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April 12, 2019

U.S. Department of Transportation
Docket Operations, M–30
1200 New Jersey Avenue SE.
West Building Ground Floor, Room W12–140
Washington, DC 20590–0001

Re: Docket Number FAA–2018–1086 and Notice Number 18–08; Advanced Notice of Proposed Rulemaking for the Safe and Secure Operations of Small Unmanned Aircraft Systems

To Whom It May Concern:

The Aircraft Owners and Pilots Association (AOPA) submits the following comment regarding the Advanced Notice of Proposed Rulemaking (ANPRM) for the safe and secure operations of small Unmanned Aircraft Systems (sUAS). Our members collectively operate over 85% of all general aviation aircraft in the United States and represent two-thirds of all pilots, making AOPA the largest civil aviation organization in the world. General aviation pilots fly at all altitudes, in all airspace, in rural and urban environments, and operate from over 19,000 unique takeoff and landing sites in the country.

AOPA also represents tens of thousands of members who fly sUAS, including several thousand members who solely fly sUAS aircraft. The FAA's ANPRM highlights the safety and security questions raised by sUAS operations in the National Airspace System (NAS). Before beyond visual line of sight operations can be routinely conducted, it is important certain safeguards are put in place to ensure manned aviation and the public are adequately protected. AOPA recognizes the FAA's methodical approach to sUAS integration and its performance-based approach to new rules. We must take the "crawl, walk, run" approach to expanding sUAS operations to ensure the data supports new or amended regulations when it pertains to safety. The integration of sUAS into the NAS where existing manned operators fly routinely presents numerous challenges. We appreciate this opportunity to provide our members' perspective on these challenges and the importance of leveraging technology to ensure safe operations and to reduce risk.

UAS Remote Identification Fundamental to Integration

AOPA was a member and active participant in the UAS Identification and Tracking (ID) Aviation Rulemaking Committee (ARC) as we recognized the importance of working with the FAA and industry stakeholders to shape a rule that will ensure remote ID requirements promote accountability of sUAS pilots while safely allowing more advanced sUAS operations. Enabling an sUAS and its pilot to be quickly identified by law enforcement and security personnel is a necessary step toward expanding the authorized use of sUAS for flights beyond visual line of sight. This technology may also mitigate the necessity for counter-UAS technology at many low-threat locations, like small airports, where manned aircraft may be inadvertently impacted by physical and electronic countermeasures. Remote ID is important for the identification of malicious or noncompliant aircraft and for the individuals responsible.

The recommendations of the UAS ID ARC lay the foundation for this ANPRM and the Notice of Proposed Rulemaking (NPRM) for the Operation of Small Unmanned Aircraft Systems over People; however, we find these rules incomplete without the "Remote Identification of Unmanned Aircraft

Systems" draft rule also being available for review. Remote ID is intertwined with these concepts and we are missing that critical leg of the stool. We look forward to the FAA publishing the NPRM for the "Remote Identification of Unmanned Aircraft Systems"; the public's feedback is important to have on all aspects before proceeding with any final rule.

AOPA supports the progress made in ASTM F38 and their recently drafted "Remote ID and Tracking" document. We believe several components of this effort still need discussion, including privacy concerns, spectrum, affordability of technology, participation requirements, noncompliance penalties, and broadcast distance. Broadcast distance has become all the more important as we have all now witnessed many of the busiest airports in the world closed due to UAS sightings. Ensuring a remote ID broadcast distance that allows airports, the FAA, and law enforcement to adequately react is critical. The FAA must address these various topics in their NPRM.

AOPA's Response to Proposals Under Consideration

A. Stand-Off Distances

Public safety would be improved by defining stand-off distances that would assure safe interactions between manned and unmanned aircraft. The FAA recently published a draft Advisory Circular, AC 90-WLCLR, "Well Clear Definition for Small Unmanned Aircraft Systems Operating Beyond Visual Line of Sight," which included a proposed horizontal and vertical distance an sUAS would need to maintain to meet the FAA's definition of "well clear." Enabling technological solutions to conduct the see-and-avoid and right-of-way requirements for sUAS will require data-derived and industry vetted stand-off distances to be defined. AOPA commented on draft AC 90-WLCLR noting we believe further industry vetting is required before certain values are chosen to define the proximity at which manned and unmanned aircraft should be operating. We believe the standards groups, ASTM and RTCA, should coordinate any definition of stand-off distance.

In addition to the stand-off distance between the sUAS and manned aircraft, it is also important to define operationally realistic stand-off distances for airports, and their approach and departure areas. As noted in Section 384 of the FAA Reauthorization Act of 2018, it is a federal offense to operate sUAS without authorization within a runway exclusion zone.

Several of the largest UAS manufacturers, including DJI and 3D Robotics, have voluntarily incorporated geofencing technology into their UAS products. As we noted in our comments to the 14 CFR § 107 NPRM, the FAA should consider developing sUAS geofencing technology standards to ensure the safety and reliability of their operations. Geofencing is a feature in a software program widely used on UAS that uses GPS or radio frequency identification to define geographical boundaries. A geofence is a virtual barrier that can prevent UAS from entering airspace that is off limits. This technology ensures even with lost-link events and other eventualities where the operator loses control that protected airspace will remain protected. Manufacturers should incorporate geofencing technology to ensure systems "out of the box" do not allow unmanned pilots to interfere with manned aircraft.

