



U.S. Department  
of Transportation

**Federal Aviation  
Administration**

# Memorandum

Subject: **INFORMATION**: Policy Statement on  
Standardization of Application of 14 CFR, Part 23,  
§ 23.1309 Regarding Hazardous Misleading Attitude  
Information; PS-ACE100-2004-10035

Date: DRAFT

From: Acting Manager, Small Airplane Directorate,  
ACE-100

Reply  
to Attn. Ervin Dvorak (816)  
of: 329-4123

To: See Distribution

## Summary

The purpose of this memorandum is to standardize Federal Aviation Administration (FAA) application of 14 CFR, part 23, § 23.1309, at Amendments 23-41 or later, regarding hazardous misleading attitude information. The display of hazardously misleading attitude information should be considered a catastrophic failure condition at the aircraft level. From a system level function that is limited to the pilot's PFD, the display of hazardously misleading attitude information may be catastrophic, hazardous, or a major failure condition depending on the airplane architectural features.

This policy is limited to installations approved for operation in Instrument Meteorological Conditions (IMC) under Instrument Flight Rules (IFR) with an electronic Primary Flight Display (PFD).

## Current Airworthiness Regulations, Advisory Material of 14 CFR, Part 23, and RTCA Document

§ 23.1309, Equipment, systems, and installations  
§ 23.1311, Electronic display instrument systems

Advisory Circular (AC) 23.1309-1C, Equipment, Systems, and Installations in Part 23 Airplanes  
AC 23.1311-1A, Installation of Electronic Display Instrument Systems in Part 23 Airplanes  
AC 20-115B, RTCA, Inc., RTCA/DO-178B

RTCA/DO-178B, Software Considerations in Airborne Systems and Equipment Certification

## **Policy**

The display of hazardously misleading attitude information should be considered a catastrophic failure condition at the aircraft level. The function of attitude at the aircraft level considers all the sources that provide the attitude function directly or indirectly from one system or combination of systems. For example, the function at the aircraft level would consider the PFD, standby attitude, and possible partial panel techniques. From a system level function that is limited to the pilot's PFD, the display of hazardously misleading attitude information may be catastrophic, hazardous, or a major failure condition depending on the airplane architectural features. These features could be the size, location, and readability of the standby or backup attitude display and the other pilot cues from the PFD.

Even with more than one attitude display installed, the software development assurance level for the pilot's PFD should be at the level for the catastrophic failure condition in AC 23.1309-1C, Figure 2. When this revision was made, the software development assurance levels for the primary PFD were intended to be Level C for Class I and Class II airplanes, Level B for Class III airplanes, and Level A for Commuter airplanes, as outlined in Figure 2 of the AC.

The FAA recognizes that the electronic PFDs may not be able to achieve the probability value in Figure 2 for hazardously misleading attitude information from only the pilot's PFD. To meet the intent of § 23.1311, the probability value from only the pilot's PFD display, including the monitor if installed, should be less than or equal to  $10^{-4}$  per flight hour due to undetected or latent failures for all classes of airplanes.

For protection from indirect effects of lightning and High Intensity Radiated Fields (HIRF), the attitude function on the displays should be protected at the catastrophic failure condition level as stated in the specific guidance or standards for lightning or HIRF.

## **Background**

In March 1999, the Small Airplane Directorate, Aircraft Certification Service, Federal Aviation Administration, issued revised Advisory Circulars (AC) 23.1309-1C, "Equipment, Systems and Installations in Part 23 Airplanes," and AC 23.1311-1A, "Installations of Electronic Displays." The primary objective was to improve the safety of the airplane fleet by fostering the incorporation of new affordable technologies that address pilot error and weather related accidents.

This revision to AC 23.1309-1C has resulted in several avionics manufacturers developing integrated electronic PFDs for part 23 airplanes at a lower cost with the software development assurance level at Level C.

## **Effect of this Policy**

The general policy stated in this document does not constitute a new regulation or create what the courts refer to as a "binding norm." The FAA Aircraft Certification Offices (ACOs) should

implement this policy when applicable to the specific project. Whenever an applicant's proposed method of compliance is outside this established policy, it must be coordinated with the policy issuing office as a standard practice, e.g., through the issue paper process or equivalent. Similarly, if the implementing office becomes aware of reasons that an applicant's proposal that meets this policy should not be approved, the office must coordinate its response with the policy issuing office.

Applicants should expect that certificating officials would consider this information when making findings of compliance relevant to new certificate actions. Also, as with all advisory material, this policy statement identifies one means, but not the only means, of compliance.

### **Contact**

For questions and assistance regarding this policy, please contact Mr. Ervin Dvorak at (816) 329-4123, by fax (816) 329-4090, or by email at [erv.dvorak@faa.gov](mailto:erv.dvorak@faa.gov).

DRAFT

David A. Downey

Distribution:

Manager, Aircraft Engineering Division, AIR-100  
Manager, Brussels Aircraft Certification Staff, AEU-100  
Manager, Boston Aircraft Certification Office, ANE-150  
Manager, New York Aircraft Certification Office, ANE-170  
Manager, Ft. Worth Airplane Certification Office, ASW-150  
Manager, Special Certification Office, ASW-190  
Manager, Atlanta Aircraft Certification Office, ACE-115A  
Manager, Chicago Aircraft Certification Office, ACE-115C  
Manager, Wichita Aircraft Certification Office, ACE-115W  
Manager, Anchorage Aircraft Certification Office, ACE-115N  
Manager, Seattle Aircraft Certification Office, ANM-100S  
Manager, Denver Aircraft Certification Office, ANM-100D  
Manager, Los Angeles Aircraft Certification Office, ANM-100L  
Manager, Transport Airplane Directorate, ANM-100  
Manager, Engine and Propeller Directorate, ANE-100  
Manager, Rotorcraft Directorate, ASW-100