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- Agenda Item 3 Air Navigation Matters**
- 3.3 Specific Developments in Air Navigation**
- CNS

AUTOMATIC DEPENDENT SURVEILLANCE – BROADCAST (ADS-B)

(Presented by the United States of America)

SUMMARY	
<p>The Surveillance and Broadcast Services (SBS) office has been moving forward with the ADS-B implementation for both Air Traffic Control (ATC) separation services (also known as ‘ADS-B critical services’) and the up-linking of Traffic Information Services - Broadcast (TIS-B) and Flight Information Services – Broadcast (FIS-B) to properly equipped aircraft (also known as ‘ADS-B essential services / pilot advisory services’). The FAA commissioned ADS-B traffic and weather services in 2008 and these services are available now, free to properly equipped aircraft flying in various portions of the United States. The agency is continuing to work with general aviation (GA) airports to provide these services. Traffic and weather services are available now.</p>	
<p>There will be ADS-B coverage in the majority of the United States National Airspace System by 2013, where there is radar coverage today.</p>	
<p><i>Strategic Objectives</i></p>	<p><i>This information paper is related to Strategic Objectives A and C.</i></p>

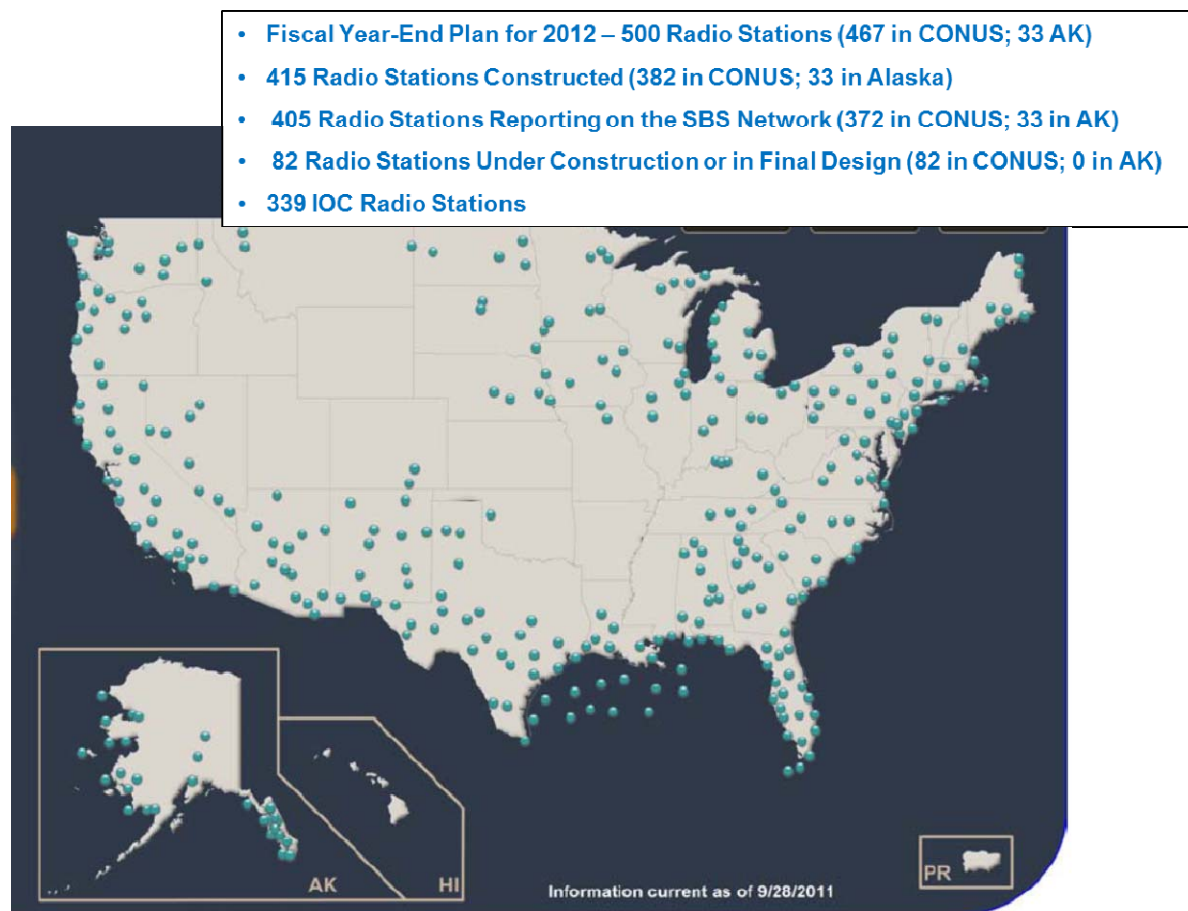
1. Background and Status

1.1 The program identified key sites for ADS-B services, as shown below.

1.1.1 Southern Florida: The program office completed the implementation and commissioning, also called the In Service Decision (ISD), of essential services / pilot advisory services in southern Florida in November 2008. This provides properly equipped aircraft with TIS-B and FIS-B information. The ISD cleared the way for the vendor (ITT) to install radio stations and transmit broadcasts for operational use across the nation, starting on the East and West Coasts and portions of the Midwest and moving to the interior of the country. Approximately, 400 radio stations are installed (339 operational) across the National Airspace System today. Deployment will be completed across the National Airspace System (NAS) by 2013.

1.1.1.1 Currently, the agency is analyzing ADS-B surveillance coverage in the Miami Oceanic Flight Information Region (FIR) and other areas such as Bermuda and Guam. Alternatives include space-based ADS-B (orbiting satellites listen to aircraft ADS-B broadcasts and relay this information to an ATC facility) as well as potential installation of ADS-B radio stations in countries willing to collaborate with the U.S. to cover the airspace of interest. An advantage of space-based ADS-B is the potential for providing coverage in broad regions of oceanic airspace, where radio station installation is not possible. The technical and cost benefits of this approach are currently being analyzed. The agency is planning to continue studying space-based ADS-B and decide by 2014 whether or not to proceed with an acquisition for this type of service.

