



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject: Certification Guidance for Installation of Non-Essential, Non-Required Aircraft Cabin Systems & Equipment (CS&E)

Date: 07/22/2010

AC No: 20-168

Initiated by: AIR-120

1. Purpose of this Advisory Circular (AC).

a. This AC provides the primary certification guidance on how to meet the airworthiness requirements for installation of non-essential, non-required aircraft cabin systems & equipment (CS&E). We incorporate in this AC the guidance in RTCA, Inc. document RTCA/DO-313, *Certification Guidance for Installation of Non-Essential, Non-Required Aircraft Cabin Systems & Equipment*, dated October 2, 2008. We also clarify certain guidance in RTCA/DO-313. (See paragraph 6.)

Note: This AC *doesn't* apply to any CS&E installed in the cockpit. Any CS&E that may interface with any required systems and equipment must be coordinated with the responsible aircraft certification office (ACO) for any additional certification considerations.

b. This AC is not mandatory and does not constitute a regulation. In it we describe a means, though it is not the only means, for manufacturers and installers to show their equipment design and installation performs its intended function. If you use the means described in this AC, however, you should follow it in all respects.

2. Whom Does This AC Apply To? This AC is for manufacturers and installers seeking airworthiness certification for installation of aircraft cabin systems and associated equipment the FAA considers non-essential, non-required CS&E.

3. Cancellation. This AC cancels AC 25-10, *Guidance for Installation of Miscellaneous, Nonrequired Electrical Equipment*, dated March 6, 1987.

4. Scope. The guidance in this AC applies to CS&E installations we approve under Title 14 of the Code of Federal Regulations (14 CFR), parts 23, 25, 27, and 29. This includes equipment the aerospace industry manufactures and also commercial-off-the-shelf (COTS) equipment.

5. Why Use RTCA/DO-313? It standardizes and streamlines the process for demonstrating compliance with airworthiness requirements, as summarized below.

a. Following the guidance and procedures in RTCA/DO-313 helps you demonstrate that:

(1) CS&E performs its intended functions within the environment it was designed for, and it meets all applicable airworthiness requirements.

(2) Normal operation of CS&E, or failure of it to perform its intended function, doesn't adversely affect the safety of the aircraft or its occupants, or the proper functioning of required equipment and systems. RTCA/DO-313 instructs you to perform a system safety assessment (SSA) to confirm there is no adverse affect on the level of safety.

b. RTCA/DO-313 also provides special emphasis on guidance that helps you meet testing and certification requirements, as follows:

(1) Procedures for electromagnetic compatibility (EMC) testing of CS&E,

(2) Guidelines for certification of COTS equipment, and

(3) Supplemental guidance on flammability testing.

c. RTCA/DO-313 paragraph 1.3 identifies some specific products and appliances the FAA consider non-essential, non-required aircraft CS&E.

Note: You may apply RTCA/DO-313 to other types of CS&E in the aircraft cabin with the coordination and approval of the responsible ACO.

6. Clarification of Certain Guidance. The following provides clarification of guidance in RTCA/DO-313. Words we've added to the guidance appear in *italics* below.

a. Purpose and Scope. Revise paragraph 1.1 of RTCA/DO-313 to add a new subparagraph to read as follows:

“Certification guidance for large transport aircraft contained in the ACs listed in appendix A, paragraph A.2 of RTCA/DO-313 must take precedence over any conflicting guidance within RTCA/DO-313, as it applies to large transport aircraft.”

b. Applicable Cabin Systems and Equipment. Revise Table 1-1, Cabin Systems, Functions and Equipment to add ** footnote, as follows:

“Wired and Wireless Network Systems**

*** Network security must be demonstrated. See new paragraph 4.6d.*” (This paragraph is added under paragraph 6f of this AC).

c. Coordinating with Aircraft Certification Office (ACO).

(1) In paragraph 2.1, General, the last sentence of first unnumbered subparagraph of RTCA/DO-313 calls for coordinating your certification method(s) with an FAA ACO. Paragraph 3.1 (the unnumbered fifth subparagraph) of RTCA/DO-313 is revised to make it clear that you’re required to coordinate with the ACO on all aspects of certain installations. The new paragraph 3.1 now reads as follows:

- “The following types of CS&E installations require additional certification considerations and *all aspects of their installation* must be coordinated with the responsible ACO.
- *Wired and wireless devices and network systems not just those using radio frequencies (RF).*
- Cabin systems with external-mounted devices or antennae.
- CS&E installations *depending on the certification basis of the aircraft may be considered a required aircraft system, as noted in paragraph 1.3 of RTCA/DO-313.*”

(2) For the installations below (numbers cited are paragraphs from RTCA/DO-313), we emphasize that the applicant must coordinate with the responsible ACO.

