



March 3, 2008

Docket Management Facility  
U.S. Department of Transportation  
1200 New Jersey Avenue, SE  
West Building Ground Floor, Room W12-140  
Washington, DC 20590-0001

RE: Docket No. FAA-2007-29305

To whom it may concern:

The Experimental Aircraft Association (EAA), the world leader in recreational aviation, represents a diverse international membership of more than 170,000 pilots, aircraft owners and aviation enthusiasts who are dedicated to the continued growth of aviation, the preservation of its history and a commitment to aviation's future. EAA programs, activities and events are known throughout the world for supporting aviation safety and promoting personal enjoyment and responsibility. These efforts are made possible through massive volunteer involvement in support of the organization, EAA's special interest divisions, a global network of nearly 1,000 local Chapters, and the affiliated National Association of Flight Instructors (NAFI).

EAA members build, own, maintain, and operate tens of thousands of aircraft spanning the full spectrum of recreational aeronautical vehicles including ultralights, amateur-built aircraft, restored historic military aircraft, antique, classic and vintage aircraft, traditional general aviation aircraft manufactured in large volume and corporate business class turboprops and jets. These aircraft, of every description and performance capability, are operated almost exclusively for recreation, and personal business use.

### **General Comments**

EAA has openly and publicly supported the Federal Aviation Administration's (FAA) efforts to modernize the National Airspace System (NAS) and specifically update the way in which air traffic is monitored and controlled. In our various publications and web sites we have promoted the potential benefits of ADS-B to our members and shared with them the positive experience of pilots who used the technology under the Capstone program in Alaska. We believe in principal that ADS-B has the potential to bring new levels of situational awareness to pilots of aircraft for which such technology is appropriate with a consequent increase in some areas of general aviation safety including flight into adverse weather conditions and terrain avoidance.

In general, EAA continues to support the notion that ADS-B can provide significant benefits to some segments of the general aviation community, however, we do not feel that this NPRM, which proposes wholesale mandatory equipage of the general aviation fleet, accomplishes any of the safety or operational benefits that EAA supports or that the FAA committed to providing. In fact, we maintain that this proposal, as written, contains all of the cost and complexity penalties of mandatory ADS-B equipage with none of the potential benefits that could be offered to GA. We believe that it is very unfortunate that the FAA did not consult with the general aviation industry in developing this proposal in an effort to implement ADS-B in a way that is beneficial to everyone and equip only those aircraft that really need it. By failing to do this and simply mandating wholesale installation of ADS-B Out for nearly 80% of the general aviation fleet while providing no tangible benefits to the GA operator, the FAA has done itself a great disservice and unnecessarily turned the recreational and general aviation community against what could well be a very useful and helpful technology if properly and appropriately implemented. EAA urges the FAA to engage the general aviation community in a dialogue not just about the technologies themselves (which the agency has done very well to this point) but also on how best to field and implement these technologies and accommodate those operators who would derive little or no benefit from such a system now or in the future.

### **Economic Analysis**

EAA sees few, if any, benefits to general aviation of the proposed Automatic Dependent Surveillance-Broadcast (ADS-B) performance requirements as presented in the Notice 07-15 published on October 5, 2007. While EAA is on record as supporting the FAA's efforts to modernize the NAS, thus far we see no significant benefit to general aviation of the ADS-B Out requirement presented in this proposal. In fact, we believe that most of the benefits cited in this NPRM either do not apply to general aviation at all or are derived from technologies already being embraced and fielded by general aviation pilots and aircraft owners on their own, such as GPS and moving map technologies.

EAA also disagrees with the basic premise used by the FAA to support this proposal and the NextGen program as a whole that air traffic operations will double by 2025. The FAA has been making this assertion for several years now and so far the data has not born out such a dramatic increase; certainly not in passenger enplanements. With dramatically increasing fuel costs and airfares, economy-wide inflationary pressures, and a slowing, if not recessionary worldwide economic picture emerging, it is even more unlikely that the doomsday scenario of doubling commercial passenger counts and aircraft operations will occur. And even though the recreational and general aviation industry has recently enjoyed its first resurgence in aircraft manufacturing and sales in decades, these same economic pressures will reduce sales and impinge on the ability of

individuals to affordably fly their own aircraft in the coming years, placing further downward pressure on the FAA's projected traffic increases.

