

**BEFORE THE
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D.C.**

IN THE MATTER OF

Petition of Amazon Prime Air for Exemption

Docket Number: FAA-2014-0474

COMMENTS OF THE SMALL UAV COALITION

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Introduction

The Small UAV Coalition¹ is pleased to provide its comments in support of the petition for exemption submitted by Amazon.com on behalf of Amazon Prime Air (“Amazon”) under section 333 of the FAA Modernization and Reform Act of 2012 (“the Act”). The Small UAV Coalition is encouraged by Amazon’s proposed and innovative delivery system using small unmanned aerial vehicles (“small UAVs”) to improve the consumer experience. Granting the operations proposed in Amazon’s petition will provide a valuable opportunity for the Federal Aviation Administration (“FAA”) to gather critical information about small UAV operations before and in conjunction with the upcoming small UAS Notice of Proposed Rulemaking, and it will advance the Congressional goal of permitting small UAVs to fly commercially in the United States safely and in the near future.

Members of the Small UAV Coalition, including Amazon, share an interest in advancing regulatory and policy changes that will permit the operation of small UAVs in the near term, beyond the line of sight, with varying degrees of autonomy, for commercial, consumer, recreational and philanthropic purposes. Coalition members are concerned that the current pace of regulatory and policy development, particularly in the U.S. but also in some other countries, has impeded and will impede small UAV development, services, and benefits for consumers. We encourage the FAA to establish, as soon as possible, a regulatory environment for small UAVs, such as Amazon’s, that will foster safe experimentation and innovation so that globally important

¹ Members of the Small UAV Coalition include 3D Robotics, AirWare, Amazon Prime Air, DJI Incorporated, GoPro, and Parrot.

development work and operations can occur here in the U.S. The Amazon petition, seeking authority to conduct UAV testing on its own property, is an ideal example of UAV experimentation that should be expeditiously granted by the FAA in order to expand the knowledge base for small UAV operation, benefitting the FAA and other small UAV stakeholders.

Although the focus of these comments is the Amazon petition, the Coalition recognizes that UAV policy in the U.S. may have ramifications worldwide. There are many UAV manufacturers outside of the U.S. who are or soon will be ready to market their products and services in the U.S., and many U.S. corporations have expanded their small UAV development activities overseas. Moreover, other countries may follow or adopt U.S. regulations or policies for their domestic UAV operations. It should be a U.S. policy imperative, therefore, to foster innovative technologies, such as Amazon's, that promise consumer and public benefits, while addressing safety, as soon as possible. The FAA should work expeditiously to implement its section 333 authority with these policy considerations in mind. The Small UAV Coalition seeks to work with the FAA to expedite testing and operation of small UAVs in the United States. Reasonable regulations, waivers and exemptions, with safety, security, and privacy as their foundation, will encourage the growing domestic and international opportunities.

In general, clarity and clear guidelines are needed from the FAA for development and operation of small UAVs, whether those UAVs are used for recreational or commercial purposes. Because of their size, weight, speed, and the altitude at which they will typically operate, small UAVs such as the ones proposed by Amazon pose considerably less safety risk than larger UAVs, such as UAVs that are used for defense and other aerospace purposes. The Small UAV Coalition urges the FAA to adopt an evaluation framework for UAV operations under section 333 that weighs the relative safety issues and risks of UAVs by class, rather than adopting artificial distinctions among UAVs based upon commercial and non-commercial operations.

The Amazon Petition

As noted above, Amazon's petition seeks FAA permission to conduct research and development activities outdoors on its own property, similar to the type of operations undertaken by hobbyists and modelers. Although Amazon's proposed small UAV operations may pose no greater risk than small UAVs that are used by hobbyists and modelers (because of weight, altitude, etc.), Amazon has proposed to abide by much stronger safety measures than are required for these groups. The Small UAV Coalition does not believe that heightened safety measures should be required for Amazon simply because of the commercial nature of its operations. Small UAVs that operate for any purpose, commercial or non-commercial, should be judged based upon the precautions taken for safe operation, taking into consideration the relevant technical parameters of the UAV.

