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U.S. Department of Transportation
Docket Operations
West Building – ground floor
Room W12-140
1200 New Jersey Ave., SE
Washington, DC 20590

Reference: Amazon Prime Air Petition for Exemption, Regulatory Docket No. FAA- 2019-0573

The Experimental Aircraft Association (EAA) is the world leader in recreational aviation. With an international membership of more than 220,000 people in over 100 nations, EAA brings together pilots, aircraft builders, owners, and aviation enthusiasts who are dedicated to sharing *the Spirit of Aviation* by promoting the continued growth of aviation, the preservation of its history and a commitment to its future.

EAA's comments to Amazon's petition for relief from certain rules in 14 CFR 61, 91, and 135 in order to conduct commercial package delivery with unmanned aerial systems (UAS) in beyond visual line-of-sight (BVLOS) operations follow.

Background of EAA's Position on UAS

EAA remains committed to the philosophy that UAS must be *integrated* into the airspace, with no concessions given to UAS that would encumber manned aircraft[1] in any operation that is presently allowed, nor any equipment mandates imposed on manned aircraft beyond what is already required. Additionally, manned aircraft *must* have the right-of-way in all circumstances.

The safety threat of UAS to manned aircraft is asymmetric – they are too small to be seen under the traditional "see and avoid" principle that relies on the mutual ability of flight crews to physically see all other nearby aircraft when operating under visual flight rules (VFR). Furthermore, the risk of physical harm from a collision is solely borne by the occupants of manned aircraft.

[1] For the purposes of these comments, references to manned "aircraft" include ultralight *vehicles* operated under 14 CFR 103

Our requirements for safe integration of UAS into the National Airspace System should not be interpreted as wholesale resistance to change. To the contrary, we view the UAS industry as rich with opportunities for personal manned aviation, with potential benefits of new participants, infrastructure, technology, and more. But the privileges of our members to safely navigate the airspace as they currently do will always be our first priority, and a non-negotiable condition of our support for UAS integration.

Sense and Avoid

Amazon correctly states in its proposal that it must demonstrate an equivalent level of safety to the manned aircraft principle of "see and avoid," which at the most basic level requires all pilots to visually identify and maneuver to avoid airborne threats. In VFR flight, electronic means of mitigating midair collision such as ADS-B and air traffic control (ATC) advisories are considered optional and secondary to a visual lookout. There is therefore heavy emphasis on the human eye's ability to see traffic in close proximity.

This doctrine is inadequate for shared airspace between manned aircraft and UAS. To use the example at hand, Amazon's MK27 is barely more than two meters wide, or just over seven feet. By comparison, a Cessna 172 has a wingspan of 36 feet, more than five times the width of the UAS. For even the sharpest-eyed pilot, the UAS will be difficult to see at a safe distance. Therefore, UAS must carry the burden to "sense and avoid" manned aircraft and other obstacles. EAA is pleased to see that Amazon appears to hold a similar view in their proposal.

EAA must also stress that "non-collaborative" aircraft will comprise a significant percentage, if not a majority, of traffic encountered by these UAS. ADS-B and Mode C transponders are only required in airspace enumerated by 14 CFR 91.225 and 215, respectively, and there are further exceptions for aircraft unequipped with engine-driven electrical systems, as well as gliders and balloons. As stated in the previous section, additional equipment mandates upon manned aircraft are unacceptable, as they represent a burden to the general aviation community undertaken for the benefit of UAS interests.

EAA proposes that Amazon must show that their sense and avoid technology performs to, at minimum, a 10^{-9} failure rate for both collaborative and non-collaborative aircraft. This is the equivalent standard for critical systems on manned aircraft. Any operating scheme must account for the presence of aircraft without position-broadcasting equipment, and the performance of Amazon's visual identification system must be held to the highest rigor.

Operations Below 400 Feet AGL

A key assumption underpinning Amazon's operating plan is espoused in their request for relief from 14 CFR 91.113(b)-(f) on page 20 of their exemption request. They assert that "the probability of an airborne encounter with other flight operations occurring below 400 feet AGL, in an operating area away from airport operations and other known flight operations (*e.g.*, a published Academy of Model Aeronautics flying field), is extremely low," and further states in the next section on relief from safe altitude minima that below 400 feet "manned operations will be extremely infrequent (other than takeoff and landing corridors at airports that we will avoid)."

