

## FAA Announces NextGen Final Rule – 5/28/10

The FAA has announced the Final Rule for NextGen ADS-B Requirements.

The Final Rule requires all aircraft flying in particular airspaces to broadcast their position via **ADS-B Out** by 2020. A nationwide infrastructure of ground stations is scheduled for completion during 2013. The ground station infrastructure will consist of approximately 800 ground stations, placed 150 to 200 miles apart.

Below you will find Brief Summaries of Key Points provided by the FAA 14 CFR Part 91 Final Rule (*Note that the information provided below has been altered for summary purposes and should be used as Reference Only.* [View Official Final Rule](#) released by the FAA for Complete Details):

### What is Automatic Dependent Surveillance-Broadcast (ADS-B):

- An advanced surveillance technology that combines an aircraft's positioning source, aircraft avionics, and a ground infrastructure to create an accurate surveillance interface between the aircraft and aircraft traffic control (ATC).
- Consists of two different services: ADS-B Out & ADS-B In. ADS-B Out provides the ATC with real-time position information. ADS-B In is the aircraft's ability to receive and display another aircraft's ADS-B Out information, as well as the services provided by the ground stations.
- Provides consistent position accuracy regardless of the aircraft's range from the receiver. ADS-B does not scan the environment like radar; therefore ADS-B does not provide unnecessary returns based on weather or other obstructions.

### Why ADS-B is Being Mandated:

It is essential to move from ground-based surveillance and navigation to more dynamic and accurate airborne-based systems and procedures to enhance capacity, reduce delay, and improve environmental performance. The improved accuracy & update rate of ADS-B is a critical segment of the NextGen infrastructure.

### ADS-B Benefits:

- Ground automation "fuses" all available surveillance information from ADS-B and SSR. This provides a complete picture of all the traffic operating in a given area.
- Dollar value of savings in fuel, time, net reduction in CO2 emissions and the consumer surplus of additional flights.
  - ◆ The estimated value range from \$6.8 billion to \$5.5 billion with an estimated midpoint of \$4.4 billion from 2012 to 2035.

### ADS-B Out vs ADS-B In:

Only ADS-B Out is required, at this time. While ADS-B In offers significant additional benefits, requirements are not well defined for immediate implementation.

Requirements adopted for ADS-B Out also support ADS-B In applications. However, to minimize the cost impact, the FAA is not adopting higher performance standards that would enable all ADS-B In applications. Operators are advised that compliance with this rule alone may not enable the full advantage of certain ADS-B In applications. The FAA is working with the industry to develop a strategy for ADS-B In performance requirements by 2012.

### Aircraft Required to Implement ADS-B:

- Aircraft operating in Class A, B or C airspace within the National Airspace System (NAS); above the ceiling & within the lateral boundaries of Class B or C airspace area up to 10,000' mean sea level (MSL); and Class E airspace areas above 10,000' MSL over the 48 contiguous US & the District of Columbia, excluding the airspace  $\leq 2,500'$  above the surface.
- Aircraft operating in the airspace within 30 NM of certain identified busiest airports, up to 10,000' MSL.
- Aircraft operating in Class E airspace over the Gulf of Mexico at & above 3,000' MSL, within 12 NM of the United States.

Aircraft requirements include all aircraft type. ADS-B cannot be used for ATC surveillance if all aircraft are not appropriately equipped. It is not feasible to fund and maintain 2 systems. The airspace in this rule meets ATC surveillance needs.

### Current ADS-B Functionality:

The ADS-B program is currently funded & designed to provide service to parts of Alaska, the Gulf of Mexico & other areas of severe traffic or terrain obstacles. ADS-B has had a noticeable effect on safety in Alaska. In addition an established ADS-B compatible Wide Area Multilateration system has been placed a Colorado mountainous area. Agreements have been developed with HAI to support operation in the Gulf of Mexico.