Amazon proposes to operate a rotor-powered UAV with a battery source on Amazon property near Seattle, within the visual line of sight of the operator and/or one or more observers. Its UAVs, with any payload, will weigh less than 55 pounds and be operated in Class G airspace below 400 feet AGL. The operations on and above Amazon's property will be a sufficient distance from any airport and other ports as well as densely populated areas. Amazon will control access to its property during UAV operations and limit it only to authorized personnel.

The pilot in command, aided by geo-fencing technology, will ensure that the UAVs remain within the lateral and vertical boundaries of the operating area. The Amazon pilot in command will hold a current FAA private pilot certificate or will have completed FAA private pilot ground instruction, and will have passed the FAA private pilot written test, as well as completed training on operating the UAV under normal, abnormal, and emergency conditions. The pilot in command and any Amazon operator or observer will maintain two-way communications during the operations. The UAV will have the capability of returning home or to a specific location should the communications link be lost. The Amazon operator will have capability independent of the UAS flight control system to force a controlled landing if necessary.

The Small UAV Coalition offers the following comments in enthusiastic support of the Amazon petition:

Consistent with Section 333, the FAA should authorize UAV operations for Amazon in the near term, including in advance of the small UAV rulemaking.

In section 333 of the Act, Congress directed the FAA to determine if certain UAV operations may be authorized even in advance of the completion of the small UAV rulemaking mandated in section 332 if operations will not “create a hazard to users of the national airspace system or the public or pose a threat to national security.”² The Small UAV Coalition believes the FAA should grant Amazon’s petition under Section 333 because Amazon proposes to operate on Amazon property, with many additional safety protections, while undertaking crucial UAV development work that will benefit the FAA, other small UAV stakeholders and, ultimately, consumers.

Section 333 is best understood in conjunction with the mandated small UAV rulemaking under section 332.³ Congress directed the FAA, under section 332, to publish a final small UAV rule by August 2014. In contrast, Congress directed the FAA, under section 333, to determine by August 2013 whether certain unmanned aircraft systems may be operated safely even before completion of the section 332 rulemaking. Although neither deadline has been met, we believe it is imperative that the FAA continue to push forward with both initiatives, expeditiously

² Section 333 states in relevant part:

(a) IN GENERAL.— Notwithstanding any other requirement of this subtitle, and not later than 180 days after the date of enactment of this Act, the Secretary of Transportation shall determine if certain unmanned aircraft systems may operate safely in the national airspace system before completion of the plan and rulemaking required by section 332 of this Act[.]

(b) ASSESSMENT OF UNMANNED AIRCRAFT SYSTEMS— In making the determination under subsection (a), the Secretary shall determine, at a minimum—

(1) which types of unmanned aircraft systems, if any, as a result of their size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line of sight do not create a hazard to users of the national airspace system or the public or pose a threat to national security; and

(2) whether a certificate of waiver, certificate of authorization, or airworthiness certification under section 44704 of title 49, United States Code, is required for the operation of unmanned aircraft systems identified under paragraph (1).

(c) REQUIREMENTS FOR SAFE OPERATION. — If the Secretary determines under this section that certain unmanned aircraft systems may operate safely in the national airspace system, the Secretary shall establish requirements for the safe operation of such aircraft systems in the national airspace system.

³ There is no pertinent legislative history that sheds any light on the meaning of this provision.

processing and approving petitions filed under section 333, such as the Amazon petition. The clear intent of Congress was to direct the FAA to authorize certain UAV operations on an expedited basis, including in advance of completing the rulemaking.⁴ Amazon has made a strong showing justifying grant of the requested authority.

Section 333 directs the FAA to authorize UAV operations that may safely operate in the national airspace system; Amazon’s petition demonstrates safe operations.

Congress gave the FAA authority to determine whether certain unmanned aircraft systems may be operated safely in the national airspace system,⁵ and listed in section 333 seven factors for the FAA to consider. The FAA is to consider operational risks and steps that can be taken to eliminate or reduce such risks. In the view of the Small UAV Coalition, risk should be the touchstone for any and all FAA rules, waivers, and exemptions governing UAVs.

