



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Airport Ground Vehicle Automatic
Dependent Surveillance Broadcast (ADS-B)
Out Squitter Equipment

Date: 09/01/2012 **AC No:** 150/5220-26
Initiated by: AAS-1 **Change:** 1

1. Purpose. This change provides updated material to ensure the appropriate appliance gets ordered through the proper channels to meet requirements established by the Vehicle Automatic Dependent Surveillance - Broadcast (ADS-B) Specification, Version 2.4, published May 01, 2012. Page change is required with the change number and date. Some text, although not changed, has been rearranged to accommodate the new material.

2. Principal Changes.

- a. Revised guidance regarding Vehicle Automatic Dependent Surveillance - Broadcast (ADS-B) Specification, Version 2.4, published May 01, 2012.
- b. Revised guidance regarding table 1 showing airports with existing or planned FAA surveillance systems.
- c. Revised guidance regarding Appendix A qualified products.

Page Control Chart

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Director of Airport Safety and Standards

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Advisory Circular

Consolidated to include Change 1

Subject: Airport Ground Vehicle Automatic
Dependent Surveillance - Broadcast (ADS-B)
Out Squitter Equipment

Date: 11/14/2011
Initiated by: AAS-1

AC No: 150/5220-26
Change:

1. Purpose of the Advisory Circular.

This Advisory Circular (AC) provides guidance on the development, installation, testing, approval, and maintenance of Automatic Dependent Surveillance – Broadcast (ADS-B) Out squitter units for airport ground vehicles. Using this AC, airports will be able to acquire approved and authorized airport ground vehicle ADS-B squitter units that are compliant with Title 14 Code of Federal Regulations (CFR), Part 91, Automatic Dependent Surveillance-Broadcast (ADS-B) Out Performance Requirements to Support Air Traffic Control (ATC) Service, as well as the initial set of ADS-B applications. Please note that the technical specifications for manufacturing ADS-B squitter units for airport ground vehicles are published in the FAA’s document, Vehicle Automatic Dependent Surveillance - Broadcast (ADS-B) Specification, Version 2.4, published May 01, 2012.

2. To Whom this AC Applies.

a. All airport ground vehicle ADS-B squitter units must meet the requirements stated in the Airport Ground Vehicle ADS-B Specification, Version 2.4.

b. Airport and vehicle operators should follow the operational guidance in this AC to ensure proper operation of airport ground vehicle ADS-B units. While such units are not currently required, the FAA strongly encourages airport operators to voluntarily equip appropriate vehicles with airport ground vehicle ADS-B squitter units.

c. In general, use of this AC is not mandatory. However, use of this AC is mandatory for all Part 139 certificated airports using this equipment, as well as projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charge (PFC) Program. See Grant Assurance No. 34, Policies, Standards, and Specifications, and PFC Assurance No.9, Standards and Specifications.

d. The AC is required for vendors developing, installing, testing, and seeking approval of ADS-B units in airport ground vehicles.

e. It is also recommended for vendors, airport operators, and other personnel who will implement, monitor, and use the airport ground vehicle ADS-B squitter units on the

Table 1. Airports with Existing or Planned FAA Surveillance Systems.

The future use of vehicle units at airports other than those equipped with FAA surveillance systems is not yet defined. Below is a table of airports currently equipped or planned to be equipped with FAA surveillance systems by 2017.

