



April 24, 2015

The Honorable Anthony R. Foxx
Secretary
U.S. Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

The Honorable Michael P. Huerta
Administrator
U.S. Federal Aviation Administration
800 Independence Avenue SW
Washington, DC 20591

Re: Operation and Certification of Small Unmanned Aircraft Systems
Notice of Proposed Rulemaking, Docket No. FAA-2015-0150

Dear Secretary Foxx and Administrator Huerta:

Amazon Prime Air is a future small UAS-based package delivery system. Amazon welcomes the FAA's small UAS notice of proposed rulemaking ("NPRM"), especially because of the agency's stated preference for a performance-based approach to UAS regulation. Yet several of the NPRM's proposed rules and prohibitions are not performance-based and, if adopted as drafted, would not establish a regulatory framework to permit Prime Air operations in the United States. We look forward to working with the FAA on this NPRM and to obtaining permission to get Amazon Prime Air flying safely and soon.

I. AMAZON PRIME AIR

Amazon Prime Air will get packages weighing up to five pounds to customers in 30 minutes or less using small UAS. Not only do we think our customers will love this service, we believe it will benefit society more broadly, and we are committed to making Prime Air available as soon as we are permitted to do so.

Our small UAS will fly below 500 feet (and generally above 200 feet except for takeoff and landing); weigh less than 55 pounds (including the package); and take advantage of sophisticated sense-and-avoid technology, as well as a high degree of automation, to ensure

safe operations at distances of 10 miles or more, well beyond visual line of sight (“BVLOS”). Using this automation, a single operator will be able to safely oversee the operation of many Prime Air vehicles. Our vehicle fleet will grow rapidly, and will continue to develop over time with additional vehicle types. In order to deliver Prime Air service to our customers, we will need permission to conduct small UAS operations that have all of these characteristics. We look forward to working closely with the FAA to ensure Prime Air becomes available to our customers as soon as possible.

II. THE FAA’S SMALL UAS PROPOSAL

Amazon is pleased that the FAA generally supports a performance-based approach to regulating rapidly evolving technology like small UAS.¹ Given the pace at which this technology is advancing, however, we ask the FAA to revise the proposed rule to more fully embrace and embody performance-based regulation that is flexible enough to keep up with expected advancements in technology – many of which are already here, or will be in place by the time the final rule is issued. As soon as possible, the FAA should begin assessing the safety considerations underlying the operating limitations proposed in the rule, rather than establishing blanket prohibitions on certain types of operations (*e.g.*, BVLOS).

We disagree with the FAA’s belief that extending see-and-avoid principles to small UAS, as well as the potential loss of positive control of small UAS, present “unique safety concerns” – and, thereby, warrant delayed consideration.² Although these safety concerns present particular engineering challenges, to be sure, such challenges are not qualitatively different from other engineering challenges facing small UAS designers, so they should be assessed starting now, ultimately resulting in performance-based operating permissions.

Overly prescriptive restrictions are likely to have the unintended effect of stifling innovation and, over time, will fail to offer any corresponding safety benefit as small UAS technology evolves. By contrast, genuine performance-based regulation would provide a flexible framework for operators to demonstrate that these types of operations can be conducted safely. To complement this performance-based approach, Amazon strongly supports the inclusion of deviation authority in the final rule to facilitate the development, testing, and introduction of UAS technologies, including Prime Air.

Amazon supports many of the comments offered by other industry participants on various aspects of the proposed rule. Our specific comments here focus narrowly on those areas that are of the greatest significance for Prime Air’s commercial operations, and respond

¹ *Operation and Certification of Small Unmanned Aircraft Systems; Proposed Rule*, 80 Fed. Reg. 9544, 9552 (Feb. 23, 2015).

² *Id.* at 9548.

to the FAA's request for "comment on whether there are additional requirements that could be specified in ways that are more performance-oriented."³ These areas are: BVLOS operations; the simultaneous operation of multiple, highly-automated small UAS by individual operators; so-called "external-load" operations; and carrying property for compensation. We also offer suggestions on how to optimize the registration process for small UAS. We believe the FAA should consistently adopt a performance-based approach throughout the final rule, and not artificially and unnecessarily limit the promising benefits of small UAS technology.

(a) Beyond Visual Line of Sight

Proposed Section 107.31 should be modified to anticipate and accommodate BVLOS operations. The ability to safely conduct BVLOS operations will unlock the transformative potential that small UAS offer for package delivery and myriad other exciting, and even lifesaving, applications – for example, the delivery of medical supplies and search and rescue operations.

Because this rule is unlikely to be finalized until late 2016 or early 2017,⁴ the FAA should establish, as soon as possible, a mechanism by which small UAS operators may be permitted to conduct BVLOS operations. This is where the technology is headed and, as the NPRM points out, "...because UAS-associated technologies are rapidly evolving at this time, new technologies could come into existence after this rule is issued or existing technologies may evolve to the extent that they establish a level of reliability sufficient to allow those technologies to be relied on for risk mitigation."⁵ In the interim, existing and improving risk mitigation technologies, such as geofencing and return-to-base functions, can be combined with established safety measures (*e.g.*, initial remote operating location) to allow certain BVLOS operations to proceed safely.

