Department of Transportation
Federal Aviation Administration
Aircraft Certification Service
Washington, DC

TSO-C68a

Date: 8/18/83

Technical Standard Order

Subject: TSO-C68a, AIRBORNE AUTOMATIC DEAD RECKONING COMPUTER EQUIPMENT UTILIZING AIRCRAFT HEADING AND DOPPLER GROUND SPEED AND DRIFT ANGLE DATA (FOR AIR CARRIER AIRCRAFT)

a. Applicability

(1) Minimum Performance Standard. This Technical Standard Order (TSO) prescribes the minimum performance standard that airborne automatic dead reckoning computer equipment utilizing aircraft heading and doppler ground speed and drift angle data must meet in order to be identified with the applicable TSO marking. This TSO has been prepared in accordance with the procedural rules set forth in Subpart O of the Federal Aviation Regulations Part 21. New models of doppler radar navigation equipment that are to be so identified and that are manufactured on or after the date of this TSO must meet the standard set forth in Radio Technical Commission for Aeronautics (RTCA) Document No. DO-158, "Minimum Performance Standards - Airborne Doppler Radar Navigation Equipment," dated October 17, 1975, as amended and supplemented by this TSO.

(2) Additions.

(i) In addition to paragraph 1.0, General Standards, of RTCA Document No. DO-158, materials used must be self-extinguishing when tested in accordance with applicable requirements of §§ 25.853 and 25.1359(d), and Appendix F of Part 25 of the Federal Aviation Regulations (FAR) effective May 1, 1972. The material may be of a size and be mounted for the test in accordance with paragraph (b) of Appendix F or may be of a size and mounted as used in the aircraft. Small parts (such as knobs, fasteners, seals, grommets, and small electrical parts) that would not contribute significantly to the propagation of a fire need not be tested.

(ii) Under normal operating conditions, the installed equipment shall not create a radiation hazard to flight crew personnel.

DISTRIBUTION: ZVS-326; A-W(WS)-3; A-X(FS)-3; A-X(CD)-3; A-FFS-1,2,7,8(LTD); A-FAC-1,2,3(LTD); AVN-1(2 copies)

(iii) If the equipment design implementation includes a digital computer, the computer software package must be validated and verified in a manner acceptable to the Administrator. An acceptable means of compliance for validation and verification of the computer software package is contained in RTCA/DO-178, "Software Considerations in Airborne Systems and Equipment Certification", November 18, 1981.

(2) Environmental Standard. The conditions and procedures prescribed in RTCA Document No. DO-160A, "Environmental Conditions and Test Procedures for Airborne Equipment" dated January 1980 are to be used in lieu of RTCA Document No. DO-160, "Environmental Conditions and Test Procedures for Airborne Equipment" dated February 28, 1975, which is incorporated as a reference in RTCA DO-158.

b. Marking.

(1) In addition to the marking specified in FAR § 21.607(d), the following information shall be legibly and permanently marked on the major equipment components:

(i) The environmental categories in which it has been qualified to operate in accordance with RTCA document DO-160A.

(ii) With regard to FAR § 21.607(d)(2), the part number is to include hardware and software identification or a separate part number may be utilized for hardware and software. Either approach must include a means for showing modification status.

(2) Each separate component of the equipment that is manufactured under this TSO must be permanently marked with at least the name of the manufacturer, the TSO number, digital computer software version (if applicable), and the environmental categories over which it has been tested.

c. Data Requirements.

(1) In addition to FAR § 21.605, the manufacturer must furnish the Manager, Aircraft Certification Office (ACO), Federal Aviation Administration (FAA), having purview of the manufacturer's facilities, one copy each of the following technical data.

(i) Operating instructions.

(ii) Equipment limitations.

(iii) Installation procedures and limitations.

(iv) Schematic drawings as applicable to the installation procedures.

(v) Wiring diagrams as applicable to the installation procedures.

(vi) Specifications.

(vii) List of the major components (by part number) that make up the equipment system complying with the standards prescribed in this TSO.

(viii) Manufacturer's TSO qualification test report.

(ix) Nameplate drawing.

(2) In addition to those data requirements that are to be furnished directly to the FAA, each manufacturer must have available for review by the Manager, ACO having purview of the manufacturer's facilities the following technical data:

(i) A drawing list, enumerating all the drawings and processes that are necessary to define the article design.

(ii) The functional test specification to be used to test each production article to ensure compliance with this TSO.

(iii) Equipment calibration procedures.

(iv) Corrective maintenance procedures (within 12 months after TSO authorization).

(v) Schematic drawings.

(vi) Wiring diagrams.

d. Data to be furnished with manufactured units. One copy of the data and information specified in paragraphs (c)(1)(i) through (vii) of this TSO and instructions for periodic maintenance and calibration which are necessary for continued airworthiness must go to each person receiving for use one or more articles manufactured under this TSO.

e. Previously Approved Equipment. Airborne automatic dead reckoning computer equipment utilizing aircraft heading and doppler ground speed and drift angle data approved prior to date of this TSO may continue to be manufactured under the provisions of its previous approval.

f. Availability of Reference Documents.

(1) Copies of RTCA Document Nos. DO-158, DO-160A and DO-178 may be purchased from the Radio Technical Commission for Aeronautics Secretariat, One McPherson Square, Suite 500, 1425 K Street, N.W., Washington, D.C. 20005.

(2) Federal Aviation Regulations 21, Subpart O, and Advisory Circular 20-110, “Index of Aviation Technical Standard Orders,” may be reviewed at the FAA Headquarters in the Office of Airworthiness, Aircraft Engineering Division (AWS-110), and at all regional ACO's.

/S/ M. C. BEARD
Director of Airworthiness