| Identifier | Airport |
|--|--|
| ASDE-X equipped airports | |
| BWI | Baltimore-Washington International Thurgood Marshall Airport |
| BOS | Boston Logan International Airport |
| BDL | Bradley International Airport |
| MDW | Chicago Midway Airport |
| ORD | Chicago O'Hare International Airport |
| CLT | Charlotte Douglas International Airport |
| DFW | Dallas-Ft. Worth International Airport |
| DEN | Denver International Airport |
| DTW | Detroit Metro Wayne County Airport |
| FLL | Ft. Lauderdale/Hollywood Airport |
| MKE | General Mitchell International Airport |
| IAH | George Bush Intercontinental Airport |
| ATL | Hartsfield-Jackson Atlanta International Airport |
| HNL | Honolulu International –Hickam Air Force Base Airport |
| JFK | John F. Kennedy International Airport |
| SNA | John Wayne-Orange County Airport |
| LGA | LaGuardia Airport |
| STL | Lambert-St. Louis International Airport |
| LAS | Las Vegas McCarran International Airport |
| LAX | Los Angeles International Airport |
| SDF | Louisville International Airport-Standiford Field |
| MEM | Memphis International Airport |
| MIA | Miami International Airport |
| MSP | Minneapolis St. Paul International Airport |
| EWR | Newark International Airport |
| MCO | Orlando International Airport |
| PHL | Philadelphia International Airport |
| PHX | Phoenix Sky Harbor International Airport |
| DCA | Ronald Reagan Washington National Airport |
| SAN | San Diego International Airport |
| SLC | Salt Lake City International Airport |
| SEA | Seattle-Tacoma International Airport |
| PVD | Theodore Francis Green State Airport |
| IAD | Washington Dulles International Airport |
| HOU | William P. Hobby Airport |
| Airports to be equipped with ASSC (2014-2012 timeframe) | |
| SFO | San Francisco International Airport |
| CLE | Cleveland/Hopkins International Airport |
| PIT | Pittsburgh International Airport |
| PDX | Portland International Airport |
| ADW | Andrews Air Force Base |
| ANC | Anchorage International Airport |

| | |
|-----|--|
| CVG | Cincinnati/Northern Kentucky International Airport |
| MSY | Louis Armstrong New Orleans International Airport |
| MCI | Kansas City International Airport |

d. Definitions. In this AC, the words “must”, “should”, and “may” are used to define different levels of requirements:

- (1) **Must:** Conveys a requirement.
- (2) **Should:** Describes a recommendation.
- (3) **May:** Denotes a permissible practice or action, but not a requirement.
- (4) **Airport Ground Vehicle ADS-B Equipment:** The navigation source, processing, and ADS-B transmission equipment that determines the position of the surface vehicle in which it resides and broadcasts that information on one of the two ADS-B data links (978 MHz UAT or 1090 MHz ES).
- (5) **Squitter:** Output pulses from an airport ground vehicle ADS-B squitter unit generated by an internal triggering system rather than by external interrogation pulses.
- (6) **Squitter Transmit Map for Airport Surface:** The squitter maps of the airport surface will define where the squitter unit will be active by controlling the squitter transmit out. The FAA will generate the squitter transmit maps and post them online for download. All airports with ASDE-X will have a Squitter Transmit Map available for download on the website for no charge. Squitter Transmit Maps for Airport Surface will be derived from ASDE-X maps.

4. Developing Equipment to Specification.

a. Airport Ground Vehicle ADS-B Process Diagram. The following process flow diagram (Figure 1) provides an overview of the steps and processes necessary to complete the vehicle ADS-B project.