While Amazon welcomes the FAA's clarification that the "exemption process will continue to be available for UAS operations that fall outside of [the] rule," including those that "may involve technologies that are not yet mature at the time of this rulemaking,"⁶ this heavy reliance on individual exemptions could hinder the pace of innovation. Instead, the FAA should create a performance-based approach that provides flexibility for technological progress. The FAA has already recognized that "[t]he distinction between design and performance standards is particularly important where technology is evolving rapidly, as is the case with small UAS."⁷

³ *Id.* at 9552.

⁴ GAO, *Unmanned Aerial Systems: Efforts Made toward Integration into the National Airspace Continue, but Many Actions Still Required*, GAO-15-254T (Dec. 10, 2014), at 2.

⁵ 80 Fed. Reg. at 9552 (noting specifically that "[t]hese technologies may alleviate some of the risk concerns that underlie the provisions of this rulemaking like the line of sight rule.>").

⁶ *Id.*

⁷ *Id.*

And the agency is likely to receive exemption requests from small UAS operators seeking to conduct BVLOS operations, in particular, long before the rule is finalized. Accordingly, the FAA should “relax operating restrictions on small UAS equipped with technology that addresses the concerns underlying the operating limitations of this proposed rule, for instance through some type of deviation authority (such as a letter of authorization or a waiver).”⁸

(b) Multiple, Highly-Automated Small UAS

In addition to flying BVLOS, our Prime Air small UAS will operate with minimal human involvement. The prescriptive requirement in proposed Section 107.35, which only allows an operator to fly one small UAS at a time,⁹ limits many of the benefits UAS technology can offer. This restriction is based on the flawed premises that small UAS must be operated under constant manual control and that FAA-recognized mitigation measures like “flight termination system[s]” are not already available today.¹⁰ Also, such a measure is, again, at odds with the FAA’s acknowledgement that performance-based regulation is preferable when technology is evolving rapidly.¹¹ As with the BVLOS restriction and other aspects of the proposed rule, this provision should be revised to specifically permit the operation of multiple small UAS by a single UAS operator when demonstrated that this can be done safely.

(c) External Load Operations

Proposed Section 107.1(b)(3) would also exclude “[a]ny aircraft conducting an external load operation” from coverage under the rule.¹² This blanket prohibition is overly broad, impractical when applied to small UAS, and would greatly limit the potential benefits of this technology. In myriad use cases, these so-called “external-load operations” would be *exactly* what the small UAS was designed for (*e.g.*, carrying a sensor suite or a small package) and would pose no increased risk associated with airworthiness that would necessitate an

⁸ *Id.*

⁹ *See id.* 9587.

¹⁰ *Id.* at 9560, n. 51 (“The use of a visual observer would not be sufficient to allow an operator to operate more than one small UAS because the operator would still need to maintain sufficient concentration to react to the information provided to him or her by the visual observer.”) and 9562 (discussing whether “flight termination system[s]” should have been required under the proposed rule)); *see also* FAA, Notice N8900.227, *Unmanned Aircraft Systems (UAS) Operational Approval* (eff. Jul. 30, 2013) at 15, https://www.faa.gov/documentlibrary/media/notice/n_8900.227.pdf. (“Although it is possible to have a completely manual (direct pilot intervention) UAS, the majority of UAS are autonomous to a certain degree.”).

¹¹ *See* 80 Fed. Reg. at 9552.

¹² *Id.* at 9586; *see also* 14 C.F.R. § 1.1 (“[e]xternal load means a load that is carried, or extends, outside of the aircraft fuselage”).

“evaluation of the air frame for safety performance impacts...[or] require airworthiness certification.”¹³ This limitation also would run contrary to the FAA’s preference for a performance-based approach to this rulemaking. Accordingly, this provision should be eliminated or clarified.

(d) Carrying Property for Compensation

The FAA should also remove the provision in Section 107.1(b)(1) that prohibits small UAS operators from the carrying of property for compensation as “[a]ir carrier operations.”¹⁴ As written, the proposed rule would effectively treat small UAS operators the same as traditional “air carriers” – those operating manned aircraft and potentially carrying hundreds of passengers or tons of cargo. Small UAS may be considered aircraft, but they are certainly not airliners, and there is no reasonable risk- or data-driven basis for including such a restriction on small UAS operators under this rule.¹⁵

The FAA’s rationale appears to rely solely on the premise that “[b]ecause there is an expectation of safe transportation when payment is exchanged, air carriers are subject to more stringent regulations to mitigate the risks to persons or non-operator-owned property on the aircraft.”¹⁶ But this manned aviation construct does not easily translate to small UAS. The economic impact to a business when considering stopping a single delivery via small UAS is negligible compared to the pressures caused by making a decision to cancel a full manned aircraft flight, thus the economic motivation to continue an operation is lessened significantly. Transporting property via small UAS should be permitted under the final rule so long as the weight of the property and the aircraft combined is less than 55 pounds.

