Advance copy pending
issuance of revised
pages for FAR 37

Title 14—AERONAUTICS AND SPACE

Chapter I—Federal Aviation Administration, Department of Transportation

[Docket No. 10666, Amdt. 37-34]

PART 37—TECHNICAL STANDARD ORDER AUTHORIZATIONS

Airborne Weather Radar Equipment

The purpose of this amendment to the Federal Aviation Regulations is to update the minimum performance standards for airborne weather radar equipment contained in § 37.168 of Part 37. This action was published as a notice of proposed rule making (35 F.R. 17192, November 7, 1970) and circulated as Notice 70-45, dated November 3, 1970.

A number of comments were received in response to the notice and these generally favored the proposed amendment. A few comments which were not within the scope of the notice will be considered in the next pertinent rulemaking action. Based upon the relevant comments and upon further review within the FAA, a number of changes have been made to the proposed rule. These changes and the FAA's disposition of the public comments are discussed hereinafter. Interested persons have been afforded the opportunity to participate in the making of this amendment and all relevant material submitted has been fully considered.

One commentator recommended that the radome and waveguide loss be defined as a two-way loss to avoid possible confusion. However, since radome and waveguide losses with respect to radar are always specified as two-way losses, no confusion will result. Therefore, the FAA does not believe a change is necessary.

One comment noted that the maximum range marking requirement of proposed § 37.168(b)(2) could cause a problem with radar having a multiple-antenna option, if range is a function of antenna gain. However, even though multiple-antenna option may permit the range to vary, the FAA does not believe that the standard need be more detailed as to marking. A similar situation exists with respect to other equipment having multiple-performance capabilities. Following the procedures used in such cases, the FAA will consider the range marking requirement to be met if the manufacturer marks the article with the appropriate class associated with one of the antennas provided. The maximum radar system range for each optional antenna would then be set forth in the manufacturer's installation procedures and a specific installation approved by the FAA accordingly.

Two commentators requested that proposed § 37.168(a)(2)(i) be clarified with respect to the effect to be given RTCA Document No. DO-138 in meeting the requirements of paragraph 2.14.1 of RTCA Document No. DO-134. The intent is that the exception stated within paragraph 2.14.1 of DO-134 remain effective after substituting reference to the appropriate figure of DO-138 in place of the corresponding figure of superseded RTCA Paper DO-108. § 37.168 (a)(2)(i) has been amended to make this clear.

With regard to the standards on emission of spurious radio frequency energy and magnetic effect, a comment recommended deletion of Category Z since past experience with RFI suppression indicates that the Category Z limits would be impractical for high-power pulse equipment such as airborne weather radar. Another commentator, however, favored the retention of both Categories A and Z. The FAA does not agree that deletion is appropriate inasmuch as Category Z is an optional category for standards on emission of spurious radio frequency energy which should remain open to a manufacturer for certification of its equipment. In response to a further comment suggesting clarification as to whether Category A or Z equipment is required for a particular aircraft type or installation condition, the FAA believes that paragraph 1, Appendix A of RTCA Document DO-138 is adequate in stating that either category of equipment may be used.

The FAA rejects a recommendation that proposed § 37.168(c)(2) be revised to require that one copy of the technical data sheet be furnished with the first article delivered to each customer rather than one copy with each article. To insure that each ultimate user receives the technical data, whether he buys from the manufacturer or a distributor, such data must be furnished with each article manufactured.

One commentator recommended that in lieu of the requirements of paragraph 2.10 of RTCA Document DO-134 the TSO should require that the system be capable of displaying signals on the shortest selected range scale down to 2 nautical miles or 10% of the selected range scale, whichever is greater. The commentator believed that the requirement of paragraph 2.10 would impose a needless spare parts expense and is not well enough defined to be operationally meaningful. Paragraph 2.10 states that the recovery time shall be such that the equipment is capable of displaying signals down to a 2-nautical mile minimum range, and the commentator has evidently interpreted the requirement as applicable to all the selectable range scales provided on the equipment. However, paragraph 2.10 does not require more than that the 2-nautical mile minimum range limitation be met on any one range scale and that the scale may be selected by the applicant. Since the applicant may select the one most advantageous scale, the FAA does not believe that the recommendation would alleviate any maintenance problem and, therefore, does not agree with the recommended change.

Finally, it should be noted that the FAA has developed a provisional signal format for the next generation instrument landing system which will operate simultaneously in the 5.0–5.25 and 15.4–15.7 GHz Aeronautical Radio Navigation Bands. Since channelization for the microwave landing guidance system is expected to consume the entire 15.4–15.7 GHz band, manufacturers of airborne weather radar equipment should take this into consideration when designing new equipment at least until compatibility with the microwave guidance system has been established.