- (a) 4.1 Lithium Batteries,
- (b) 4.2 Glass in the Cabin,
- (c) 4.3 Wireless RF Cabin Systems Electromagnetic Compatibility,
- (d) 4.5 Approval of In-seat Video Systems,
- (e) 4.6 System Security Considerations,
- (f) 4.7 Instructions for Continued Airworthiness (ICA), and
- (g) 4.8 Airplane/Rotorcraft Flight Manual.

Note: Lithium batteries (4.1) and System Security Considerations (4.6) may require an issue paper or special condition based on the SSA.

d. Flammability for Small Parts. Paragraph 3.9.c.1., Flammability for Small Parts of RTCA/DO-313 is revised to limit applicability. The new title is revised to read as follows:

“1. Additional Flammability for Small Parts (*only applicable to transport aircraft with 19 passenger seats or less*).”

e. Glass in the Cabin. The first unnumbered paragraph in paragraph 4.2 of RTCA/DO-313, Glass in the Cabin is revised to address limited applicability. The new unnumbered paragraph reads as follows:

“Coordinate any installation of glass in the cabin, whether as a decorative divide or as part of a component, with the local ACO. Because of the hazards associated with such installations, a specific means of compliance, *equivalent level of safety or special conditions, as appropriate*, may be imposed with an issue paper required. *The following guidance is only applicable to video monitors and cathode-ray tubes.*”

f. System Security Considerations. Add a new paragraph 4.6d to read as follows:

“*d. The applicant must ensure that the design will prevent all inadvertent or malicious changes to, and all adverse impacts upon, all systems, networks, hardware, software, and data in the aircraft control domain and in the airline operations domain from all points within the CS&E domain.*”

g. Guidance Documents. Revise appendix A of RTCA/DO-313 accordingly:

(1) Paragraph A.2, Guidance Documents is revised to add the following:

- “AC 21-16E RTCA, Inc. Document RTCA/DO-160E, *Environmental Conditions and Test Procedures for Airborne Equipment.*”
- AC 25-26 *Development of Standard Wiring Practices Documentation.*
- AC 25.869-1A *Fire Protection Systems.*
- AC 25.899-1 *Electrical Bonding and Protection Against Static Electricity.*
- AC 25.1360-1 *Protection Against Injury.*”

(2) Paragraph A.3, Orders is revised to add the following:

- “8110.105 *Simple and Complex Electronic Hardware Approval Guidance*”

h. Clarification of COTS Equipment Operation. Appendix D of RTCA/DO-313 is revised to clarify paragraph D.6.5.2, Equipment Function (the last sentence of the second unnumbered subparagraph). The new sentence reads as follows:

“Since the COTS equipment provides no required function, *cabin crew action (such as cycling COTS equipment power) may be required for continued COTS equipment operation.*”

7. Who Can Use RTCA/DO-313?

a. Manufacturers and installers of CS&E who are applying for:

- (1) Type certificates (TC),
- (2) Supplemental type certificates (STC),
- (3) Amended type certificates (ATC),
- (4) Amended supplemental type certificates (ASTC),
- (5) Parts manufacturer approvals (PMA), and
- (6) Field Approvals

b. Manufacturers of aircraft products or appliances incorporating COTS components.

Note: We recognize that COTS may not be available for tests and evaluation to satisfy the objectives of RTCA/DO-313. There are alternative methods or processes to ensure that COTS microprocessors perform their intended functions and meet airworthiness requirements. Coordinate your plans for alternative methods or processes with us early in the certification project.

8. Future Changes or Revisions. We may revise this or other associated ACs or publish policy changes to clarify the use of RTCA/DO-313 for a specific part of 14 CFR.

9. Related Documents and How to Get Them.

a. Order copies of RTCA documents from RTCA Inc., 1828 L Street, NW, Suite 805, Washington DC 20036-4007. Telephone 202-833-9339; fax 202-833-9434. You can also order copies from the RTCA Internet website at <http://www.rtca.org/>.

b. Order copies of 14 CFR parts from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 979050, St. Louis, MO 63197. For general information, telephone 202-512-1800 or fax 202-512-2250. You can get free copies from the U.S. Government Printing Office Internet website at <http://www.gpoaccess.gov/ecfr/index.html>.

David W. Hempe
Manager, Aircraft Engineering Division
Aircraft Certification Service