Additionally, the FAA *already* permits a wide variety of commercial operations to be conducted *without* an air carrier certificate.¹⁷ The FAA has also, to date, granted more than 220

¹³ 80 Fed. Reg. at 9553. More troubling, however, is the unsupported assertion that these so-called “external-load” operations could only be permitted following the completion of a subsequent rulemaking: “[t]his type of evaluation would be beyond the scope of the flexibility provided for in section 333.” George Thurston, FAA, *Notice of Proposed Rulemaking Regulatory Evaluation – Small Unmanned Aircraft Systems: 14 C.F.R. Part 107* (Feb. 2015), at 71.

¹⁴ *Id.* at 9586.

¹⁵ *See id.* at 9552.

¹⁶ *Id.* at 9553 (noting that operators could transport “their own property within their business” or conduct “research and development operations transporting property”).

¹⁷ For example, with manned aircraft, various types of “aerial work operations, crop dusting, banner towing, and ferry or training flights, are excluded from the certification requirements of Part 119...[and]...are thus permitted...under the less stringent operating rules of part 91.” Letter from Mark W. Bury, Assistant Chief Counsel for International Law, Legislation, and Regulations, to Rebecca B. MacPherson (Aug. 13, 2014), at 2, n. 3 (*citing* 14 C.F.R. § 119.1(e)(4)). There are also circumstances where the FAA does not require certification for an operator to

exemptions authorizing at least two dozen different types of commercial small UAS operations (*e.g.*, aerial inspection of bridges, wind turbine blades and towers, flare stacks, power lines, chemical plants and construction sites) that are subject to the general operating rules of Part 91.¹⁸ Even to the extent the FAA has determined that transporting property for payment would make a small UAS operator an “air carrier” by statute,¹⁹ the agency could easily address the corresponding technical certificate requirement in the final rule.²⁰

(e) Aircraft Registration Process

The FAA should reevaluate its proposed Section 107.89(a) on registration,²¹ in order to streamline the process as much as possible. Small UAS owners should not be required to “provide additional information during the registration process,”²² beyond what is currently required of typical manned aircraft. Moreover, the information “requirements imposed on amateur-built aircraft” would be unnecessarily burdensome for small UAS owners and provide the FAA with little, if any, useful data while the small UAS “market...continue[s to experience] broad innovation until designs emerge that are well balanced against the tasks found to be best served by this segment of aviation.”²³ Such requirements would also disregard the fundamental differences between small UAS and manned aircraft that the FAA has repeatedly recognized in the proposed rule.²⁴ The FAA also can – and should – adopt a simple online registration system²⁵ for small UAS for the same reasons, as well as the anticipated spike in registrations.

carry persons and/or property and receive compensation in furtherance of a business. *See, e.g.*, 14 C.F.R. §§ 1.1 (definition of “Commercial Operator”) and 91.501.

¹⁸ FAA, *Authorizations Granted Via Section 333 Exemptions* (rev. Apr. 24, 2015), https://www.faa.gov/uas/legislative_programs/section_333/333_authorizations/.

¹⁹ 80 Fed. Reg. at 9553 (*citing* 49 U.S.C. § 44711(a)(4)).

²⁰ *See, e.g., id.* at 9558 (“An unmanned aircraft airman certificate would be a new type of airman certificate that would be created by this proposed rule specifically for UAS operators to satisfy the statutory requirement for an airman certificate.”). The statutory “air carrier operating certificate” requirement is contained in the same provision (*see* 49 U.S.C. § 44711(a)(4)) and thus creating a new type of small UAS air carrier certificate would not be “beyond the scope of this rulemaking.” 80 Fed. Reg. at 9549, n. 8

²¹ *See id.* at 9589.

²² *Id.* at 9574.

²³ *Id.*

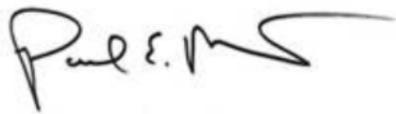
²⁴ *See, e.g., id.* at 9548 and 9565.

²⁵ FAA stated nearly five years ago that “online [registration] submission is not prohibited by the regulatory text, and [that the agency is] exploring options for future acceptance of registration information electronically. *Re-Registration and Renewal of Aircraft Registration; Final Rule*, 75 Fed. Reg. 41968, 41972 (Jul. 20, 2010).

III. CONCLUSION

In conclusion, Amazon is encouraged by the FAA's general preference to adopt a performance-based approach to regulating small UAS operations. However, to truly embrace and embody performance-based regulation that creates a framework for small UAS innovation to flourish, the proposed rule needs to be modified. We look forward to continuing our close working relationship with the FAA in order to realize our vision for launching Amazon Prime Air safely and soon. There is no reason the United States cannot lead the world in fostering safe commercial UAS development and operations. We request that the FAA move towards finalizing this proposed rule, taking into account the concerns we have raised herein, as expeditiously as possible.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Paul E. Misener". The signature is stylized and cursive.

Paul Misener
Vice President for Global Public Policy