



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

# Advisory Circular

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**Subject:** STANDARDIZATION GUIDE  
FOR INTEGRATED COCKPITS IN PART 23  
AIRPLANES

**Date:** 9/30/04

**AC No:** 23-23

**Initiated By:** ACE-100 **Change:**

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## 1. WHAT IS THE PURPOSE OF THIS ADVISORY CIRCULAR (AC)?

**a.** This AC is to acknowledge the General Aviation Manufacturers Association (GAMA) Publication #12, "Recommended Practices and Guidelines for an Integrated Flightdeck/Cockpit in a 14 CFR Part 23 (or equivalent) Certificated Airplane," as an acceptable means for showing compliance with applicable requirements for electronic displays in part 23 airplanes. Guidance in AC 23.1311-1A, Installation of Electronic Displays in Part 23 Airplanes, Society of Automotive Engineers (SAE), and Radio Technical Commission for Aeronautics (RTCA, Inc.) documents was used in developing the GAMA Publication #12. (GAMA Publication #12 is available from GAMA's website at [www.gama.aero](http://www.gama.aero).) A combined industry and Federal Aviation Administration (FAA) team developed this GAMA publication.

**b.** This material is neither mandatory nor regulatory in nature and does not constitute a regulation. It describes acceptable means, but not the only means, for demonstrating compliance with the applicable regulations. The FAA will consider other methods of demonstrating compliance that an applicant may elect to present. While these guidelines are not mandatory, they are derived from extensive FAA and industry experience in determining compliance with the relevant regulation. If we become aware of circumstances that convince us that following this AC would not result in compliance with the applicable regulations, the FAA will not be bound by the terms of this AC, and we may require additional substantiation or design changes as a basis for finding compliance.

**c.** This material does not change, create any additional, authorize change in, or permit deviations from regulatory requirements.

## **2. WHAT IS AN INTEGRATED COCKPIT/FLIGHTDECK?**

Generally, an integrated cockpit/flightdeck combines a number of flight guidance, airplane systems, and situational awareness control and display functions into a minimum number of interdependent electronic displays. For the purposes of this AC and the GAMA Publication #12, an integrated cockpit/flightdeck must include electronic display and control of all primary aircraft airspeed, altitude, and attitude instruments, and all essential navigation and communication functions. Integration may also include display and control of airborne surveillance, aircraft systems and engine systems.

## **3. WHAT DOES THE GAMA DOCUMENT PROVIDE?**

a. This document provides a recommended practice, which, if followed, will result in more standardized cockpit display and control systems. One significant benefit to standardization between cockpit designs is that it should improve pilot performance (that is, reduce pilot errors, tasks performance times, and so forth) when transitioning between different aircraft systems. The GAMA Publication #12 is a living document to allow it to evolve with the rapidly changing flight technology. We expect the document to evolve and to increase integrated cockpit commonality with each revision. This document only addresses the pilot interface issues associated with integrated cockpits/flightdecks.

b. We also expect that with increasing cockpit commonality there will be reduced training needed to safely transition from one electronic cockpit to another. Given that expectation, GAMA Publication #12 does not address the initial training needed for a pilot to safely transition from traditional round dial instruments to integrated electronic flight displays.

c. Finally, the guidance provided in GAMA Publication #12 is intended to streamline the certification process. The industry/FAA team that composed GAMA Publication #12 specifically addressed issues with integrated cockpits/flightdecks that are frequently raised by FAA flight test and human factors personnel. This document should allow FAA and manufacturers to focus on certification issues associated with new technologies and displays - not on design aspects the FAA has already determined are acceptable because the FAA already approved them in another manufacturer's product. This does not mean that all integrated cockpit issues are addressed in the GAMA document because that is not possible or even desirable for systems as complex as integrated cockpits. The GAMA Publication #12 acknowledges that there should always be room for innovation and new technology.

## **4. TO WHOM DOES THIS AC APPLY?**

a. The guidance provided in this document is directed to airplane manufacturers, modifiers, foreign regulatory authorities, and FAA small airplane type certification engineers, and their designees. This AC, and the associated GAMA Publication #12, applies if you are developing or installing an integrated cockpit system into any small part 23 airplane.

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**b.** GAMA Publication #12 guidance was developed based on a minimum display set of a Primary Flight Display (PFD)/Navigation Display (ND) and Multifunction Display (MFD). The document applies to “integrated cockpit” installations in older airplanes as well as new airplanes. Moreover, GAMA Publication #12 may be used for partial “integrated cockpit” equipment installations where the guidance is applicable.

#### **5. ARE THERE ANY REFERENCES FOR THIS AC?**

GAMA Publication #12, Recommended Practices and Guidelines for an Integrated Flightdeck/Cockpit in a 14 CFR Part 23 (or equivalent) Airplane.

s/

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