As we previously noted, Amazon seeks permission to conduct activities on Amazon property that are already accepted for hobbyists and modelers. We recognize that, in implementing the Federal Aviation Act as Congress directed, the FAA historically has imposed greater requirements on commercial operators than on general aviation. However, those requirements derive from a legitimate public concern over passenger safety on manned aircraft that serve as common carriers for public transportation, and do not apply to operation of small unmanned aircraft, such as the UAV operations proposed by Amazon.

Furthermore, Amazon pledges to abide by much stronger safety measures than those required of non-commercial operators, including limiting access to the property to only authorized personnel; maintaining two-way communications between observer and pilot in command; requiring the pilot in command to either (A) hold a current FAA private pilot certificate or FAA-recognized equivalent, or (B) have completed FAA private pilot ground instruction and passed the FAA private pilot written examination; and using only operators that have completed training on operating the UAV in normal, abnormal, and emergency conditions.

Unlike the model aircraft concept defined in section 336, the FAA’s safety evaluation of UAV operations does not hinge on whether the operation is public, commercial, recreational or philanthropic.⁶

Finally, the Small UAV Coalition wishes to respond to comments filed by the Air Line Pilots Association (“ALPA”) in other section 333 exemption dockets, in which ALPA argues that all

⁴ In section 332(b)(1), Congress directed the publication of a rule for small unmanned aircraft systems “to the extent the systems do not meet the requirements for expedited operational authorization under section 333 of this Act.” Congress clearly intended for the FAA to proceed expeditiously to authorize safe operation and experimentation of small UAVs.

⁵ Subsections 333(a) and (c) provide that safety in the national airspace system is the ultimate consideration.

⁶ Although Congress in section 336 limited the special rule for model aircraft to aircraft “flown for hobby or recreational purposes,” the FAA need not and should not apply a commercial/non-commercial distinction in its small UAV rulemaking under section 332 or when considering petitions for exemption and other requests under section 333. All regulations and policies with respect to small UAVs should be safety and risk-based, taking into consideration size, weight, speed, altitude, etc., and this approach should be taken in evaluating Amazon’s petition.

aircraft, manned and unmanned, in the National Airspace System (“NAS”) “must operate to the same high level of safety.” This position is at odds with the explicit direction by Congress in the Federal Aviation Act,⁷ that the FAA promulgate safety regulations considering “(A) the duty of an air carrier to provide service with the highest possible degree of safety in the public interest, and (B) differences between air transportation and other air commerce.” Requirements imposed on common carriers for air transportation under Parts 121 and 135 are much more stringent than requirements imposed on general aviation under Part 91. Certainly requirements may differ depending on whether a UAV will be operating in Class A or Class G airspace. Manned aircraft are currently subject to different requirements based on the airspace in which they are operated. Here, Amazon proposes to operate its UAVs in Class G airspace below 400 feet AGL, with vertical boundaries reinforced by geo-fencing technology. It also will operate in an unpopulated area, with operational capabilities to minimize risk. These precautions are more than adequate to ensure safe operations by Amazon. The Small UAV Coalition believes some of these precautions are more than the FAA should ultimately require for small UAV operations.

While the Coalition is committed to ensuring the safety of small UAV and UAS operations in the National Airspace System, we believe FAA safety regulations should be proportionate to the risks posed by the particular UAV operations proposed, distinguishing small UAVs from other UAVs. Small UAV operations, such as those proposed by Amazon, pose minimal risks to safety and should, therefore, be subject to minimal and appropriate regulations.

When evaluating the Amazon petition, the FAA should consider the seven factors Congress directed the FAA to consider, but the FAA should recognize that this list is not exhaustive or requisite.

As Amazon’s petition shows, factors other than the seven factors set forth by Congress in section 333 are relevant. In section 333, Congress directed the FAA to consider the following when making section 333 determinations: size, weight, speed, operational capability, proximity to airports, proximity to populated areas, and operation within visual line of sight. But in the words immediately preceding this list, Congress stated that the FAA is to consider these factors “at a minimum.” The FAA may consider additional relevant factors not enumerated in section 333, including some factors that are addressed in Amazon’s petition, such as: location, limiting operational site access to authorized personnel, the airspace and altitude of its small UAV operations, two-way communications capability, and pilot training and experience.