In consideration of the foregoing, § 37.168 of the Federal Aviation Regulations is amended to read as hereinafter set forth, effective August 18, 1972.

§ 37.168 Airborne weather radar equipment, TSO-C63b.

(a) *Applicability.* (1) This technical standard order prescribes the minimum performance standards that airborne weather radar equipment must meet in order to be identified with the applicable TSO marking. New models of equipment that are to be so identified, and that are manufacturered on or after August 18, 1972, must meet the requirements of Radio Technical Commission for Aeronautics Document No. DO-134 entitled "Minimum Performance Standards—Airborne Weather and Ground Mapping Pulsed Radars," dated February 16, 1967, and Radio Technical Commission for Aeronautics Document No. DO-138 entitled "Environmental Conditions and Test Procedures for Airborne Electronic/

(As published in the Federal Register /37 F.R. 14289/ on July 19, 1972)

Electrical Equipment and Instruments" dated June 27, 1968, except as provided in subparagraph (2) of this paragraph. RTCA Documents Nos. DO-134 and DO-138 are incorporated herein in accordance with 5 U.S.C. 552(a)(1) and § 37.23 of the Federal Aviation Regulations, and are available as indicated in § 37.23. Additionally, RTCA Documents Nos. DO-134 and DO-138 may be examined at any FAA regional office of the Chief of Engineering and Manufacturing Branch (or in the case of the Western Region, the Chief, Aircraft Engineering Division), and may be obtained from the RTCA Secretariat, Suite 655, 1717 H Street NW., Washington, DC 20006, at a cost of $6 per copy for Document No. DO-134 and $8 per copy for Document No. DO-138.

(2) Exceptions:

(i) RTCA Paper DO-108, referenced in RTCA Document No. DO-134, has been superseded by RTCA Document No. DO-138, and the requirements of RTCA Document No. DO-134 must be met using the environmental test condition of RTCA Document No. DO-138. The exception provided in paragraph 2.14.1 of RTCA Document No. DO-134 is applicable after substituting the words "Figure 2 on page 13 of DO-138 Appendix A" in place of the words "Figure 4-A on page 9 of the DO-108 Appendix A."

(ii) RTCA Document No. DO-138 lists environmental test conditions covering equipment subjected to water, hydraulic fluid, sand and dust, fungus and salt spray, for which there are no corresponding equipment performance requirements in RTCA Document No. DO-134, and compliance with these environmental test conditions is not required. If the applicant elects to certify compliance with any of those environmental test conditions, the equipment performance requirements of paragraph 2.7 of RTCA Document No. DO-134 must be met after the equipment has been exposed to those test conditions.

(b) *Marking.* In addition to the markings specified in § 37.7, the article must be permanently and legibly marked with the following information:

(1) The environmental categories over which the article has been designed to operate must be marked in accordance with RTCA Document DO-138, Appendix B.

(2) The maximum system range in nautical miles, declared by the article manufacturer. This must be identified on the name plate, following the environmental category designations, by the word "class" and the following class number which identifies the maximum system range:

Class:	*Maximum system range in nautical miles*
1	25
2	50
3	75
4	100
5	125
6	150
7	over 150

(3) Each separate component of the article (antenna, transmitter-receiver, indicator, etc.) must be identified with at least the name of the manufacturer, the TSO number, and the environmental categories over which the article component is designed to operate. Where an environmental test procedure is not applicable to that component and the test is not conducted, and X should be placed in the space assigned for that category.

(c) *Data requirements.* (1) In accordance with § 37.5, the manufacturer must furnish to the Chief, Engineering and Manufacturing Branch, Flight Standards Division (or in the case of the Western Region, the Chief, Aircraft Engineering Division), Federal Aviation Administration, in the region in which the manufacturer is located, the following technical data:

(i) One copy of the operating instructions and equipment limitations of the manufacturer.

(ii) One copy of the installation procedures with applicable schematic drawings, wiring diagrams, and specifications, and a list of components (by part number) or possible combinations thereof, which make up a system complying with this TSO. The procedures must set forth all limitations, restrictions, or other conditions pertinent to the installation.

(iii) One copy of the manufacturer's test report.

(2) One copy of the technical data specified in subparagraph (1)(ii) of this paragraph must be furnished with each article manufactured.

(d) *Previously approved equipment.* Airborne weather radar equipment approved prior to the effective date of this section may continue to be manufactured under the provisions of its original approval.

(Secs. 313(a), 601, Federal Aviation Act of 1958, 49 U.S.C. 1354(a), and 1421; sec. 6(c), Department of Transportation Act, 49 U.S.C. 1655(c))

Issued in Washington, D.C., on July 10, 1972.

C. R. MELUGIN, Jr.,
Acting Director,
Flight Standards Service.