The current system of defining stand-off distances around airports—a radius from the airport and its airspace—results in an inefficient and ineffective system. A new system should be defined that minimizes the airspace where sUAS operations would need to be restricted while simultaneously reducing the risk to manned operations. Each airport is unique in terms of runway orientation, dimensions, instrument approaches, and airspace protection, which is why circles of one dimension are ineffective. By utilizing the 14 CFR § 77 imaginary surfaces, which were enacted to protect airports and heliports from obstructions, a standardized formula of airport protection can be repurposed for geofencing. The 14 CFR

§ 77 surfaces capture the protection necessary for instrument procedures, traffic pattern operations, and account for airports of all sizes. These surfaces use circular and rectangular shapes to form various areas of protection.

The 14 CFR § 77 surfaces allow for unique but consistent airport protection; however, geofencing technology should not be a substitute for ensuring that remote pilots are aware of where they are operating in the NAS. We believe it is premature to mandate a geofencing requirement around airports. The concerns to be addressed through any mandate could instead be relieved through other proposals, such as education. Before proceeding with any type of regulatory action, industry standards should be defined, and manufacturers afforded the opportunity to voluntarily participate.

AOPA is aware of numerous cases of sUAS sightings near airports that have led to ground stops and other operational impacts. There have also been several documented cases of midair collisions between a sUAS and a manned aircraft. Stand-off distances integrated into sUAS aircraft via voluntary technology, combined with operator education and common-sense regulations, will mitigate the risk of an accident as the number of sUAS operations increase. We believe the FAA should be careful to not take a reactionary approach and curtail UAS operations or overregulate this emerging aviation industry. The operational and policy dictated reaction must be commensurate with the threat.

B. Altitude, Airspeed, and Other Performance Limitations

We believe the existing speed (maximum 87 knots) and altitude (400 feet AGL) requirements listed in 14 CFR §107 to be effective for public safety. These requirements for sUAS were vetted by industry and have been in place for several years. Modifying these values, either up or down, would be problematic and we do not believe, in either case, that change is warranted.

As new UAS operations take place, such as routine flights at altitudes above 400 feet AGL, it may be necessary to reevaluate these limitations. Operations above 400 feet AGL will increase the likelihood of an encounter with a manned aircraft. In a 2019 AOPA membership survey, 75% of pilots reported they normally operate below 6,000 feet MSL. At altitudes above 400 feet AGL, there will be more manned aircraft and those will be travelling at a higher speed.

Existing speed restrictions, specifically 14 CFR § 91.117, may not be appropriate for UAS. The 200 knot and 250 knot speed restrictions are designed to promote and ensure flight safety and the protection of life and property. One purpose of 14 CFR § 91.117 is to enhance the ability of pilots to see and avoid each other while in flight. Slower speeds allow a pilot more time to see and avoid other aircraft. Many UAS are considered more challenging to see and avoid than a manned aircraft, and the risk of a midair collision increases at higher speeds. This is true when considering human reaction times and the higher velocities of manned aircraft at altitude. UAS operations above 400 feet AGL will need to have speed restrictions that allow for a realistic see-and-avoid operation given the lack of conspicuity of most UAS.

What speed restriction applies may vary for the airframe and the equipage. We believe the FAA should enact performance-based rules to account for different technological solutions, like detect and avoid, that are shown to be equivalent or better than human performed see-and-avoid. Lower velocity speed restrictions may be the result of technological limitations, such as speed limits to ensure detect-and-avoid systems are effective. We do not believe that a single manufacturer's limitations should negatively affect the entire industry. Regardless, the FAA must ensure restrictions are in place to ensure manned aircraft are adequately protected from a midair collision with a UAS.

C. Unmanned Traffic Management (UTM) Operations

The Unmanned Traffic Management (UTM) concept has been shown to be necessary to address numerous foreseeable operational and efficiency issues with normalized beyond visual line of sight and high-density UAS operations. Trajectory sharing for deconfliction and management of traffic flows will be needed via UTM as the number of aircraft and airspace access increases. Before the FAA implements a policy on UTM, additional supporting work is needed by ASTM and RTCA. We believe it would be premature to implement UTM without further collaborative work with manned aviation.

The UTM system must be transparent to general aviation and ensure manned operations are not required to participate. Manned aviation already operates in an air traffic management system managed by FAA, military, and contract air traffic controllers. It would be confusing and onerous to impose a new system on general aviation aircraft that fly at low-altitude. There should be no expectation that manned pilots will need to review UTM information before flight.