While we agree that certain elements of the air traffic system are strained to capacity, our observation is that this is only true at a few of the 35 busiest airports, known as Operational Evolution Partnership (OEP) airports that have been saturated with air carrier operations, which in some instances have already doubled. This doubling is not due so much to a substantial increase in passenger enplanements but rather, because the airlines have made a dramatic shift in the nature of their aircraft fleet from wide body and large narrow body aircraft of 150 seats or more to a much larger fleet of regional jet aircraft with seating capacities in the 50 to 70 passenger range. This move alone has contributed more to congestion at the OEP airports and the increased air traffic operations counts at those airports than nearly all other factors combined.

We see the strains being placed on the national air traffic system as a problem largely brought about by the business practices of the commercial air carrier industry, concentrating operations at a handful of OEP airports and shifting to a fleet of more numerous low-capacity aircraft creating terminal airspace and ground facility saturation. However, this air carrier problem is forcing a mandatory equipment requirement whose cost will be born most heavily by the community least responsible for the problem and least likely to derive benefit from the solution; recreational and general aviation. Under the proposal, the commercial air carriers would need to equip around 5,000 revenue-generating aircraft to comply with and participate in the proposed new air traffic system. General aviation on the other hand would need to equip more than 200,000 aircraft with ADS-B and other supporting technologies just to continue to do what it does successfully today. This cost is born by individuals; private citizens who own their aircraft for recreation and/or personal transportation, not corporations who can pass the costs on to their customers as is the case for the air carriers.

EAA also strongly disagrees with the FAA's cost/benefit analysis as it relates to general aviation in that we feel the equipment and installation costs of ADS-B are grossly understated. The proposal does not take into account the fact that nearly 80% of the general aviation fleet would be required to equip with ADS-B and in no way accounts for the fact that most of these aircraft would also need to upgrade their GPS systems, install cockpit displays, upgrade electrical systems, and possibly add Mode C altitude encoding as well. Additionally, the proposal only accounts for the simplest installation where all of the various components are fully compatible with one another. Ultimately one of the most expensive and frustrating elements of this equipage process is going to be integrating all of the existing and future equipment needed for a useful ADS-B system. There is a nearly infinite array of avionics and aircraft combinations that have to be successfully married together in general aviation. This is not a simple plug-and-play system but rather a highly variable hodgepodge of technologies and products that will

either need to be painstakingly integrated physically, electrically, and in terms of software, or be completely replaced at tremendous expense. We believe that the FAA has drastically underestimated both the population of aircraft that will require ADS-B under this proposal and the cost to equip each aircraft.

The FAA also argues that the transition from primary and secondary radar surveillance to aircraft-based surveillance technologies will save money. This may be true for the FAA itself, although this is questionable given that the agency will still need to maintain approximately half of its existing primary radar sites while installing hundreds of new ADS-B ground facilities to replace the radars that are decommissioned. Regardless of whether the agency actually saves money in the end or not, one thing is absolutely incontrovertible; under this proposal the agency is dramatically shifting the costs of the NAS from FAA ownership and operation of ground-based ATC surveillance technologies to the individual aircraft owner to the tune of many billions of dollars.

### **Operational or Safety Benefits to GA**

In our view the agency also has not successfully quantified what operational benefits or penalties might be derived from this proposal on recreational and general aviation. Instead, the agency uses the benefits to the air carrier industry and Gulf Coast helicopter operations as justification for the entire rule and assumes that these benefits will also hold true for general aviation as a whole. EAA maintains that this is a false assumption that fails to acknowledge that the major cost of compliance of this proposal falls on the segment of industry least responsible for congestion and delays, least able to absorb the cost, and least likely to benefit in terms of safety, convenience, or access to airspace by the proposed requirement.

FAA argues that there will be significant reductions in delays and thus consequent saving in fuel consumption as a direct result of the implementation of system-wide ADS-B, but EAA maintains that recreational aviation derives none of these benefits since general aviation is not typically subjected to the airline-created delays at OEP airports in the first place. There is little fuel or time to be saved for general aviation operators who fly without delay to outlying airports and other landing facilities. However, under the proposal general aviation would be required to shoulder the majority of the cost to accommodate these alleged benefits to the air carriers and the FAA.

The proposal cites the reduction in fatalities in Alaska under the Capstone program as the basis for claims of improved safety yet fails to analyze how this might translate to accident reduction in the Continental United States. The fact of the matter is that much of the safety benefit derived in Alaska came from the improved flight crew situational awareness provided by various ADS-B In functions in extremely hostile and remote

locations without radar coverage. It is little wonder that safety improved through terrain avoidance and weather situational awareness alone. However, under this proposal, the vast majority of the GA fleet would be required to install ADS-B Out and would derive none of the situational and weather awareness benefits that could in any way impact general aviation accidents that occur due to flight into adverse weather and terrain avoidance. ADS-B Out only serves to assist the FAA with aircraft traffic separation and thus could only potentially improve the extremely rare incidence of mid-air collision accidents in controlled airspace where ADS-B Out would be implemented. This is a very small and somewhat unlikely safety enhancement for the dramatic proposed costs of billions of dollars. The proposal for mandatory ADS-B Out equipage provides no safety benefit to the vast majority of general aviation operators in the lower 48 states and represents nothing more than an extremely expensive requirement to replace previously mandated and perfectly functional surveillance equipment already in GA aircraft today, such as Mode A/C transponders and encoders.

