

Note to Manufacturers Regarding Change to Ephemeris CRC Bit Order of Transmission

TSO-C161 requires manufacturers of Ground Based Augmentation System (GBAS) avionics seeking a TSO authorization to meet the minimum performance standards (MPS) for the Positioning and Navigation (PAN) equipment in Section 2 of RTCA/DO-253A, “Minimum Operational Performance Standards (MOPS) for GPS Local Area Augmentation System Airborne Equipment”. References in RTCA/DO-253A to RTCA/DO-246() should be interpreted to refer to RTCA/DO-246B, which was the version effective at time of publication of the TSO. The requirement to process Message Type 1, containing the Ephemeris CRC, in accordance with RTCA/DO-246B can be found in Section 2.3.7 (LAAS-107). The requirement for calculating the ephemeris CRC in accordance with RTCA/DO-246B can be found in Section 2.3.8.1.1 (LAAS-117). A related test requirement specifies that simulated VHF Data Broadcast signals be in compliance with RTCA/DO-246B (LAAS-214).

RTCA has approved a change to the ephemeris CRC bit order of transmission, section 2.4.3.2 Message Type 1 Parameters, in RTCA/DO-246C. This section of the ICD defines the ephemeris cyclic redundancy check (CRC) and the bit order for the transmission of the ephemeris CRC term by a LAAS ground station. **The change reorders the 16 remainder coefficients comprising the ephemeris CRC from their current transmission order of $r_1, r_2, r_3, r_4 \dots r_{16}$, to $r_9, r_{10}, r_{11} \dots r_{16}$, followed by $r_1, r_2, \dots r_8$.** The definition of the remainder coefficients has not changed and is specified in RTCA/DO-246B Appendix A.

Note (1): This change is not backwards compatible with the existing standard. The change was adopted for compatibility with a significant number of current implementations of ground equipment and avionics.

Note (2): Other changes to the ICD to support the newly incorporated GBAS Approach Service Type D and VHF Data Broadcast (VDB) authentication are not relevant for TSO-C161 equipment.

The FAA is updating TSO-C161 to capture this change. The International Civil Aviation Organization (ICAO) is processing a similar amendment to Volume I (Radio Navigation Aids) of Annex 10 to the Convention on International Civil Aviation. Until the updated TSO is published, applicants seeking TSO authorization should deviate from the requirements identified above in regard to the Ephemeris CRC bit order of transmission and be consistent with the order specified in RTCA/DO-246D. The updated TSO will not invoke RTCA/DO-246D in its entirety, as DO-246D includes other requirements to support complex approaches and Category III operations that have not been validated.

Please coordinate with your local Aircraft Certification Office (ACO) on any current or future work related with TSO-C161. Deviation requests to the TSO relating to this change should follow 14 CFR 21.609 with the request directed to the ACO.

Please contact Hamza Abduselam, 202-385-4688, with any questions or concerns.