



Federal Aviation Administration

Memorandum

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To: See Distribution List

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Subject: Installation Approval for ADS-B OUT Systems

The purpose of this memorandum is to explain the Federal Aviation Administration's (FAA's) policy regarding installation of Automatic Dependent Surveillance-Broadcast (ADS-B) OUT systems into civil aircraft certificated under Title 14, Code of Federal Regulations (14 CFR) Parts 23, 25, 27, 29, and their predecessor regulations, for compliance of section 91.225 and section 91.227. This memorandum replaces the memo dated October 10, 2012 on the same subject.

Note: Compliance to section 91.225 and section 91.227 requires installation of equipment meeting the performance requirements of TSO-C166b or TSO-C154c equipment after January 1, 2020.

How can the ADS-B OUT system obtain initial approval?

Initial ADS-B OUT system pairings (transmitter/GPS) must be approved for installation using the Type Certificate (TC), Amended TC (ATC), or Supplemental Type Certificate (STC) process. Consult your Aircraft Certification Office to determine the appropriate approval process for these initial installations. Once the performance of the initial pairing has been established, the FAA considers follow-on installations of the same pairing to be approved.

Organization Designation Authorization (ODA) holders can issue ATC and STC when authorized by their FAA Organization Management Team (OMT).

After initial approval, can applicable ADS-B OUT systems be installed on aircraft not covered by that approval?

Yes, ADS-B OUT systems that have previously received FAA approval and meet all of the following conditions may be installed and returned to service on other aircraft without further data approval:

Note: If an Approved Model List (AML) STC is available that provides for the installation of specific ADS-B transmitter and GPS pairings on listed aircraft, consider using the data from that AML STC for the ADS-B OUT system installation.

Note: Some elements of an ADS-B OUT installation may not meet the definition of a minor alteration, such as the installation of antenna(s) that penetrate a pressure vessel. Such installation elements may require additional data from the aircraft manufacturer or other FAA approved data. Reference Attachment 1 of this memorandum, *ADS-B OUT Alteration Flowchart* for guidance on determining the eligibility of ADS-B OUT installations covered by this policy.

- a. The ADS-B OUT equipment is manufactured under TSO-C166b or TSO-C154c;
- b. The Global Navigation Satellite System (GNSS) position sensor is manufactured under TSO-C129 or later, TSO-C145a/C146a or later, or TSO-C196 or later;
- c. The installer has a statement of compliance from the applicable manufacturer(s) or STC holder that the equipment (self-contained) or specific equipment pairing (ADS-B OUT transmitter and GNSS position sensor) have been shown, via TC, Amended TC, or STC, to comply with all section 91.227 requirements. This statement of compliance may be included in the applicable installation instructions. The installation instructions must address how the equipment is to be installed and maintained to comply with not only the applicable TSOs but also section 91.227 requirements;
- d. The installer has documentation from the STC holder(s) (per section 91.403(d)) that indicates the owner/operator of the aircraft has permission to use the STC data for the alteration;
- e. The ADS-B OUT equipment, GNSS position sensor, and interconnect wiring are connected in accordance with the applicable manufacturer's or STC installation instructions;
- f. The installation is performed in accordance with documentation from the manufacturer(s) or STC holder indicating what configuration settings, if applicable, are to be used for the ADS-B OUT system to meet section 91.227 requirements which include, but may not be limited to:
 - (1) FAA assigned Mode S/International Civil Aviation Organization (ICAO) code address (hexadecimal/octal format) associated with current aircraft registration;
 - (2) Emitter Category (ref. AC 20-165, Chapter 3);
 - (3) System Integrity Level (SIL);
 - (4) System Design Assurance (SDA);
 - (5) Flight Identification (e.g., N-number); and
 - (6) GNSS sensor settings required to correctly communicate with the ADS-B OUT equipment
- g. The installation is performed in accordance with 14 CFR Part 43. Acceptable methods, techniques, and practices may be found in AC 43.13-2B;