The NPRM bases most of its benefit on the assertion that money and time will be saved and capacity increased through the implementation of ADS-B Out yet the FAA has not successfully, in our opinion, identified exactly how this capacity increase and consequent reduction in delays will occur. Indeed, most of the delays within the system today are the direct result of capacity constraints at the largest OEP airports whose airspace is saturated, not by limitations of available airspace but by limitations of available runway, taxiway and gate space. When inclement weather reduces this strained capacity even further, chaos emerges in the air traffic system and ripples across the entire NAS. However, even if the FAA were at some point in the future to contemplate reduced aircraft separation minimums as a result of the implementation of ADS-B (a matter that is completely deferred in this NPRM), EAA cannot see how that would in any way positively impact the pattern of delays that are squarely the result of over-utilization of OEP airports by the commercial air carriers.

### **Proposed Air Carrier ADS-B Test**

EAA maintains that the assertion that the NAS will realize significant capacity increases and efficiency gains as a result of ADS-B has not been well proved to this point and is largely theoretical. We are not at all comfortable with requiring the entire general aviation fleet to equip with highly expensive new technologies based on a theory. EAA strongly recommends that the FAA propose the mandatory implementation of ADS-B Out solely on commercial air carriers who generate the very delays used to justify the proposal and study the actual effect this technology has on delays at OEP airports and overcrowding in terminal and high altitude enroute airspace before requiring the vast majority of general aviation aircraft who fly outside of these areas to equip at tremendous expense. FAA's proposed mandate that general aviation operators equip their aircraft

with ADS-B Out at the cost of billions of dollars, before proving that the system will actually improve the chronic capacity shortages at air carrier hub airports (rarely used by general aviation) borders on irresponsible. EAA urges the FAA to undertake a program similar to Capstone for air carriers in the lower 48 states to test the benefits of the proposed ADS-B Out equipment and procedures on capacity and delays and determine whether this technology will in fact have the desired and stated benefits. If in fact ADS-B Out can have the positive impact on system efficiency the FAA hopes for, then we can explore what aircraft and in which airspace it makes sense to require ADS-B for general aviation.

EAA supports the continued implementation of ADS-B in the Gulf of Mexico where radar coverage is non-existent and where operational safety and efficiency could be greatly enhanced for the myriad helicopter operations that occur there. We believe that the Gulf Coast is the one significant exception to the rule for the lower 48 states where ADS-B could have a significant measurable impact on safety and enhance the ability of operators to function in adverse weather conditions.

### **Non-Electrically Equipped Aircraft**

Under the existing National Airspace System exceptions to mandatory transponder and encoding altimeter requirements are automatically granted for aircraft that do not have an engine driven electrical system or a system sufficiently robust to power transmitting avionics such as ultralights, vintage aircraft, certain amateur built aircraft, gliders and balloons. It is our contention that all of the same exceptions available to these recreational and general aviation aircraft from the Mode A/C requirements in place today should continue to be in force under any future air traffic system whether that system is based on ADS-B or some other technology. We believe that it was the intent of the NPRM to retain these operational exceptions, however this was not clearly stated in the proposal. EAA maintains that accommodations must continue to be made for aircraft not capable of supporting ADS-B and other electrical ATC surveillance equipment without unduly restricting their access to airspace around major metropolitan areas, above 10,000 feet, or to airspace above FL240 which is particularly relevant to glider pilots.

### **Alternative Portable/VFR ADS-B MOPS**

EAA is deeply concerned that that FAA is proposing mandatory equipage of a technology largely developed for use by commercial turbine aircraft without also developing practical and economical equipment necessary for the vast majority of the general aviation fleet. EAA estimates that mandating the use of ADS-B in Classes A, B, C and E airspace above 10,000 feet MSL would require between 75% and 80% of the

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entire general aviation fleet to equip with ADS-B Out Universal Access Terminal (UAT) technology. The only ADS-B equipment available today is far too costly for the average general aviation aircraft and can exceed the value of the actual aircraft in the instance of older and/or smaller aircraft. This is not a realistic expectation on the part of the FAA and any benefits of investing in such technology are further eroded by the fact that there is often insufficient instrument panel space available on these older and smaller aircraft to install the elements associated with ADS-B In that might actually bring some benefit to the recreational pilot.

