

**Note to Manufacturers Regarding the Use of Geometric Type Codes When In the Altitude Reporting Off Condition**  
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Aircraft operating in ADS-B Only airspace (e.g. Gulf of Mexico) have been noted to drop from the Air Traffic Controller (ATC) display when the 1090ES Transponder is placed in Altitude Reporting Off mode (i.e. Alt Off). Upon further investigation, it was noted that Section 2.2.3.2.3.1.1 subparagraph c of DO-260B Minimum Operating Performance Standards (MOPS) for 1090ES systems currently states:

If valid horizontal position information is available to the ADS-B Transmitting Subsystem, but valid barometric pressure altitude information is not available, and valid geometric altitude information is available, the ADS-B Subsystem shall set the TYPE Code Subfield of Airborne Position Messages to a value in the range from 20 to 22 depending on the radius of containment R<sub>c</sub> in accordance with Table 2-14.

Furthermore, Note 2 of Table 2-14 currently states:

Type Codes 20 to 22 or Type Code 0 are to be used when valid “Baro Altitude” is not available.

When placed in Alt Off mode, the transponder will switch to using geometric altitude and will be causing a Type Code of 20-22 in the Airborne Position. The Geometric Type codes correspond to a Navigation Integrity Category (NIC) of 11, 10, or 0. Unless certified with the ability to sync to the GPS Time Tag, the 1090ES system will not be capable of reporting the higher NIC values (i.e. 10 or 11). Therefore, a NIC of 0 will always be reported in the Alt Off condition. Reporting a NIC of 0 results in the ADS-B target being inhibited from the ATC display.

To prevent target dropouts, the Federal Aviation Administration (FAA) requests that avionics manufacturers implement the following when submitting for a TSO-C166b authorization, or when performing a software revision to existing TSO-C166b authorized systems:

When the 1090ES system is placed in the Alt Off Mode, the system should continue to transmit the Airborne Position Message with:

- 1) No altitude information
- 2) A Type Code corresponding to the appropriate NIC level based off of the Horizontal Containment Radius as outlined in Table 2-14

When the 1090ES system is placed in the Alt Off mode, the system should report Geometric Altitude Difference in the velocity message as a difference from zero pressure altitude. This may cause the Geometric Altitude field to be limited to the maximum value.

The 1090ES system should continue to clear the altitude field in replies to Mode C interrogations when placed in the Alt Off condition.

If you have any questions, please contact Alex Rodriguez, AIR-132 at 202-267-8692 or via email at Alex.J.Rodriguez@faa.gov