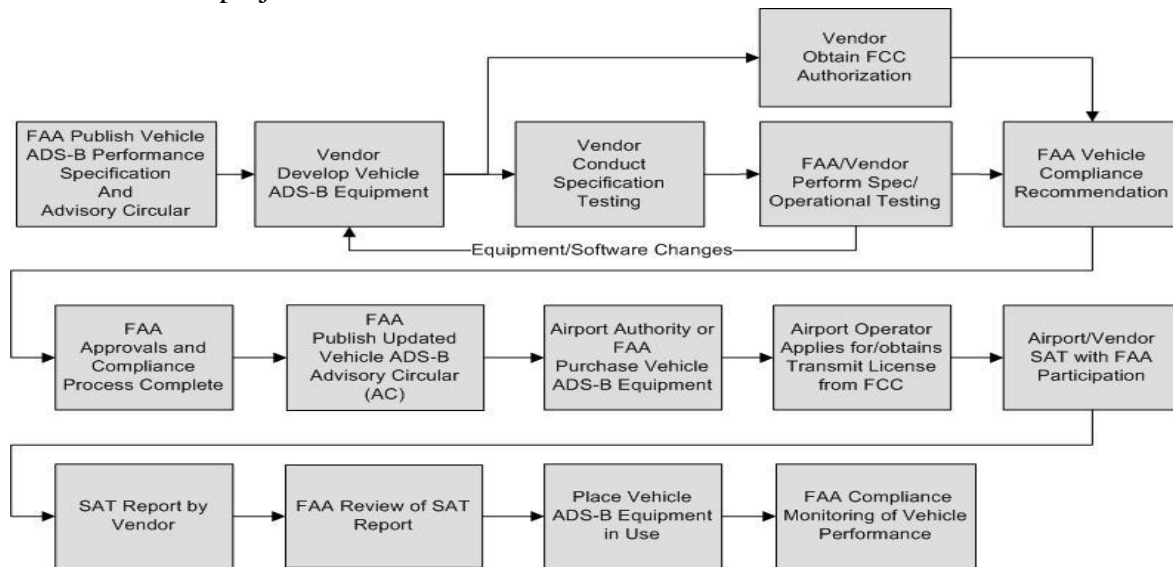


Figure 1. Vehicle ADS-B Process Diagram

b. Airport Ground Vehicle ADS-B Specification. The vehicle ADS-B squitter specification document (version 2.4) details requirements for the vehicle units residing in airport surface vehicles, which are necessary to determine the position of the surface vehicle in which it resides and broadcast that information on one of the two ADS-B data links. This document provides the requirements for both 978 MHz UAT and 1090 MHz ES transmissions. Vendors producing equipment for surface vehicles must adhere to the requirements stated in the document.

The document addresses the broadcast of ADS-B only (the reception and display of ADS-B data in the vehicle is not addressed). Additionally, the document addresses testing and compliance of the airport ground vehicle ADS-B squitter units and includes guidelines for verification.

c. FAA Specification Testing. The airport ground vehicle ADS-B Factory Acceptance Test (FAT) plan and Site Acceptance Test (SAT) plan will outline the test procedures and processes necessary for the vehicle units to demonstrate compliance with the specification document. The airport ground vehicle ADS-B squitter units will be tested to verify they meet the functional and performance requirements. Testing includes the bench tests and environmental tests outlined in the specification document. Requirements for unit level testing are described for both 1090 MHz ES and 978 MHz UAT equipment. These tests are performed at the vendor's facilities as approved by the FAA. Integration testing of the airport ground vehicle ADS-B unit, including the navigation system and the ADS-B transmitting system, is conducted to verify system performance. The vendor submits test documentation to the FAA verifying successful completion of the specified tests. The FAA reserves the right to witness specific test procedures at the vendor's facility.

d. Subsequent to obtaining approval for the bench and environmental test results, the vendor will make a unit available to the FAA for additional testing at the FAA Technical Center. The FAA will conduct additional testing of the unit for an operational equivalent to a first article test. This testing will consist of limited bench testing of key requirements to verify performance. The FAA may require the vendor to provide test tool support similar to the capabilities that the vendor may have used for the factory bench testing to enable specific tests or provide access to internal test points for verification. Also, the unit will be subjected to testing at a specified test facility that verifies the operation at an airport location. The FAA will provide information to the vendor to generate a squitter transmit map for the airport surface to support the testing. The equipment will be tested to verify the squitter transmit map for the airport surface requirements within and outside of the squitter area. This test will consist of operating the equipment and subjecting the equipment to scenarios similar to those that would be encountered at the airport within which the vehicle is intended to operate.

The FAA Technical Center has developed test plans, which will reference the testing requirements in the specification document, additional equipment-level tests that may be required at the FAA facility, and a Site Acceptance Testing (SAT) Checklist that will provide a detailed description of the SAT procedures that are required to demonstrate vehicle unit compliance.

Additionally, equipment manufacturers shall provide the FAA Technical Center evidence of a quality control program for production of their airport ground vehicle ADS-B units when submitting the factory test report.

APPENDIX A. QUALIFIED PRODUCTS

FAA Approved Model Number: FDL-978-TXG/E
Name: V-MAT (Vehicle Movement Area Transmitter)
ADS-B data link: 978 MHz Universal Access Transceiver
Vendor: Exelis, Inc.
Manufacturer: FreeFlight Systems
Contact: Exelis
(855) 890-5137
Sales.CAS@exelisinc.com
www.exelisinc.com