Each of the seven identified factors identified by Congress is potentially relevant to the FAA’s safety risk determination, but not all of these factors are a prerequisite for every exemption. In particular, the FAA cannot interpret section 333 as prohibiting operations beyond the visual line of sight in every case. If Congress intended any factor to be a requirement, it would have mandated such restrictions by law.

It is incumbent on the FAA to evaluate each factor within the context of the applicant’s proposed UAV operations. Consider the factor of weight. Congress did not provide a weight (or size) limit for model aircraft, and provided that a small UAV (for purposes of the small UAV rulemaking under section 332) could weigh up to 55 pounds (section 331(6)). Congress did not

⁷ 49 U.S.C. 44701(d) and 44702(b).

provide a weight (or size) limit in section 333. Whether the weight of the aircraft poses an undue safety risk will depend on the facts and circumstances of the particular UAV operations: altitude of operation, airspace for operation, and geographic area. In Amazon's case, the weight of its small UAV, with payload, is less than 55 pounds. Considering the altitude and area in which its small UAVs will be operated, on Amazon property with access limited to authorized personnel, its UAV operations will pose no safety risk to other aircraft, national security, or persons on the ground.

Other factors the FAA may consider include speed and proximity of UAV operations to airports and populated areas. With respect to speed, the relevance of this factor depends on the facts and circumstances of the particular UAV operations. The speed of a UAV operating in the same airspace as commercial aircraft operations is a legitimate safety factor. However, the speed of a UAV operating below 400 feet AGL should be evaluated with respect to safely maneuvering, detecting and avoiding. Amazon's small UAVs may travel over 50 mph, but the operations covered by this petition will take place below 400 feet AGL, within the visual line of sight, and confined to Amazon's property. Thus, these operations do not create any safety risk that is not more than adequately mitigated.

The proximity of UAV operations to airports and populated areas are also relevant factors. There are over 19,000 airfields in the United States; of these, only 5,000 or so are public use airfields. Over 3,000 airports are listed in the National Plan of Integrated Airport Systems, but only 500 of these have commercial service. The safety risk of a UAV operating close to an airfield that is not public is appreciably less (and easily managed) compared with UAVs operating proximate to commercial service airports such as John F. Kennedy International Airport or Chicago O'Hare International Airport. Amazon will confine its UAV operations to its own property, which is a sufficient distance from any airport, heliport, seaplane base, spaceport, or other location with aviation activities.

The risk of UAV operations that are close to populated areas is highly dependent on the specific facts and circumstances. Congress did not define "populated area" and it is not apparent that this concept is the same as or similar to the concept of "congested area" in 14 C.F.R. 91.119. Similar to the concept of shielding (used in determining electromagnetic interference), tall buildings or structures between airports or populated areas and the proposed small UAV operation may allow a small UAV to operate without a safety risk, despite the operation's proximity to either. There is often a congregation of people present on a closed set where a UAV will be used for filming; however, the UAV may be operated safely nearby or inside a populated area. Amazon's proposed UAV operations will avoid this issue by conducting its operations on private property, with only Amazon employees, contract personnel, and invitees present. Security measures will be in place to deter unauthorized access and, to eliminate distractions, Amazon will prohibit operators and observers from engaging in any activity that could interfere with the safe operation of Amazon small UAVs.

Finally, Congress also directed the FAA to consider operational capability of the UAV. In addition to geo-fencing capability, each Amazon small UAV will be equipped with operational capabilities to ensure safety. In the event of difficulty, observers will be able to force safe landings using both hardware and software physically separate from flight control systems. Each

UAV will also stop operating and safely return to a previously identified location on Amazon's private property if the communications link is lost.

We believe the relevant factors for the FAA's UAV evaluation, whether or not identified in section 333, should be viewed through the lens of the particular UAV operations that are proposed in each petition, including Amazon's petition. In considering whether to authorize UAV operations, the FAA should evaluate and balance these factors using safety and security as cornerstones, not rigidly adhere to a list of factors that may or may not be relevant or important to particular UAV operations. In the view of the Small UAV Coalition, there should be no question that Amazon's proposed operations satisfy the seven factors set forth by Congress and many additional mitigating factors that will ensure the safety and security of Amazon's proposed small UAV operations.

