



50 F St. NW, Suite 750
Washington, D.C. 20001

T. 202-737-7950
F. 202-273-7951

www.aopa.org

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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-2019-0562 and Amendment Number 91-355; Interim Final Rule for the Revision to Automatic Dependent Surveillance-Broadcast (ADS-B) Out Equipment and Use Requirements

To Whom It May Concern:

The Aircraft Owners and Pilots Association (AOPA) submits the following comments regarding the Interim Final Rule for the revision to Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment and use requirements. ADS-B enables the FAA, operators, and the National Airspace System (NAS) to transition from ground-based radar to GPS-enabled surveillance. ADS-B equipage allows for better tracking of aircraft in areas outside of conventional radar coverage and to a much higher precision thanks to the highly accurate GPS position source.

AOPA, the world's largest aviation membership association, represents members who collectively own, lease, and operate over 85% of all general aviation aircraft in the United States. We are encouraging ADS-B equipage among general aviation as it can improve the ability for search and rescue to find aircraft that become overdue, among many other benefits. However, since the rule became effective nine years ago, we have learned of many diverse issues affecting the ability and willingness of general aviation aircraft owners to purchase and install an ADS-B system.

We are pleased and appreciative to see one of these issues being addressed in this Interim Final Rule, namely formation flights. The formation flying community has been watching this process closely as it affects a large number of pilots and whether they equip. We support this rule as it promotes the safe conductance of formation flights for pilots and Air Traffic Control (ATC). Additionally, this rule addresses the legitimate security needs of sensitive government operations while ensuring these aircraft remain safely visible to other aircraft who are using TCAS or TIS-B for aircraft collision avoidance.

We do not believe, however, that this rule goes far enough to address several other concerns of general aviation that have been discussed in the government and industry collaborative venue of *Equip 2020*. We feel the FAA has not done enough to address the negative impact of 14 CFR §91.225(f) on at least three types of issues: the voluntary equipage of nonelectrical aircraft, operator privacy concerns, and an adverse inconsistency with the transponder rule. As we outline below, we are requesting the FAA make further modifications to ADS-B regulations and policy to encourage additional ADS-B equipage and to address the privacy concerns of thousands of aviators. We believe further modifications are in the public's interest and would provide relief from some current issues by more effectively promoting safety and efficiency in the NAS.

Modified rule supports formation flying community

In collaboration with the FAA, Formation Flying Inc. (FFI), Formation and Safety Team (FAST), International Council of Air Shows (ICAS), and the Experimental Aircraft Association (EAA) Warbirds of America, we formed the ADS-B Formation Working Group in 2018. Industry, the military, and the FAA have historically interpreted a standard formation flight of two or more aircraft as a single aircraft for ATC purposes. The definition of formation flight covered communication and navigation requirements so that only the lead aircraft need communicate with air traffic and assume responsibility for ensuring the flight's compliance with air traffic instructions. Notably, it has become the accepted NAS standard for aircraft engaged in a standard formation flight to have all trail aircraft stop squawk (cease transponder and ADS-B transmissions), regardless of whether air traffic provided explicit permission to do so (as noted in 14 CFR §91.215 and 91.225); however, this aspect had not yet been documented formally in the formation flight definition.

Because of the approaching ADS-B mandate, we found it necessary to ensure the regulatory framework would support formation flights with no degradation of safety. The FAA also recognized the safety concerns for ATC. Formation flight transponder procedures calls for the wingmen to stop squawk. This prevents multiple radar beacon targets from appearing on controllers' displays where only one should. Those extra targets become "clutter" that can obscure other, more important information. Additionally, these procedures prevent false warnings, alerts, and avoidance maneuvers from being generated by on-board aircraft detection systems.

If strictly followed, the existing 14 CFR §91.225(f) would adversely impact safety by degrading air traffic services and reducing pilot situational awareness. We support this Interim Final Rule as it ensures routine formation flying, like photo missions, air shows, fly ins, mass arrivals, training sorties, etc., can continue in an ADS-B equipped environment safely and efficiently, whether in contact or not in contact with ATC. This rule reflects the operational reality of formation flying in the United States and meets user requirements, which was only possible via the close collaboration between government and industry.

To facilitate voluntary equipage, FAA must make provisions for aircraft using battery power for transponder and ADS-B hardware

AOPA has been contacted by numerous pilots who fly an aircraft that does not have an engine-driven electrical system, but does have a battery-powered certified transponder, who wish to equip with ADS-B. These owners are affected by a barrier to equipping with ADS-B because 14 CFR §91.225(f) requires ADS-B to be on at all times (whether in ADS-B airspace or not), which is not possible as a flight's duration may be longer than the limited battery power of some systems. As we and EAA noted in a recent white paper addressed to the FAA and *Equip 2020*, these aircraft owners want to equip with a battery-powered ADS-B system to continue being based at airports in rule airspace (for example, where there is Class C to the surface). These aircraft do not have the ability to install an electrical system and a portable wind-driven system may not be feasible.