- h. The installed ADS-B OUT system has been verified to comply with both the system configuration and equipment performance requirements of section 91.227. The system configuration aspects of section 91.227 requirements include the ICAO code address, emitter category, SIL, SDA, flight identification, etc. Performance aspects of section 91.227 requirements include Navigation Integrity Category (NIC), Navigation Accuracy Category for Position and Velocity (NACp and NACv), etc. Acceptable compliance verification methods include:
- (1) Operational Flight Evaluation. Conduct an operational flight evaluation (OFE) per section 91.407(b) and request an FAA ADS-B compliance report at the following email address 9-AWA-AFS-300-ADSB-AvionicsCheck@faa.gov. Include the aircraft's registration number (N-number) and the ADS-B transmitter and GPS equipment make/model information when submitting requests to the FAA for ADS-B OUT system OFE performance checks. Following receipt of the applicable OFE compliance report the installer must verify the installed ADS-B OUT system complies with all section 91.227 performance requirements and the system configuration is correct for the aircraft; or
 - (2) Ramp Test Equipment (ref. section 91.407(c)). Use ramp test equipment to verify proper system configuration and compliance with section 91.227 equipment performance requirements.
- i. The ADS-B OUT alteration must be documented in the aircraft maintenance record per section 43.9(a) and include the statement, "The installed ADS-B OUT system was shown to meet the equipment performance requirements of 14 CFR section 91.227."

Submit a FAA Form 337 to document ADS-B OUT alterations. On Form 337, Block 8, include the following compliance statement, "The installed ADS-B OUT system was shown to meet the equipment performance requirements of 14 CFR section 91.227" along with the applicable ADS-B OUT transmitter and GPS make/model information. Submit the completed Form 337 to the Aircraft Registration Branch, AFS-750, P.O. Box 25504, Oklahoma City, Oklahoma 73125. The Form 337 can be submitted directly without FAA approval in Block 3.

Note: ADS-B OUT alterations performed on aircraft operated by certificated operators may be documented in a manner acceptable to the Administrator.

Can ADS-B OUT systems that do not meet the requirements for installation without further data approval be installed?

Yes, an ADS-B OUT system that fails to meet the requirements for installation without further data approval (as discussed above) must be performed using approved data through appropriate means (See FAA Order 8300.16, *Major Repair and Alteration Data Approval* for data approval means). Document applicable ADS-B OUT major alterations, per section 43.9, and include the required statements and equipment information specified in the above section in the aircraft maintenance record and on Form 337, Block 8.

Does installation of an ADS-B Out system require revision of the Aircraft Flight Manual (AFM)?

Yes, following installation of a compliant ADS-B OUT system the General section of the AFM must be revised to include the following statement, “The installed ADS-B OUT system has been shown to meet the equipment performance requirements of 14 CFR 91.227.” Applicable AFM revisions do not require FAA approval.

Can a TC holder modify their aircraft design for ADS-B OUT under a minor change in type design?

Yes, on those aircraft with existing equipment which can be modified to comply with ADS-B OUT performance requirements and which meet the criteria for a minor alteration as specified in this memorandum. Some installations may not constitute a major change in type design, so the use of a TC amendment or STC is an acceptable method for approval. Once a specific ADS-B OUT system pairing receives a design approval, use of this same pairing on a different aircraft type is a minor aspect of the design change. If other aspects of the design change are evaluated and determined to be minor, the overall design change may be made as a minor change to type design. Pursuant to 14 CFR section 21.95, minor changes in type design may be approved under a method acceptable to the FAA before submitting to the FAA any substantiating or descriptive data.

For aircraft requiring initial installation of ADS-B OUT equipment, consult your Aircraft Certification Office regarding applicability for a major change in type design.

Under FAA Order 8100.15B, *Organization Designation Authorization Procedures* qualified ODA holders can issue ADS-B OUT approvals without first getting FAA approval. (For additional information, see FAA Policy Memo No. AIR100-15-140-DM30 and AIR100-15-140-DM37 under <http://rgl.faa.gov>.)

Who should I contact for questions about this policy memorandum?

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Attachment 1 ADS-B Alteration Flow Chart