Section 333 permits the FAA to authorize UAV operations without type, production, or airworthiness certification; Amazon has demonstrated that no such certification is necessary.

Congress expressly vested in the FAA authority to determine the substantive safety requirements to impose on UAV operations under section 333. Congress also left to the FAA the question of how authorizations would be granted pursuant to section 333. It tasked the FAA with determining *whether* a certificate of waiver, certificate of authorization or airworthiness certification under 49 U.S.C. 44704 should be required.

Amazon's petition, similar to other petitions, seeks an exemption from the airworthiness certification regulation.⁸ Given the nature of its proposed operations, we believe an exemption from the certification requirements for experimental category aircraft is warranted. Experimental category aircraft are so named because the FAA certifies aircraft under the experimental category for research and development, and specifically for "testing new aircraft design concepts, new aircraft equipment, new aircraft installations, new aircraft operating techniques, or new uses of aircraft."⁹ The airworthiness certification process is unnecessary if the FAA and the UAV operator agree on certain operational limitations to ensure safety (similar to limitations on an airworthiness certificate). The operational limitations proposed by Amazon should be more than adequate to grant an exemption from the airworthiness certification regulation. Furthermore, we note that similar small UAV operations, conducted by hobbyists and modelers, are appropriately permitted without such certification.

In general, the Small UAV Coalition strenuously asserts that traditional pilot certification requirements for manned aircraft are unnecessary and inappropriate for operators of small unmanned aircraft. Although the requirement for a pilot to hold an airman certificate is statutory, section 333 of the Act instructs the FAA to consider whether to require, waive, or exempt the enumerated certificates "at a minimum." The FAA should waive or exempt the pilot certification requirement with respect to small UAS operators under section 333 as well as under its general waiver/exemption authority in the Federal Aviation Act.¹⁰ The manifold innovative UAV

⁸ 14 C.F.R. Part 21.

⁹ 14 C.F.R. 21.191(a).

¹⁰ 49 U.S.C. 44701(f).

technologies, particularly for small UAVs, should not be subject to a one-size-fits-all paradigm with respect to pilot certification. Applying manned aircraft pilot certification requirements to small unmanned aircraft is not necessary as a matter of safety, and does not make sense as a matter of public policy.

Section 333 permits the FAA to use any administrative process to authorize UAV operations.

Congress also left to the FAA the question of how the substantive safety requirements under section 333 would be imposed. Congress provided no guidance other than to expedite operational authorizations, including in advance of completing the small UAV rulemaking under section 332. Amazon's petition for exemption is one of over 30 petitions docketed since the FAA invited entities to submit petitions.

Although the FAA may use its Part 11 exemption process to authorize UAV operations under section 333, the FAA also has broad authority under the Federal Aviation Act to grant an exemption from any safety regulation "if the Administrator finds the exemption in the public interest."¹¹ In evaluating Amazon's petition and other petitions filed under section 333, it may be more appropriate to assess the safety impact, if any, of the particular small unmanned aircraft operations that are proposed, rather than to engage in a comparison with Federal Aviation Regulations adopted with manned aircraft in mind.

We encourage the FAA, in granting an exemption petition under section 333, to advise the public, where it is appropriate, that a subsequent petition requesting the same relief under the same material facts will be granted. For the FAA's own administrative convenience, and for the benefit of small UAV innovation, the FAA can and should make public interest and safety determinations more broadly than in case-by-case exemption proceedings. Three illustrations, among many others, may be found in section 333 petitions for exemption filed to date, including Amazon's. For example, the Federal Aviation Regulations require that the approved Airplane Flight Manual, the aircraft registration certificate, and the aircraft airworthiness certificate be carried on board the aircraft.¹² For all small UAVs, regardless of the nature of their operations, these requirements are impractical and may be remedied simply by ensuring these documents are maintained in the UAV operator's identified ground station. Consistent with the intent of section 333, the FAA can impose this requirement across the board. Congress directed the FAA in section 333 to determine which "types of operations" may be conducted safely in the national airspace system; thus, Congress contemplated the making of generally applicable safety determinations apart from and in advance of the small UAV rulemaking.

Section 333 authority does not expire on the publication of a small UAV rule.