As currently designed and proposed in this Notice, ADS-B equipment consumes too much power to be used effectively under battery power in vintage aircraft, ultralights, balloons, gliders and other aircraft unable to make permanent installations. For this proposal to be even remotely practical for recreational and general aviation, the FAA needs to develop minimum operating performance standards (MOPS) that would allow for the development and use of low-power, portable units that are affordable and useful to owners of low-end and non-electrically equipped aircraft.

EAA would also encourage the FAA to examine the concept of developing differing MOPS for VFR and IFR operations so that aircraft that only operate under VFR conditions outside of Class A and B airspace might be able to carry equipment that transmits at a lower power level. Another consideration for VFR only MOPS would be the allowance of satellite positioning systems as input to the ADS-B that poses lower integrity than is called for under the NPRM. For example, GPS units with integrity levels of less than NIC 7 all the way down to NIC 0 might well be acceptable for general aviation VFR operations outside of Class A and B airspace rather than requiring the entire GA fleet to reequip with new GPS units possessing integrity levels of greater than NIC 9 which is intended for full IFR separation. We believe that a "one-size-fits-all" approach contributes to making a transition to ADS-B unaffordable for general aviation and brings about community-wide resistance to what might otherwise be a valuable enhancement when combined with ADS-B In and cockpit display technologies.

### **Equipment Requirements Above FL100 and FL240**

Regardless of the technology used, EAA maintains that recreational and general aviation aircraft, which under the proposal would generally be equipped with ADS-B Universal Access Transmitters (UAT), should not be precluded from operating above FL240 simply because they do not also have a 1090ES (Extended Squitter) broadcast link. ADS-B UAT will work just as well above FL240 for those occasional flights by general aviation aircraft at those levels without compromising safety or capacity. This is particularly relevant to gliders.

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Finally, EAA does not concur with the proposed requirement that ADS-B Out be required for all flights above 10,000 feet MSL. We believe that this ceiling is too low and severely limits general aviation operations, particularly over the Rocky Mountains where flights above 10,000 feet are routinely conducted to transit east and west. This situation alone would require pilots who would otherwise have no need for ADS-B to equip just to cross the mountains or else fly dangerously low through some of the lower passes to avoid the equipment requirement. We do not think this is either necessary or desirable from a safety standpoint and urge the FAA to consider a higher ceiling for mandatory ADS-B use.

## **Conclusion**

EAA continues to maintain that a combination of ADS-B In and Out can provide significant benefits to certain segments of the general aviation community. However:

- EAA does not feel that this NPRM, which proposes wholesale mandatory ADS-B Out equipage of the recreational and general aviation aircraft fleet, accomplishes any of the safety or operational benefits that might otherwise be derived.
- EAA maintains that this proposal, as written, contains all of the cost and complexity penalties of ADS-B with none of the potential benefits that could be offered to the recreational and general aviation operators.
- EAA strongly urges the FAA to ensure that the limited exceptions to existing transponder and encoder requirements for aircraft that do not have an electrical systems sufficiently robust to power such equipment be continued under any ADS-B or other future ATC surveillance scheme.
- EAA encourages the FAA to examine more thoroughly the concept of developing differing MOPS for VFR operations outside of Class A and B airspace so that aircraft operating outside of these high density areas in VFR conditions could carry ADS-B equipment of a lower transmitting power and cost while ensuring adequate levels of surveillance and separation.
- EAA strongly believes that the FAA has done itself a great disservice and unnecessarily prejudiced the recreational and general aviation community against what could well be a very useful and helpful enhancement. By mandating wholesale installation of ADS-B Out for nearly 80% of the recreational and general aviation fleet that do not operate into or out of the OEP airports, the FAA is not encouraging the willing and voluntary adoption of this new technology as promised over the years of its development.

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- EAA urges the FAA to engage the general aviation community in a dialogue not just about the technologies themselves (which the agency has done well to this point) but on how best to field and implement these technologies and accommodate those operators who derive little or no benefit from such a new system now or in the future.

We stand ready to assist the Department of Transportation and the Federal Aviation Administration in their quest to improve and modernize the nation's airspace and air traffic system. If there are any questions or concerns, please feel free to contact our Washington, DC office at 410-226-5526 and we will be more than happy to work with you and your staff.

Respectfully,

/s/

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Experimental Aircraft Association (EAA)