The population of aircraft owners affected includes many vintage aircraft, including models from Aeronca, Luscombe, Piper, Taylorcraft, and others. The number of total affected vintage aircraft may be in the hundreds; however, there is no way to know, as this would not be recorded anywhere except in individual aircraft maintenance records. Affected vintage aircraft are joined by a growing fleet of motor gliders, of which there are several hundred in the United States, the engines of which are turned off for the soaring phase of flight. Such aircraft may have a modern electrical system, but one that is designed to charge only while the engine is operating, after which they are functionally identical to battery-only aircraft. Notably, single-engine piston aircraft owners are the most sensitive to the cost of ADS-B

avionics. Within this category of vintage aircraft, the average airframe value is less than \$40,000 and the average age is over 30 years old. The initiative to equip is driven by the desire to remain based at the airport at which they currently are located. Having to relocate airports would have an economic impact on the aircraft owner who is forced to move, the airport which loses tenants, and the community as a whole.

The disadvantaged aircraft are primarily based in Class C airspace and operate predominantly outside controlled airspace (i.e., where they legally can turn their transponder off in accordance with 14 CFR §91.215). Per 14 CFR §91.215(b)(3)(i) and 91.225(e)(1), Class C airspace is not an exception area for aircraft without engine-driven electrical system, so these aircraft must equip or receive an authorization to fly in this airspace. Installing a battery-powered, TSO'd ADS-B system to complement, or in place of, the existing transponder supports safety and facilitates a pilot's legal obligations to fly in Class C airspace, avoiding the need for any authorization request and approval. Seeking an ATC approval can be time consuming and may not always be approved, creating an untenable long-term situation.

For an aircraft not originally certificated with an engine-driven electrical system nor subsequently certificated with such a system, and for aircraft designed to utilize only a battery as the source of electrical power during soaring flight, we propose that the best solution would be to allow an exception to 14 CFR §91.225(f): operators are permitted to turn off their transponder and ADS-B system upon exiting controlled airspace if utilizing a battery-powered system. This could be accomplished via a long-term waiver issued to individual applicants or a codified exception in 14 CFR §91.225(f). This would provide the benefit of ADS-B while the aircraft is in controlled airspace and it would avoid having to relocate the aircraft to a different airport outside Class C airspace.

Lack of privacy for general aviation pilots is an equipage barrier

Another unintended and unforeseen consequence of 14 CFR §91.225(f) and the ADS-B final rule is the loss of privacy due to new technologies operated by third parties that allow the tracking of ADS-B Out equipped aircraft, including those on a VFR 1200 transponder code, using ground stations. Aircraft tracking websites display this unique information to the public in real-time. Of course this creates security concerns for the military and government agencies, which is rightfully being addressed in this rule, but private aircraft operators also have significant concerns that have not been addressed in this rule nor satisfactorily resolved by the FAA. We regularly hear from pilots that they are delaying or avoiding equipping because of this concern.

The privately-operated aircraft tracking networks that use ADS-B bypass the FAA's Block Aircraft Registration Request (BARR) program and Aircraft Situation Display to Industry (ASDI) data, and these companies can assess significant fees on operators wishing to have their aircraft removed from display to the public. It is clear that privacy or anonymity must now originate at the aircraft and not from an FAA system downstream. The 978 MHz UAT ADS-B system with anonymous mode is the only approved method of achieving ADS-B regulatory compliance and an equivalent level of privacy as is available for solely Mode C transponder equipped aircraft; however, we know about 85% of aircraft owners are equipped with 1090 MHz ADS-B systems.

AOPA has been actively engaged in collaborative conversations with the FAA, the National Business Aviation Association (NBAA), and our other industry partners to find a solution that would enable anonymity for those civil operators using 1090 MHz ADS-B systems and for those utilizing air traffic services. ADS-B broadcasts an aircraft's unique International Civil Aviation Organization (ICAO) code and call sign, which can be captured by anyone with a suitable receiver. This information can then be used to determine who owns and operates the aircraft, and even track their movements globally. The

proliferation of privately-owned receivers tied to large networks and flight tracking websites has dramatically changed the aviation privacy landscape for security agencies and private operators.

Pilots who fly solely in the United States and outside of Class A airspace do have an option of equipping with ADS-B using the 978 MHz UAT, which will randomize or not emit the aircraft's unique ICAO code or call sign when used in the anonymous mode. We are appreciative that the FAA responded to our 2018 petition for exemption noting pilots may utilize anonymous mode when on a VFR flight plan but otherwise not requesting ATC services. Yet, most general aviation pilots are equipping with 1090 MHz ADS-B systems as this is the international standard, including for Canada, and allows access to more airspace. Unfortunately, this system does not include an anonymous mode capability. The clear preference for 1090 MHz systems highlights the importance of finding a solution for these operators.

