



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

# Policy Statement

**Subject:** Application of AC 20-170,  
*Integrated Modular Avionics Development,  
Verification, Integration, and Approval  
Using RTCA/DO-297 and Technical  
Standard Order-C153.*

**Date:** 05/ 23/  
2013

**Policy No:**  
PS-ANM-25-08

**Initiated By:**  
ANM-100

## Summary

This policy statement describes Federal Aviation Administration (FAA) Transport Airplane Directorate certification policy on when the guidance of Advisory Circular (AC) 20-170, *Integrated Modular Avionics Development, Verification, Integration, and Approval Using RTCA/DO-297 and Technical Standard Order-C153*, dated October 28, 2010, is relevant to a particular part 25 certification program and should be applied. This policy statement is necessary because of the wide range of complex, highly integrated systems that could be referred to by a part 25 applicant as an integrated modular avionics (IMA) system. This policy statement provides criteria and resources to help applicants and aircraft certification offices determine if the guidance in AC 20-170 is applicable, regardless of how the system is referred to or what name it has been given.

## Definition of Key Terms

In the text below the terms “must,” “should,” and “recommend” have a specific meaning that is explained in Attachment 1.

## Current Regulatory and Advisory Material

AC 20-170, *Integrated Modular Avionics Development, Verification, Integration, and Approval Using RTCA/DO-297 and Technical Standard Order-C153*, was published on October 28, 2010. That AC recognizes the industry standard RTCA/DO-297, *Integrated Modular Avionics (IMA) Development Guidance and Certification Considerations*, dated November 8, 2005, as an acceptable means of compliance. This policy statement highlights material that is contained in RTCA/DO-297 that will assist applicants and their suppliers in making the determination about the relevancy of the guidance material contained in AC 20-170.

## Relevant Past Practice

The FAA published AC 20-145, *Guidance for Integrated Modular Avionics (IMA) That Implement TSO C153 Authorized Hardware Elements*, in 2003. That AC was canceled with the release of AC 20-170, which incorporated relevant material from AC 20-145. Additional issues regarding the design, verification, and installation of IMA systems have been addressed in aircraft program-specific issue papers. The need for many of these issue papers was removed when AC 20-170 was published, as either the guidance provided in RTCA/DO-297 or the AC text itself addressed those issues.

## Policy

1. **Background.** When IMA systems began to be used in commercial aircraft, they shared several specific architectural attributes, such as a number of generic computing modules and shared supporting resources—such as Input/Output (I/O) processing modules and power supplies—installed in one or more cabinets. During this time, applicants and developers of these IMA systems normally used AC 20-145 as one acceptable means of compliance to meet the regulations.

However, technology has advanced since those first-generation IMA systems. There are many variations, large and small, on the possible system architectures of an IMA. As a result, these systems may not resemble those first-generation IMA systems. AC 20-145 no longer fully addressed the issues encountered during the development, verification, and installation of increasingly complex IMA systems. AC 20-170 is intended to address these additional issues.

The purpose of this policy is to help part 25 applicants determine when the guidance contained in AC 20-170 is relevant to their airborne systems. Please note that this policy does not make compliance to AC 20-170 mandatory. That AC, as with all ACs, documents one, but not the only, acceptable means of compliance to the applicable regulations. However, if applicants are not going to adopt the guidance contained in AC 20-170 as their acceptable means of compliance, then they should propose a method that addresses all the issues covered in that AC.

2. **IMA System Definition.** AC 20-170 and RTCA/DO-297 provides the following definition of an IMA:

*“Shared set of flexible, reusable, and interoperable hardware and software resources that, when integrated, form a platform that provides services. These services are designed and verified to a defined set of safety and performance requirements, to host applications performing aircraft functions.”*

Although the current guidance material provides a definition of an IMA system, some applicants contend that it contains enough ambiguity to not provide a conclusive method of establishing if an airborne system is or is not an IMA. Applicants and system designers under part 25, therefore, should also consider the architecture, functions, and components to determine if an airborne system is or is not an IMA.

As stated in AC 20-170, paragraph 1-4.d, an IMA system is defined by the system architecture and not by the functionality that system provides. IMA systems may not always implement functions historically regarded as “avionics,” such as flight deck displays, navigation, and communication. IMA systems may also be used to implement other aircraft functionality, such as fly-by-wire flight controls, inertial reference/air data systems, and electrical power systems. There may be more than one IMA system on an aircraft. An IMA system could feasibly mounted within an engine assembly.

