



Department of Transportation
Federal Aviation Administration
Aircraft Certification Service
Washington, D.C.

TSO-C197

Effective
Date: 11/15/10

Technical Standard Order

Subject: Information Collection and Monitoring Systems

- 1. PURPOSE.** This technical standard order (TSO) is for manufacturers applying for a TSO authorization (TSOA) or letter of design approval (LODA). In it, we (the Federal Aviation Administration, or FAA) tell you what minimum performance standard (MPS) your information collection and monitoring system (ICMS) must first meet for approval and identification with the applicable TSO marking.
- 2. APPLICABILITY.** This TSO affects new applications submitted after its effective date.
- 3. REQUIREMENTS.** New models of ICMS identified and manufactured on or after the effective date of this TSO must meet the MPS qualification and documentation requirements in the European Organization for Civil Aviation Electronics (EUROCAE) document ED-155, *Minimum Operational Performance Specification for Lightweight Flight Recording Systems*, dated July 2009. All ICMS must meet the requirements in ED-155 Chapters 2-1, 2-2, 2-3 and 2-4 of Section 2. All deployable ICMS must also meet the requirements in ED-155 Chapters 3-1, 3-2, 3-3 and 3-4 of Section 3. Additionally, each Type of ICMS must meet the requirements of ED-155 listed in the table below.

ICMS Type	<i>Your design must also meet the following requirements in ED-155</i>	<i>Your design does not need to meet the following requirements in ED-155</i>
I	Part I, Cockpit Audio Recording System	I-2.1.7 and I-6
II	Part II, Aircraft Data Recording System	II-2.1.7, II-2.1.9, II-2.1.12, and II-6
III	Part III, Airborne Image Recording System	III-2.2 and III-6
IV	Part IV, Data-link Recording System	IV-2.1.6, IV-2.1.11, and IV-6

- a. Functionality.** This TSO's standards apply to a system that records cockpit audio, aircraft data, airborne images, or data link communications.

b. Failure Condition Classification. Malfunction of the function defined in paragraph **3.a** of this TSO is a minor failure condition. Loss of the function defined in paragraph **3.a** of this TSO is a minor failure condition. Design the system to at least this failure condition classification.

c. Functional Qualification. Demonstrate the required functional performance under the standard test conditions specified in ED-155.

d. Environmental Qualification. Demonstrate the required performance under the environmental test conditions specified in ED-155 using standard environmental conditions and test procedures appropriate for airborne equipment.

NOTE: The use of RTCA/DO-160D (with Changes 1 and 2 only, incorporated) or earlier versions is generally not considered appropriate and will require substantiation via the deviation process as discussed in paragraph **3.f** of this TSO.

e. Software Qualification. If the article contains software, develop the software according to RTCA/DO-178B, *Software Considerations in Airborne Systems and Equipment Certification*, dated December 1, 1992, with the exception of any reference requiring involvement of the certification authorities, to the design assurance level consistent with the failure condition classification defined in paragraph **3.b** of this TSO.

f. Deviations. We have provisions for using alternate or equivalent means of compliance to the criteria in the MPS of this TSO. If you invoke these provisions, you must show that your equipment maintains an equivalent level of safety. Apply for a deviation under the provision of 14 CFR 21 Subpart O.

4. MARKING.

a. Mark at least one major component permanently and legibly with all the information in 14 CFR 21 Subpart O. The marking must include the serial number. Also mark the ICMS type as defined in the table in paragraph **3**.

b. Also, mark the following permanently and legibly, with at least the manufacturer's name, subassembly part number, and the TSO number:

(1) Each component that is easily removable (without hand tools), and

(2) Each subassembly of the article that you determine may be interchangeable.

c. If the article includes a deviation per paragraph **3.f** of this TSO, the marking must include a means to indicate a deviation was granted.

d. If the component includes a digital computer, then the part number must include hardware and software identification. Or, you can use a separate part number for hardware and software. Either way, you must include a means to show the modification status.

NOTE: Similar software versions, developed and tested to different software or hardware design assurance levels, must be differentiated by part number.

5. APPLICATION DATA REQUIREMENTS. You must give the FAA aircraft certification office (ACO) manager responsible for your facility a statement of conformance, as specified in 14 CFR 21 Subpart O and one copy each of the following technical data to support your design and production approval. LODA applicants must submit the same data (excluding paragraph **5.h**) through their civil aviation authority.

a. A Manual(s) containing the following:

(1) Operating instructions and equipment limitations sufficient to describe the equipment's operational capability.

(2) Describe in detail any deviations. As applicable, identify equipment by part number, version, revision, and criticality level of software/hardware, classification for use, and environmental categories.

(3) Procedures and limitations sufficient to ensure that the ICMS when installed according to the installation procedures, still meets this TSO's requirements. Limitations must identify any unique aspects of the installation. The limitations must include a note with the following statement:

“This article meets the minimum performance and quality control standards required by a technical standard order (TSO). Installation of this article requires separate approval.”