The FAA's concept of "rolling ICAO codes" is a promising approach to increasing anonymity for general aviation operators. Rolling ICAO codes refers to the concept of the aircraft emitting randomly assigned ICAO codes that will be changed periodically. In combination with an anonymous call sign, the aircraft would be harder to track. This is a feasible solution for some operators of 1090 MHz ADS-B systems but we have not yet seen the FAA take the necessary steps to begin a demonstration effort. In the short term, the FAA should consider other avenues for relief that would assure properly eligible aircraft can fly anonymously safely and efficiently in the NAS.

Most importantly, work must be expedited on the long-term solution: encryption of ADS-B data. It is understood that to facilitate privacy, anonymity must be initiated at the source—the aircraft—as the many privately-operated ground receiver networks do not rely on an FAA data stream to feed their tracking websites. Encryption at the source will allow an automated solution that will reduce the workload for operators and the agency, and this solution could become a global standard. The cost associated with investment in software and hardware upgrades will need to be part of the conversation to determine the practicality and benefit of pursuing an option that may include changing the Minimum Operational Performance Standards (MOPS). Although encryption may facilitate privacy from nongovernment receivers, we understand it is not a near-term solution and it will require further conversation.

FAA must harmonize the regulations addressing inoperable transponder and ADS-B systems

A notable difference between the transponder rule and the ADS-B rule is the lack of the word "operable" in 14 CFR §91.225(f). 14 CFR §91.215(c) makes it clear that the transponder must be on when it is operable, versus 91.225(f) which appears to indicate an aircraft may not be flown if the ADS-B system is not on, such as because it is broken, after the system is installed in the aircraft, i.e., equipped.

§91.215, ATC transponder and altitude reporting equipment and use.

(c) *Transponder-on operation.* While in the airspace as specified in paragraph (b) of this section or in all controlled airspace, each person operating an aircraft equipped with an operable ATC transponder maintained in accordance with §91.413 of this part shall operate the transponder, including Mode C equipment if installed, and shall reply on the appropriate code or as assigned by ATC, unless otherwise directed by ATC when transmitting would jeopardize the safe execution of air traffic control functions.

§91.225, Automatic Dependent Surveillance-Broadcast (ADS-B) Out equipment and use.

(f) Each person operating an aircraft equipped with ADS-B Out must operate this equipment in the transmit mode at all times unless...

This difference creates several issues for pilots, and it could lead to potential misunderstandings and an inconsistent application of the rule. We believe the requirement in 14 CFR §91.225(g)(1) indicates pilots with an inoperable ADS-B system would need to request an ATC authorized deviation, even when operating in non-rule airspace, and would only be able to fly to where repairs could be made or the ultimate destination of that flight. This is overly limiting and not warranted given the flexibility of the transponder rule. The transponder rule was more permissive in allowing aircraft owners to fly with their transponder inoperable so long as they remained outside of transponder required airspace.

We do not believe it is reasonable to place an additional burden on pilots who have already adopted ADS-B. An example of an additional burden would be having to request ATC permission for each flight, and limiting where those flights can go, should their system become inoperable. Many pilots in rural areas of the United States can fly entirely outside ADS-B rule airspace, which is defined in 14 CFR §91.225, and may not have easy access to a repair shop. In fact, it can take weeks for an ADS-B system to get repaired due to equipment availability, etc. Severely limiting the operations of an aircraft because of an inoperable ADS-B system is unnecessarily onerous. This restriction is beyond the requirements of the transponder rule and could serve as a disincentive to equipage. Pilots with an inoperable ADS-B system would still need to remain clear of ADS-B rule airspace unless an ATC authorization was requested and approved.

We believe the number of aircraft that would be affected by this situation (inoperable ADS-B Out and flight remains clear of rule airspace) simultaneously would be few so safety would not be adversely impacted. We contend the FAA should harmonize 14 CFR §91.225(f) with 91.215(c) by amending the language to read: "Each person operating an aircraft equipped with an operable ADS-B Out must operate this equipment in the transmit mode at all times..." This minor modification would positively assist many aircraft owners with an inoperable ADS-B system ferrying their aircraft short distances or completing multiple flights in a rural area where repairs may not be possible. These flights may also take place where an ATC authorized deviation may be infeasible due to remoteness and a lack of connectivity, yet the operation would be perfectly safe with the ADS-B system temporarily inoperable.

Conclusion

AOPA appreciates this rule change to promote safe formation flying operations and the collaborative environment in which this issue was raised by industry and worked with the FAA. We also believe the exception to the rule for security agencies to cease ADS-B Out transmissions to be warranted, but we believe the FAA has thus far failed to adequately address the legitimate privacy issues of civil operators who utilize air traffic services. Many operators have legitimate privacy concerns that we believe the FAA must address before 2020. We understand many aircraft owners have still not equipped due to the operational issues of the rule that we have raised in *Equip 2020* for some time. We urge the FAA to undertake additional policy and regulatory changes to address the above concerns affecting general aviation pilots.

We look forward to continuing to work with the FAA and our industry partners to ensure the safe and efficient operations of ADS-B equipped and non-equipped aircraft in the NAS. Please feel free to contact me at 202-509-9515 if you have any questions.

Sincerely,



Rune Duke
Senior Director, Airspace and Air Traffic