While operations below 400 feet are certainly far less frequent than those above this altitude, EAA does not share Amazon's optimism that the probability of an encounter at this altitude is superlatively low. While the risk does not necessarily preclude Amazon from operating as requested, it does highlight the importance of effective sense and avoid technology. We offer the following examples of EAA members operating below 400 feet away from charted airports.

Part 103 Ultralight Vehicles

Figure 1 Powered paragliders, like other ultralights, fly at low altitude and can operate from small fields

Due to their light weight, slow speeds, and unique modes of operation, ultralight vehicles are permitted by 14 CFR 103 to operate at any altitude so long as they do not operate over congested areas, or within controlled airspace without ATC approval.

A good example of ultralight operators are powered paragliders (PPG). There has been a surge in PPG popularity in recent years, and they are usually flown under Part 103 as ultralight vehicles. They can be footlaunched from areas as small as suburban backyards and safely operate below 400 feet. Few are equipped with advanced instrumentation and many do not carry radios.

In 1984, the FAA published Advisory Circular 103-7 as a companion to the recently-established rule on ultralights. It contained the following cautionary note to operators:

> You are Responsible for the Future Direction the Federal Government Takes With Respect to Ultralight Vehicles. The actions of the ultralight community will affect the direction Government takes in future regulations. The safety record of ultralight vehicles will be the foremost factor in determining the need for further regulations.

We believe that over the past 35 years the ultralight community has kept its end of this bargain. It deserves the freedom to operate with no additional safety risk imposed upon them by any new activity.

Private Airports/Helipads

For many aviators, their version of the American Dream involves owning a small airstrip. Near EAA's home of Oshkosh, Wisconsin, there are many small runways on farms and other rural property, but private airports can be found in built-up areas – close to busy airspace – as well. We also cannot forget helicopters, which only require minimal square footage to operate, not unlike UAS, as well as helicopters that may operate in areas for medical and other emergency tasks. Not all of these landing areas are registered and/or charted, and many states do not require their owners do so. Therefore, UAS

Figure 2 Private airstrips (to the right of the highway in this photo) can be close to residential areas, and not all are required to be charted

operators cannot assume that all airports and helipads are known through publicly-available sources.

Backcountry Flying

Figure 3 "Backcountry" flying may involve remote operating areas or off-airport locations closer to town

Backcountry aviation is becoming a very popular pursuit for pilots who find enjoyment and satisfaction in operating their aircraft out of small fields, beaches, and other off-runway areas. Some of this "backcountry" flying can be surprisingly close to civilization. To use another example from EAA's home state, southwestern Wisconsin and areas along the Wisconsin River are popular "backcountry" spots, not far from some major cities – one need not go to Alaska to find aircraft with big tires plying the bush.

Seaplanes

Seaplanes do not require charted areas to takeoff and land, and subject to local jurisdiction can operate anywhere that there is suitable water. Note that simply avoiding water is not sufficient, as arrival/departure corridors could be over land.

Figure 4 Seaplanes use diverse bodies of water, and can fly low over shorelines when arriving/departing

Open Water and Sparsely-Populated Areas

Finally, while such operations are relatively rare it is important to note that 14 CFR 91.119 allows flight below 500 feet over open water and sparsely-populated areas. 500 feet is not quite the hard floor on all operations that it is sometimes assumed to be.

44807 Exemption on Airworthiness

EAA respects the will of Congress in creating 49 USC 44807, which allows exemptions for unmanned aircraft to operate commercially pending type certification. We would, however, request that Amazon's type certification process be monitored carefully by the office controlling this exemption, and upon discovery of any unsafe characteristics the operations of the craft be immediately re-evaluated.

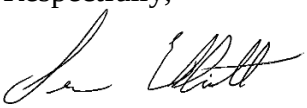
Conclusion

As previously stated, EAA's interest in this petition is that Amazon's operation and that of all UAS users be safely integrated into the NAS alongside manned aircraft. The stakes are simply too high for any alternative to be acceptable. The UAS community must also find the means to integrate without manned aircraft facing any mandates or restrictions for the benefit of UAS. EAA believes that Amazon's operating plan holds promise, as it does consider the risks to

manned aircraft and proposes appropriate mitigations. EAA implores the FAA to validate that the risk assumptions are accurate and that the mitigations are reliable to the greatest degree of certainty.

Please do not hesitate to contact EAA if we can assist further.

Respectfully,



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