveries.

The Virginia Tech study examined how the American people in three cities – Christiansburg, Virginia; Austin, Texas; and Columbus, Ohio – perceived drone deliveries. The study utilized drones that carry five pounds or less and travel at high speeds of up to 80 miles per hour. Based on the responses received from participants, the study determined drones can provide the following benefits by the fifth year:

- Economic benefits from drone package delivery are significant, particularly for individuals that face mobility challenges or live in areas underserved by other transportation options. For example, drones could support 3.6-6.6% of metropolitan residents who lack access to a vehicle (up to 66,000 people in a single metropolitan area).[10]
- Consumers who use drones recover $23.0-45.9 million in time savings per year.[11]
- Drone delivery could help a consumer in a lower density community save 31 to 56 hours per year in avoidable travel,[12] or help a higher denser community save time equivalent to $582.5 million per year.[13]
- Drones can also alleviate issues surrounding prescription abandonment which can have a total cost and impact of up to $213 million due to pharmacy inaccessibility and lack of transportation equity.[14]

Partner Benefits

Drone delivery at scale, which can be enabled by the Part 108 rule currently before you, will also have significant benefits for businesses and retailers.

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[8] P. Kremer, F. Haruna, R. Sarpong, D. Agamah, J. Billy, K. Osei-Kwakye, P. Aidoo, D. Dodoo, and M. Okoh-Owusu., *An Impact Assessment of the Use of Aerial Logistics to Improve Access to Vaccines in the Western-North Region of Ghana*, 41 Vaccine 36, 5248 (Aug. 2023), https://www.sciencedirect.com/science/article/pii/S0264410X23007016.

[9] Maria Jose Ospina-Fadul, Pedro Kremer, Scott Stevens, Florence Haruna, Marion Okoh-Owusu, Godfred Sarpong, Kingsley Osei-Kwakye, Joshua Billy, and Osey Sakyi, *Cost-effectiveness of aerial logistics for immunization: a model-based evaluation of centralized storage and drone delivery of vaccines in Ghana using empirical data* 1 (Feb. 21, 2024), https://ssrn.com/abstract=4775458 or http://dx.doi.org/10.2139/ssrn.4775458.

[10] Sarah Lyon-Hill, et. al., *Measuring the Effects of Drone Delivery in the United States*, at vi.

[11] *Id.*

[12] *Id.* at 20.

[13] *Id.* at 16.

[14] *Id.* at 27.

- Wing has developed a custom-built drone delivery platform with accompanying back-end software to enable highly automated, rapid, on-demand deliveries directly to people's residences. The company has successfully delivered over 400,000 packages directly to customers with our commercial partners globally.

As Wing continues expansion across the Dallas-Fort Worth area, studies have quantified the benefits that drone delivery at scale can bring to retail partners:

- At scale, drones could support around 2 percent of all purchases in the Dallas-Fort Worth Metroplex, helping participating businesses increase annual sales by $197 million across the DFW Metroplex.
- Drones could help local businesses access 3 to 4 times as many customers as more households come into range.
- Drone delivery can assist in connecting grocery stores with potential customers who live in food deserts, boosting sales and providing residents with fresher, healthier grocery options. In some areas of Dallas, for example, residents have to travel 3-4 miles to get to the nearest grocery store.

As this analysis demonstrates, retail partners stand to gain significantly from drone delivery at scale in the U.S. and our retail partners are excited to see these benefits grow with the BVLOS rule.

Societal Benefits

A final Part 108 will help enable safe, scalable drone delivery and the societal benefits it promises, including economic, environmental, and safety outcomes.

- Since launching Prime Air drone delivery in the US in 2022, Amazon has safely delivered thousands of items, including prescription medications, to customers in under an hour.
- But there isn't a clear path to scale – which for Prime Air is delivering 500 million packages by drone annually – without additional regulatory certainty. Streamlining BVLOS operations will allow this industry to reach more customers, thereby increasing the societal benefits.
- We expect that a final Part 108 rule will deliver economic benefits by supporting companies' ability to expand drone delivery operating locations, generating new investment and partnerships in communities.
- Scalable beyond visual line of sight operations also stand to provide environmental benefits in communities served by drone delivery. For example, Prime Air's drones are fully electric and produce zero exhaust emissions during flight. Transitioning to renewable energy is one of the most impactful ways to lower carbon emissions.
- Finally, drone delivery also stands to improve safety by offering customers a means to obtain goods without driving to the store.

Conclusion:

Part 108 is the cornerstone of a larger economic transformation that drone delivery can bring to the United States. The benefits are clear: cost savings, job creation, enhanced efficiency, and expanded access to goods and services, particularly for underserved communities. These economic gains are not speculative—they are supported by the experiences of the assembled companies.

Equally clear are the costs of delay. Each day without regulatory clarity means lost economic opportunities, hindered innovation, and missed chances to address critical public needs, such as faster delivery of life-saving medical supplies or equitable access to essential goods in rural areas.

This is a pivotal moment. By publishing the proposed rule now, the Office of Information and Regulatory Affairs has the opportunity to ignite innovation, drive economic growth, and improve the lives of countless Americans.