
What Is ADS-B ?¹

ADS-B is radically new technology that is redefining the paradigm of COMMUNICATIONS - NAVIGATION - SURVEILLANCE in Air Traffic Management today. Already proven and certified as a viable low cost replacement for conventional radar, ADS-B allows pilots and air traffic controllers to "see" and control aircraft with more precision, and over a far larger percentage of the earth's surface, than has ever been possible before.

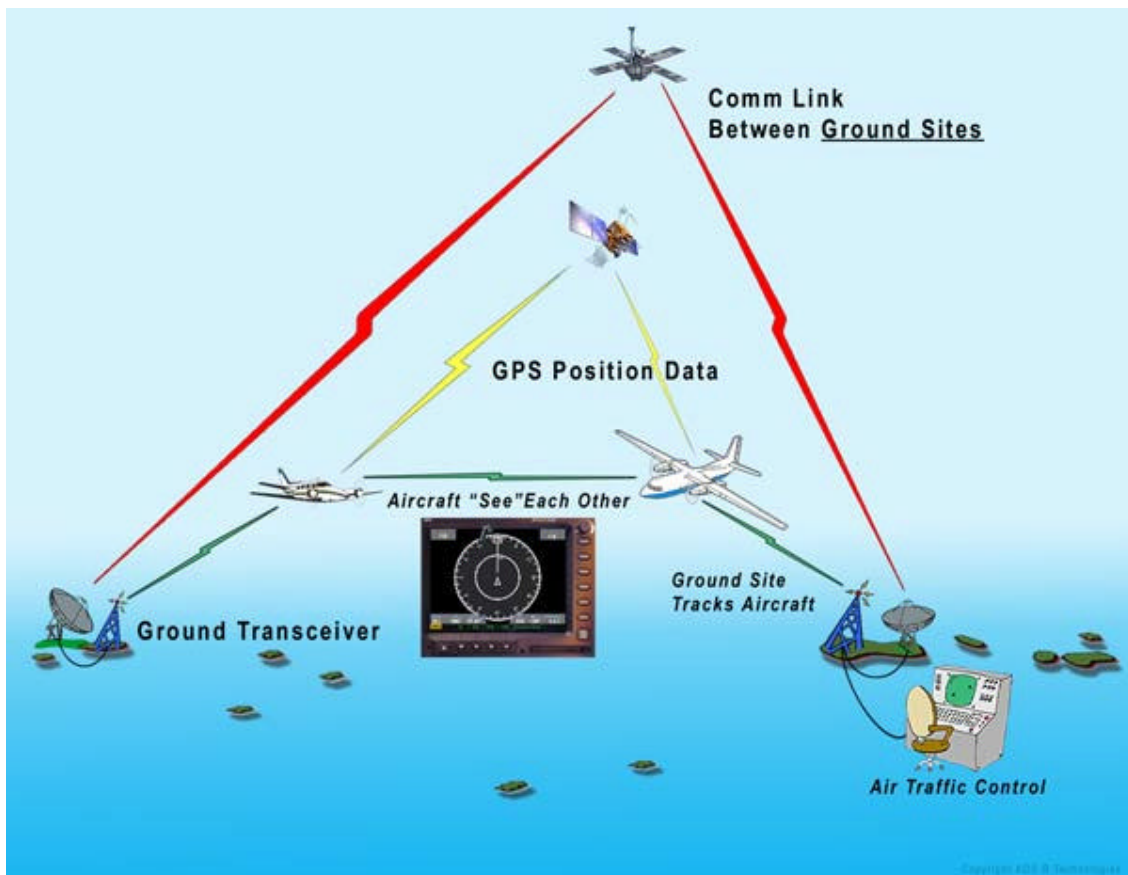
"ADS-B" is an acronym that stands for:

Automatic- It's always ON and requires no operator intervention

Dependent - It depends on an accurate GNSS signal for position data

Surveillance - It provides "Radar-like" surveillance data to ground controllers and other aircraft

Broadcast - It continuously broadcasts to any aircraft, or ground station equipped for ADS-B



¹ Adaptado de <http://ads-b.com/home.htm>? [2005-07-29]

How Does It Work?