3. **Examples of an IMA System.** To aid in the effort of providing a more definitive way of establishing an IMA system, Annex D of RTCA/DO-297 provides several examples of possible architectures. Part 25 applicants should consult these examples to determine if the guidance material in AC 20-170 is relevant.
4. **Key Characteristics of an IMA System.** Some instances of IMA systems may not exactly fit the examples of Annex D of RTCA/DO-297. Tables 1 and 2 in Section 2.3 of RTCA/DO-297 also provide information regarding the key characteristics of an IMA system as well as the hosted applications. The key characteristics in these tables may also be used in the determination if an airborne system is an IMA. These tables are not intended to be used as checklists that would provide a definitive “yes” or “no” answer to the question of whether any particular system is indeed an IMA. Rather, applicants and their suppliers should use these key characteristics as a reference when attempting to determine when AC 20-170 and RTCA/DO-297 are applicable.
5. **Relevancy of the Guidance Contained in AC 20-170.** The guidance provided in AC 20-170 is relevant and should be considered to be an acceptable means of compliance if an airborne system in question meets any of the following criteria:
  - a. Fits the definition of an IMA in paragraph 2,
  - b. Resembles one or more of the examples of Annex D of RTCA/DO-297 in paragraph 3, or
  - c. Contains key characteristics discussed in paragraph 4 that indicate the system may be an IMA.

Note: As indicated in paragraph 4, the lists of IMA key characteristics in Tables 1 and 2 in Section 2.3 of RTCA/DO-297 are not intended to be a checklist. The presence of only a single attribute from these tables is not enough to categorize an airborne system as an IMA. These tables are intended to be used as a guide and, therefore, a specific number of these attributes cannot be identified. Engineering judgment is required.

Please see AC 20-170, paragraph 7-5, to determine if the guidance in AC 20-156, *Aviation Databus Assurance*, to dedicated data networks for IMA systems is relevant.

As stated previously in paragraph 1, this policy statement does not require an applicant to adopt the specific guidance in AC 20-170. Guidance material contained in an AC represents one, but not the only, acceptable means of compliance. If an applicant chooses to not use the guidance in AC 20-170 as its selected means of compliance, then it should be prepared to propose an alternative method of compliance. The proposal for an alternative means (other than the one published in AC 20-170) should address the technical and procedural issues contained in that AC. The applicant should be prepared to document its proposed approach with an issue paper.

6. **Technical Standard Orders (TSO) and Relevance of AC 20-170.** The presence or absence of TSO-Authorized (TSOA) articles within the avionics system does not affect the decision of whether AC 20-170 is relevant to the development, integration, and approval of that airborne system. If the system has been granted one or more TSO authorizations, AC 20-170 provides guidance about how compliance data from the TSOA may be used to show compliance to the applicable regulations and guidance material at the installation level for the purpose of obtaining aircraft certification. Applicants seeking a type certificate or approval of a change to type design should refer to AC 21-50, *Installation of TSOA Articles and LODA Appliances*, dated February 11, 2011. This AC includes more information regarding appropriate use of FAA-approved data under a TSOA to support showing compliance to the airworthiness regulations applicable to the category of the product on which the TSO article is being installed.

### **Effect of Policy**

The general policy stated in this document does not constitute a new regulation. Agency employees and their designees and delegations must not depart from this policy statement without appropriate justification and concurrence from the FAA management that issued this policy statement. The authority to deviate from this policy statement is delegated to the Transport Standards Staff Manager.

### **Conclusion**

The Transport Airplane Directorate has concluded that it is necessary to create policy on when to apply the guidance in AC 20-170, *Integrated Modular Avionics Development, Verification, Integration, and Approval Using RTCA/DO-297 and Technical Standard Order-C153* in part 25 applications. The general policy stated in this document does not constitute a new regulation or create what the courts refer to as a “binding norm.”

Jeff Duven  
Acting Manager, Transport Airplane Directorate  
Aircraft Certification Service  
Attachment

## Attachment 1

**Terms**

Table A-1 defines the use of key terms in this policy statement. The table describes the intended functional impact.

Table A-1 Definition of Key Terms

	<b>Regulatory Requirements</b>	<b>Acceptable Methods of Compliance (MOC)</b>	<b>Recommendations</b>
<b>Language</b>	Must	Should	Recommend
<b>Meaning</b>	Refers to a regulatory requirement that is mandatory for design approval	Refers to instructions for a particular MOC	Refers to a recommended practice that is optional
<b>Functional Impact</b>	No Design Approval if not met	Alternative MOC has to be approved by issue paper.	None, because it is optional