Congress directed the FAA, under section 333, to determine whether certain unmanned aircraft systems may be operated safely even before completion of the section 332 rulemaking. However, section 333 is not temporary authority which expires with the publication of a final small UAV rule. There is no "sunset" provision. If Congress had intended section 333

¹¹ 49 U.S.C. 44701(f).

¹² 14 C.F.R. 91.9(b), 91.203(a) and (b).

authorizations to expire, or that the FAA would no longer entertain petitions for exemption after publication of a final rule, it would have included such a provision. For instance, Congress included a sunset provision for its pilot program for passenger facility fee authorizations at non-hub airports.¹³ Congress inserted sunset triggers in connection with age standards for pilots operating certain types of flights.¹⁴ A view that section 333 authorizations must expire or be superseded by the small UAV rule is unsupported by the statutory text. There is no basis to opine that UAV operations under section 333 and upcoming small UAV rules will not exist in parallel. Rather, section 333 gives the FAA the necessary flexibility to grant case-by-case authority and foster the development of the U.S. UAV industry.

The small UAV rulemaking will benefit from safety determinations made by the FAA under section 333, including making a positive decision on Amazon's petition in the near term.

The Small UAV Coalition believes the FAA should adopt and propose some of the precedents it sets in granting section 333 petitions as part of the small UAV Notice of Proposed Rulemaking, provided that it exercises proportionality, taking into account specific classes of UAVs, such as the particular characteristics of small UAVs. As we have made clear, the Small UAV Coalition firmly believes that operators will employ different technologies and standards commensurate with the particular capabilities of the UAS and the particular capabilities of the UAV operations. It may be that some technologies and protocols may be generally applicable, but others should be tailored to specific classes of UAV/UAS technology. We encourage the FAA to adopt the broadest and most flexible approaches at this stage to ensure continued innovation of technology and standards that will allow for safe small UAV operations across a myriad of small UAV/UAS technologies and applications.

We also believe that the experience the FAA and the UAV industry gain from UAV operations authorized under section 333, as well as the experience gained at FAA test sites and elsewhere, can improve and accelerate the rulemaking process. Allowing Amazon and other petitioners to begin near-term operations under section 333, with appropriate conditions and limitations, will provide innovators the necessary physical and regulatory space to pioneer technologies and develop viable business models. This experience and knowledge also will allow the FAA to develop the optimal regulatory framework that both promotes safety and supports growth of a very promising industry by allowing the FAA to learn from operations pursuant to section 333 authority and incorporate insights and lessons learned into the regulatory framework. All of this will allow manufacturers, operators and other interested parties to effectively participate in the rulemaking process with real-world data, observations and analysis.

Conclusion

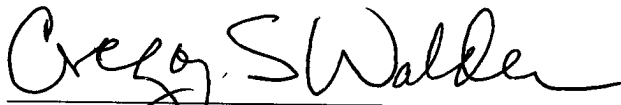
The Small UAV Coalition is pleased to support this petition and to recommend that the FAA apply section 333 flexibly in this case. Amazon's petition demonstrates that its small UAS operations can be conducted safely on Amazon-controlled property, with a number of voluntary safety precautions. In the view of the Small UAV Coalition, the FAA should expeditiously grant Amazon authority under section 333. The Small UAV Coalition believes that Amazon's

¹³ 49 U.S.C. § 40117(1)(7).

¹⁴ 49 U.S.C. 44729(c)(2) & (d).

important development work, to use small UAVs to introduce a new and innovative delivery system for consumers, provides a valuable opportunity for the FAA to advance the Congressional goal of permitting small UAVs to fly commercially in the U.S. safely and in the near future.

We believe the relevant factors for the FAA's evaluation of the Amazon petition – including several factors we have identified that are not enumerated in section 333 – all support a grant of the Amazon petition. In considering whether to authorize UAV operations such as Amazon's, the FAA should evaluate and balance these factors using safety and security as cornerstones. There is no question that Amazon's proposal puts safety and security first. The Small UAV Coalition hopes that the FAA will create a regulatory environment for UAVs that will foster safe experimentation and innovation for companies such as Amazon, so that globally important UAV development work can occur in the United States.



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