WHY BOEING 787S ARE APPEARING TO LOSE THEIR WAY

News / Manufacturer

The **Boeing 787 Dreamliner** is facing another challenge from regulators. Canadian and Australian authorities have instituted restrictions on the type based on a bug in its implementation of Automatic Dependent Surveillance – Broadcast (ADS-B) technology, which has been found to transmit inaccurate positional data while declaring the data as high integrity.

After receiving data from a number of incidents, including where the 787 appeared to deviate from track (and from the true position of the aircraft) but then “jumped back” to the correct position, Boeing identified that the root cause was associated with the surveillance processor within the 787 Integrated Surveillance System which computes the ADS-B message.

As described by an ICAO working group, “The 787 uses an onboard data network to deliver packetized data inputs from other airplane sensors. When the latitude and longitude information was split across different data packets, the transponder function did not process the position data, and instead commenced extrapolating the position at constant heading and velocity – until the position data was again contained within a single message packet. Geometric level was similarly affected and did not update during these periods of extrapolation.”

Canada’s blacklisting of the 787 in its controlled airspace means that the planes must operate as though they do not have ADS-B installed, maintaining greater physical separation. Australian authorities were less aggressive in their approach, restricting the ADS-B data from being used on the ground at Brisbane, Melbourne and Sydney airports. Had they blacklisted the type completely,

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it would have imposed a 29,000 ft ceiling on operations within the country's airspace, a move that would raise significant challenges for Jetstar and its fleet of 787s, as well as other carriers which operate the type into Australia, as reported by Flightglobal.

Kontron NOW - VIDEO Avionics_300x300_watchVideoIn a statement issued to the Reed publication, Boeing insisted that the bug "is not a safety concern" because "existing systems such as radar provide the necessary positional data to [air traffic control] that allow the continued safe operation of the fleet".

While it's technically true that there are various tracking systems in operation at any given time, ADS-B is a critical component of navigation systems of the future. To wit, the FAA is requiring ADS-B Out performance by 1 January 2020, to operate in designated airspace. ADS-B Out is the ability to transmit a properly formatted ADS-B message from the aircraft to ground stations and to ADS-B-In-equipped aircraft.

Moreover, aircraft carrying the proper technology including ADS-B and CPDLC are being spaced closer together over the North Atlantic to increase capacity, cut flight times and save on fuel. It would appear that this tighter spacing will not apply to the 787s until Boeing gets all the aircraft fixed.

It is true that this is not a critical safety issue today. There are redundancies available which will meet the needs of airlines and aviation authorities. A software fix has been finalized by Boeing and Rockwell Collins, according to ICAO, and should be relatively easy to get deployed across the legacy fleet of 787s flying today (new aircraft are being delivered with the fix installed). But with ever increasing dependence on ADS-B, it seems a shame that the fix is considered a voluntary update.

"Boeing will encourage the operators to accomplish the upgrade as soon as possible after the Service Bulletin release (expected December 2015) but the times will vary from operator to operator. Boeing expects the fleet upgrades to take place through 2016," says the ICAO working group about the deficiency update.

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