Radio Stations Deployment Status as of January 2012

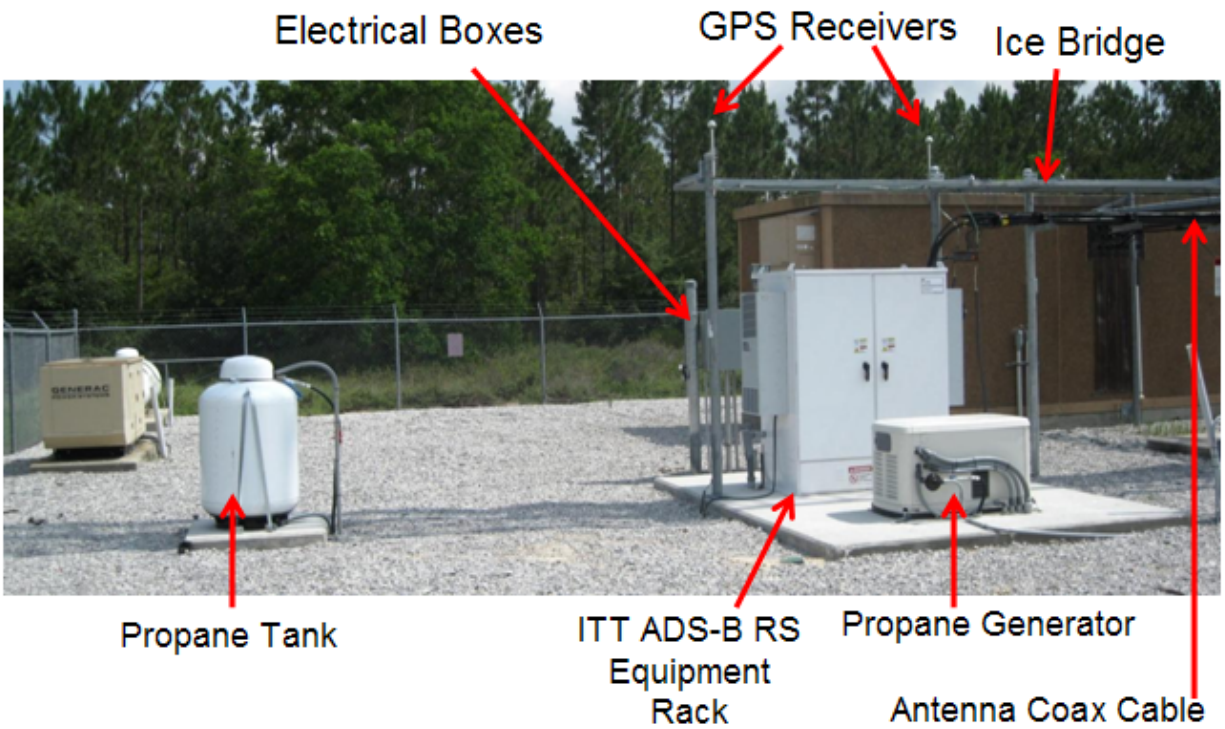


The following website has the above map which is updated regularly:
<http://www.faa.gov/nextgen/flashmap/>

Sample Radio Station Site



Typical Radio Site Equipment



1.1.2 Louisville, Kentucky: Louisville Terminal Radar Approach Control (TRACON) was chosen as one of the key sites for ADS-B critical services due to United Parcel Service (UPS) equipping with ADS-B capable avionics. The Initial Operating Capability (IOC) was achieved on the ARTS IIE automation system in November 2009.

1.1.3 Gulf of Mexico / Houston Center: The Gulf of Mexico was chosen as another key site due to the agreement with the Helicopters Association International (HAI) and the oil and gas industry partners. The platform owners provided space for the FAA to deploy ADS-B radio stations while operators would provide transportation and equip with proper avionics. IOC at Houston Center was achieved on the HOST automation system in December 2009.

1.1.4 Philadelphia, PA: Philadelphia TRACON and Philadelphia Tower are receiving ADS-B services. This is the first site to integrate with the Airport Surface Detection Equipment – Model X (ASDE-X) system for ADS-B surface surveillance. The IOC was achieved on the Standard Terminal Automation Replacement System (STARS) in March 2010.

1.1.5 Juneau, Alaska: Anchorage Center is now separating aircraft flying in and around the Juneau area using ADS-B data. The program office achieved IOC on the Micro En Route Automated Radar Tracking System (MEARTS) in April 2010.

1.2 The Air Traffic Organization (ATO) and the Office of Aviation Safety (AVS) approved the ADS-B In-Service Decision (ISD) for Air Traffic Control (ATC) separation services in September, 2010. This milestone enables the use of ADS-B information as a qualified surveillance source to provide ATC services throughout the NAS. ATC will use ADS-B surveillance information in the same manner as current dependent /cooperative surveillance system information is used, i.e., to assist aircraft with navigation, to separate aircraft, and to issue safety alerts and traffic advisories. ADS-B will be used to enhance surveillance information for ATC automation system functions.

1.2.1 By mid-2014, the FAA plans to install ADS-B radio stations in Puerto Rico and begin offering Air Traffic Control (ATC) separation services with ADS-B in the San Juan Flight Information Region (FIR) by the middle of 2014.

1.3 ADS-B has been adapted to 4 of the FAA's current automation platforms.

1.3.1 Furthermore, the agency is planning to have ADS-B surveillance services at New York TRACON and Houston Air Traffic Control Center (ARTCC) in March 2012.