### System Requirements:

- Position Source – WAAS is not required by the rule, however at this time it is the *only* positioning service that provides the equivalent availability of radar.
  - ◆ It is expected that future position sources such as GNSS using the L5 GPS signal, GPS using Galileo signals & GPS tightly integrated with inertial nav systems will provide 99.9% availability.
  - ◆ Non-augmented GPS aircraft may experience outages that limit access to the airspace.
- Broadcast Link – 1090 MHz Extended Squitter (ES) or Universal Access Transceiver (UAT).
  - ◆ FL 180 (the lower boundary of Class A airspace) is the ceiling for operating an aircraft equipped only with UAT.
- Transmit Power Requirements – UAT equipped aircraft = min 16-watt transmit power; 1090 MHz ES aircraft = min of 125-watt transmit power.
- Antenna – a single bottom mounted antenna (NAC<sub>p</sub>, less than 0.05NM) is the minimum requirement for ATC surveillance.
  - ◆ Note that this does not remove or modify the existing antenna requirements for transponders or TCAS/ACAS.
- Transponders will still be required when the backup surveillance strategy using SSR is necessary.

### System Compliance:

Aircraft are to meet the requirements of this rule for the duration of operation. To facilitate compliance, a preflight availability prediction service will be provided by 2013. Prior to departure, operators should verify that the requirements will be met for the duration of the flight. If an aircraft meets the requirements but experiences outages, the ATC will be notified & services will be provided.

An aircraft that is not properly equipped to meet the requirements will not have access to the airspace. If the aircraft is not capable of meeting the performance requirements, the operator may request a deviation from the ATC facility. Authorizations may not be granted due to a variety of reasons.

### Certification:

It is necessary to require the new standards of TSO-C166b / DO-260B (1090 MHz ES) and TSO-C154c / DO-282B (UAT) as the minimum performance standard.

- The updated standards do not increase performance requirements. View [FAA Final Review](#) page 5, section 3 for complete RTCA revisions.
- DO-290B and DO-282B are more mature standards and fully support domestic and international ADS-B air traffic control surveillance.

### International Cohesion:

The RTCA standards were developed with close international cooperation. The US is working with other GNSS providers to ensure system interoperability, improve performance, and reduce cost for integrated receiver equipment.

### Backup Strategy:

A Surveillance/Positioning Backup Strategy Alternatives Analysis identified a reduced network of SSRs as the recommended backup for ADS-B. The risk posed by ADS-B dependency has been accepted since the navigation and surveillance functions have independent backup systems.

### Information Security:

Several analyses on the security aspects of ADS-B have been conducted. These analyses included the information system for collecting data, transmitting and storing data, as well as the risk assessments on vulnerability of broadcast messages. A SCAP concluded that ADS-B meets all qualifications & mandates of this process.

Additionally, a specific assessment of the vulnerability risk of broadcasts being used to target air carrier aircraft was conducted. The assessment confirmed that using ADS-B data does not subject an aircraft to any increased risk compared to the current risk. As part of this process, this information was forwarded to interagency partners, including DOD, TSA, FBI & US Secret Service. These entities did not identify any reason to invalidate the findings.

### Automatic Dependent Surveillance Rebroadcast (ADS-R):

ADS-R will be deployed in all areas where ADS-B ATC exists. ADS-R collects traffic information broadcasts on the 1090 MHz ES or UAT links and rebroadcasts the information to the opposite datalink users.

### Spacing & Optimized Profile Descent (OPD):

The information broadcasted will be used to better sequence aircraft approach with the development of a Merging & Spacing application. The ground-based system will send précis suggested speed instructions to en route aircraft. In addition to Spacing, a tool is being developed to enable a fuel-saving procedure called OPD.

### Immediate Expansion:

The FAA is actively pursuing agreements with airlines, avionics manufacturers, airports and other NAS users to encourage early installation. FAA continues to examine opportunities to provide ADS-B services in areas that would benefit from increased surveillance. Cities, states, airports and private interests such as hospitals and trauma centers are encouraged to help determine needs and opportunities.