The criteria for which UAS operators must participate in UTM has been increasing in clarity the last few years through research by NASA and other organizations. It is understood certain urban environments where high-density operations take place may require commercial operators to participate. This is akin to how Class B airspace requires participation in air traffic services from all operators, including general aviation. However, for UTM, hobbyist sUAS operations will continue under visual line of sight operations and are not going to be at the volume of commercial operations, so we do not believe it should be necessary for recreational sUAS operators to need to participate except from an advisory or voluntary standpoint. We recognize that recreational operations will quickly be dwarfed by commercial operations once the FAA provides normalized airspace access.

We believe it is important that UTM be open to multiple vendors to facilitate competition and provide UAS operators the ability to choose their service provider. A single commercial provider could limit the access to the airspace for cost-sensitive commercial UAS operators. The various UTM vendors providing the service must be able to communicate with each other and field compatible systems such that no single vendor has sole control of a geographic area.

Each airspace user community should contribute to the funding of the FAA and the airspace system commensurate with their demand on resources. As UAS is an emergent user, we believe it is premature to identify a precise amount, mechanism, or collection point for any contribution. AOPA does not believe that there has been any persuasive argument presented that supports any requirement for recreational unmanned operators to pay a service fee to have access to the airspace they have access to today. It is unrealistic for recreational operators to be subject to a user fee to fly. The limited resources the FAA or a UTM service provider will devote to this segment of aviation does not justify a user fee. If a recreational operator desires additional services beyond those required for simple flight, it is appropriate for the user to be charged for those extra amenities.

As more UAS beyond visual line of sight operations begin to take place in the NAS, we have noted that some commercial operators and prospective UTM service providers rely on cooperative systems, primarily ADS-B, being installed on the manned aircraft in order for the risk of midair collisions to be mitigated. We do not believe the see-and-avoid requirement for UAS operators can be accomplished solely on the reliance of general aviation aircraft having a transponder or ADS-B. From both the manned and unmanned perspective, there should be concern and caution regarding overreliance on cooperative systems for detecting nearby manned aircraft.

There are exceptions to the regulatory requirement to have an ADS-B system on manned aircraft; many aircraft types are unable to have these systems installed because of a lack of an electrical system, and these systems can break midflight. Not only will engine-driven general aviation aircraft not necessarily be equipped, but ultralights, gliders, birds, and other obstructions will occupy the airspace. It is important technological solutions are fielded that account for non-cooperative aircraft and objects, and the philosophy of cooperative deconfliction should be relegated to the minority of special cases.

Several beyond visual line of sight proposals rely on the FAA's ADS-B mandate to justify why cooperative deconfliction is feasible. As general aviation makes up the largest fleet that needs to equip with ADS-B to fly in airspace defined in 14 CFR § 91.225, we have been tracking equipage closely. Based on FAA and MITRE data provided to Equip 2020 participants, it is clear tens of thousands of general aviation aircraft will not be equipped in 2020, nor in the years thereafter. It will take time to reach a high percentage of equipage in the NAS.

As of February 1st of this year, 67,775 general aviation aircraft were ADS-B equipped. Based on the data provided to Equip 2020, we anticipate 92,000 general aviation aircraft to be equipped out of the active fleet of 211,000—indicating 44% equipage by the time the ADS-B mandate takes effect. The large number of unequipped aircraft highlights the importance of creating policies that do not create an overreliance on a technology largely absent from the general aviation fleet. Over time and in certain airspace, equipage will increase, but we believe it would be a fallacy to rely solely on cooperative systems for deconfliction. Instead, the UAS industry, manned aircraft community, and the FAA should encourage and promote the use of additional collision avoidance technology that supplements cooperative systems.

E. Small UAS Critical System Design Requirements

Given the increase in government-conducted intentional GPS interference, we are concerned what effect loss of GPS will have on large and small UAS that may fly beyond visual line of sight above 400 feet AGL. There are public safety concerns for individuals on the ground and in the airspace. As most UAS fly at low altitudes today, it is likely they are not exposed to the effects, but as more civil operations take place at higher altitudes, there is an increased likelihood of loss of GPS. NASA studies and manufacturer information indicates GPS loss can have catastrophic flight safety impacts. This is a critical technology that has been integrated into flight control systems, navigation, geofencing, ADS-B, etc., such that it becomes a single point failure that could lead to disastrous results. The FAA should engage with UAS users and the government agencies that conduct GPS interference events to educate and determine any necessary mitigations.

Conclusion

AOPA seeks to protect the freedom to fly for everyone who loves to fly, regardless of the aircraft they choose. We are actively working to safely integrate UAS operations within the NAS by ensuring that these pilots have the appropriate level of aeronautical knowledge.

We believe the remote ID NPRM to be a significant step to addressing safety and security, so we look forward to its publication and to commenting. Another important step is the Section 2209 referenced "UAS Flight Restrictions Near Critical Infrastructure Facilities" NPRM, but, as we noted in our June 18, 2018, letter to the FAA, enacting permanent restricted or prohibited areas must include a public review and comment period. Segregating airspace must be conducted in an open and transparent manner.

We appreciate this opportunity to provide feedback on these important topics, and we look forward to future opportunities to comment on proposed rules. Please feel free to contact me at 202-509-9515 if you have any questions.

Sincerely,

Rune Duke
Senior Director, Airspace and Air Traffic