1.3.2 The FAA has proposed the next STARS sites in FY12 will be the following:

1. Tampa, FL
2. Daytona Beach, FL
3. Charlotte, NC
4. Miami, FL
5. Kansas City, KS
6. New Orleans, LA
7. Corpus Christi
8. San Antonio, TX
9. El Paso, TX
10. Anchorage, AK

1.3.3 Below is a list of proposed sites that will become operational in FY12 for En Route Automation Modernization (ERAM):

1. Albuquerque, NM
2. Denver, CO
3. Minneapolis, MI
4. Seattle, WA

1.3.4 The following list is the proposed Common Automated Radar Terminal Systems (CARTS) sites for FY12:

1. Potomac, VA
2. Atlanta, GA
3. Northern California
4. Minneapolis, MN
5. Southern California

1.4 The ADS-B final rule was published in May 2010 and mandates performance requirements for ADS-B avionics that will be required to fly in certain airspace. The ADS-B rule requires aircraft to be equipped by 2020 to transmit “ADS-B Out” to fly in generally the same busy airspace where transponders are required today (ADS-B Out transmits location information received from the Global Navigation Satellite System (GNSS) out of the aircraft to ADS-B radio stations and to other aircraft equipped to receive ADS-B broadcasts). Equipage for “ADS-B In” to receive free traffic and weather services is voluntary. The rule does not preclude other navigation source methods. Also, this rule does not mandate “ADS-B In”. An Aviation Rulemaking Committee (ARC) was chartered in the summer of 2010 to address the “ADS-B In” strategy for implementation. The final report was received in September 2011 and it did not recommend a mandate for “ADS-B In”. Currently, the agency is working through the recommendations and will have a response this year (2012).

1.5 Also, the FAA will continue with the development of future applications such as:

1. Ground-Based Interval Management – Spacing development and deployment
2. Flight Deck Based Interval Management-Spacing flight trials
3. In Trail Procedures Operational Evaluation
4. Traffic Situation Awareness with Alerts flight tests

1.5.1 In addition to the ground deployment of ADS-B, the agency has signed agreements with several airlines (JetBlue, United, US Airways and UPS). These agreements are set up to equip a limited set of aircraft with ADS-B “Out” rule compliant avionics and demonstrate the benefits of advanced ADS-B applications and procedures during revenue service. The operational evaluations will give the agency detailed cost and benefit data, and encourage airlines to equip early to capitalize on ADS-B benefits.

1.6 The program office is seeking approval of the safety case for the use of the 3 NM separation application.

1.6.1 This approval would enable the use of 3 NM separation within en route airspace above flight level 180 which has been proven under the conditions outlined in the Safety Risk Management Documentation (SRMD) and other associated documentation. The final report is planned to be presented to the Surveillance and Broadcast Services leadership by the end of March, with agency wide approval expected in June 2012.

2. Discussion

2.1 There are a number of countries exploring ADS-B infrastructure and potential regulatory efforts to require ADS-B on aircraft in controlled airspace.

2.2 The FAA remains committed to maximizing the interoperability of avionics capability between air navigation service providers (ANSPs). This would include reducing the complexity of operations and allowing carriers to operate in different markets with the same level of performance.

2.3 The FAA would like other countries to consider that if the minimum performance of 5 mile separation in non-radar airspace and older standards are used it could limit ADS-B benefits and services. In order to minimize aircraft retrofit costs and various other risks, countries should consider using ADS-B for 3 mile separation in the terminal environment, airport surface operations and with “ADS-B In” applications. Using this separation would have both substantial safety and efficiency gains.

2.4 It is important that other countries consider the total benefits that are gained from ADS-B before publishing any regulations or requirements. The FAA has shared its position and data through the Requirements Focus Groups and in RTCA and EUROCAE documents.

2.5 The FAA Final Rule and standards (most notably DO-260B) provide the maximum benefits possible for “ADS-B Out” as they are known today.

2.6 The agency is also willing to enter into agreements for more detailed studies to review operational, scientific and economic analysis necessary for decision making regarding implementation of ADS-B.

3. Conclusion

3.1 The FAA continues to work with all areas of industry to ensure current program information is readily available.

3.2 The SBS Program Office continues to work on Pilot Advisory and ATC Separation Services rollout and ADS-B In applications development, and with aircraft and avionics manufacturers, operators, states, and countries to explore successful agreement implementation to accelerate ADS-B benefits.