(4) A summary of the test conditions used for environmental qualifications for each component of the article. For example, a form as described in RTCA/DO-160F, *Environmental Conditions and Test Procedures for Airborne Equipment*, Appendix A.

(5) Schematic drawings, wiring diagrams, and any other documentation necessary for installation of the ICMS.

(6) List of line replaceable components, by part number, that makes up the ICMS. Include vendor part number cross-references, when applicable.

b. Instructions covering periodic maintenance, calibration, and repair, for the continued airworthiness of ICMS. Include recommended inspection intervals and service life, as appropriate.

c. If the article includes software: a plan for software aspects of certification (PSAC), software configuration index, and software accomplishment summary.

- d.** Nameplate drawing with the information required by paragraph **4** of this TSO.
- e.** Identify functionality, features or performance contained in the article not evaluated under paragraph **3** of this TSO (that is, non-TSO functions). Non-TSO functions are accepted in parallel with the TSO authorization. You must declare these non-TSO functions and include the following information with your TSO application:
 - (1)** Description of the non-TSO function(s), such as performance specifications and software, hardware, and environmental qualification levels. Include a statement confirming that the non-TSO function(s) don't interfere with the article's compliance with the requirements of paragraph 3.
 - (2)** Procedures and limitations sufficient to ensure that the non-TSO function(s), when installed according to the installation procedures, still meets this TSO's requirements. Limitations must identify any unique aspects of the installation.
 - (3)** Instructions for continued performance applicable to the non-TSO function(s) described in paragraph **5.e.(1)**.
 - (4)** Interface requirements and applicable installation test procedures to ensure compliance with the performance data defined in paragraph **5.e.(1)**.
 - (5)** Results of test/analysis, as appropriate, to verify that performance of the hosting TSO article is not affected by the non-TSO function(s).
 - (6)** Results of test/analysis, as appropriate, to verify the function and performance of the non-TSO function(s) as described in paragraph **5.e.(1)**.
- f.** The quality control system description required by 14 CFR 21 Subpart O, including functional test specifications. The quality system should ensure that you will detect any change to the approved design that could adversely affect compliance with the TSO MPS, and reject the article accordingly. (Not required for LODA applicants.)
- g.** Material and process specifications list.
- h.** List of all drawings and processes (including revision level) that define the article's design.
- i.** Manufacturer's TSO qualification report showing results of testing accomplished according to paragraph **3.c** through **3.e** of this TSO.

6. MANUFACTURER DATA REQUIREMENTS. Besides the data given directly to the responsible ACO, have the following technical data available for review by the responsible ACO:

- a. Functional qualification specifications for qualifying each production article to ensure compliance with this TSO.
- b. Equipment calibration procedures.
- c. Schematic drawings.
- d. Wiring diagrams.
- e. Material and process specifications.
- f. The results of the environmental qualification tests conducted according to paragraph **3.d** of this TSO.
- g. If the article includes software, the appropriate documentation defined in RTCA/DO-178B including all data supporting the applicable objectives in RTCA/DO-178B *Annex A, Process Objectives and Outputs by Software Level*.
- h. If the article contains non-TSO function(s), you must also make available items **6.a** through **6.g** as they pertain to the non-TSO function(s).

7. FURNISHED DATA REQUIREMENTS.

- a. If furnishing one or more articles manufactured under this TSO to one entity (such as an operator or repair station), provide one copy of the data in paragraphs **5.a** through **5.e** of this TSO. Add any other data needed for the proper installation, certification, use, or for continued compliance with the TSO, of the ICMS.
- b. If the article contains non-TSO function(s), include one copy of the data in paragraphs **5.e(1)** through **5.e(4)**.

8. HOW TO GET REFERENCED DOCUMENTS.

- a. Order RTCA documents from RTCA Inc., 1828 L Street NW, Suite 805, Washington, D.C. 20036. Telephone (202) 833-9339, fax (202) 833-9434. You can also order copies online at www.rtca.org.
- b. Order EUROCAE documents from EUROCAE, 102 rue Etienne Dolet, 92240 Malakoff France. Telephone 33 (0) 1 4092 7930, fax 33 (0) 1 4655 6265. You can also order from the EUROCAE Internet website at www.eurocae.net.
- c. Order copies of 14 CFR part 21, Subpart O, from the Superintendent of Documents, Government Printing Office, P.O. Box 979050, St. Louis, MO 63197. Telephone (202) 512-1800, fax (202) 512-2250. You can also order copies online at www.access.gpo.gov. Select "Access," then "Online Bookstore." Select "Aviation," then "Code of Federal Regulations."

d. You can find a current list of technical standard orders and advisory circulars on the FAA Internet website Regulatory and Guidance Library at <http://rgl.faa.gov/>. You will also find the TSO Index of Articles at the same site.



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