Far different from radar, which works by bouncing radio waves from fixed terrestrial antennas off of airborne targets and then interpreting the reflected signals, ADS-B uses conventional Global Navigation Satellite System (GNSS) technology and a relatively simple broadcast communications link as its fundamental components. Also, unlike radar, ADS-B accuracy does not seriously degrade with range, atmospheric conditions, or target altitude and update intervals do not depend on the rotational speed or reliability of mechanical antennas.

In a typical applications, the ADS-B capable aircraft uses an ordinary GNSS (GPS, Galileo) receiver to derive its precise position from the GNSS constellation, then combines that position with any number of aircraft discretely, such as speed, heading, altitude and flight number. This information is then simultaneously broadcast to other ADS-B capable aircraft and to ADS-B ground, or satellite communications transceivers which then relay the aircraft's position and additional information to Air Traffic Control centers in real time.

The 978 MHz Universal Access Transceiver ("UAT") variant is also bi-directional and capable of sending real-time Flight Information Services ("FIS-B"), such as weather and other data to aircraft. In some applications, conventional non-ADS-B radar traffic information ("TIS-B"), can also be uplinked as well.

ADS-B is a relatively simple and very cost effective technology that works well at low altitudes and on the ground. It is also completely effective in remote areas or in mountainous terrain where there is either no radar coverage, or where radar coverage is restricted by problems with elevation, or line of sight.

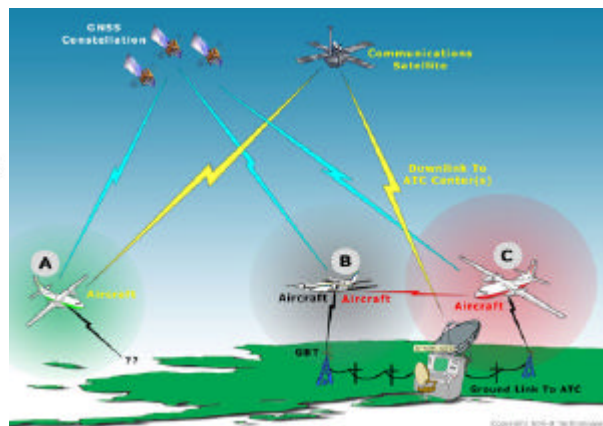
"SATELLITE-ENABLED ATM USING ADS-B"

Wherein both Ground Based Tranceivers (GBT's) and satellite connectivity are used within the same system.

- ? Satellite connectivity is Primary in remote / oceanic areas
- ? GBT's are primary in known satellite "shadow" areas
- ? GBT's supplement satellite connectivity where redundancy and/or additional reliability is needed (ie; Terminal Areas)

Aircraft **A** has flown beyond range of a GBT.
 Aircraft **A** continues to broadcast its ADS-B data, however, no other ADS-B equipped aircraft is within air-to-air range.
 Therefore, ATC and all other ADS-B aircraft receive **A**'s data via satellite link and;
A receives TIS-B, FIS and all other ADS-B aircraft positions over the same satellite link until it flies within range of a GBT.

Aircraft **B** and Aircraft **C** are both within range of a GBT.
B and **C** broadcast their ADS-B data and receive TIS-B, FIS and Aircraft **A**'s position via the nearest GBT.
B and **C** also receive each other's air-to-air ADS-B broadcast and would continue to do so even if they both flew beyond GBT range (regardless of satellite connectivity).



"ACTUAL TIS-B DISPLAYS"

Actual CAPSTONE TIS-B displays as seen over Cook Inlet, Anchorage, Alaska, March 2004.

- ? TIS-B (Terminal Information Service-Broadcast) re-broadcasts ATC radar targets in a format compatible with ADS-B traffic displays.
- ? Targets may be displayed in either "relative", or "barometric" altitude
- ? Target information, including range, speed, altitude and relative position "clock codes" are repeated on a detailed text page
- ? TIS-B gives a CAPSTONE equipped aircraft all the advantages of TCAS within a participating ATC environment

