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Todd Tompkins
Standards Staff, ACE-111
Small Airplane Directorate
Federal Aviation Administration
901 Locust Street, Room 301
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RE: Draft FAA Policy Statement, PS-ACE-23-10, *HIRF/Lightning Test Levels and Compliance Methods for 14 CFR 23 Class I, II, and III Airplanes*

Dear Mr. Tompkins:

We are writing today to express the Aircraft Owners and Pilots Association's (AOPA) support for the Federal Aviation Administration's (FAA) draft policy statement, *HIRF/Lightning Test Levels and Compliance Methods for 14 CFR 23 Class I, II, and III Airplanes* (Policy). The Policy outlines an appropriate, risk-based means of demonstrating compliance with the requirements for protecting electrical and electronic systems in smaller airplanes exposed to lightning and a high-intensity radiated fields (HIRF) environment. AOPA strongly recommends the FAA finalize and adopt the Policy, which will enable more companies to enter the market for retrofitting type-certificated aircraft in a cost-effective and safe manner. AOPA also urges the FAA to finalize and implement a policy to allow for more suitable verification of software and airborne electronic hardware for simple systems.

HIRF/Lightning Protection

14 C.F.R. part 23¹ includes airworthiness standards to ensure that a manufacturer protects the airplane's electrical and electronic systems from the effects of lightning and a HIRF environment. Under § 23.1306, the FAA requires an applicant for a supplemental type certificate (STC) to meet certain lightning protection standards for each electrical and electronic system certificated for IFR-operations. Equipment with a catastrophic, hazardous, or major failure condition must be designed and installed so that the equipment recovers normal operation in a timely matter after the airplane is exposed to lightning. (§ 23.1306.) For equipment with catastrophic failure conditions, the FAA also requires the applicant to demonstrate that its equipment is designed to withstand a certain amount of lightning without any adverse effects and remain functional. (§ 23.1306(a).)

¹ All references to parts or sections shall hereinafter refer to Title 14 of the Code of Federal Regulations, unless otherwise stated. The draft policy also applies to amendment 23-64 to part 23 (§§ 23.2515 and 23.2520), effective August 30, 2017. (*Revision of Airworthiness Standards for Normal, Utility, Acrobatic, and Commuter Category Airplanes*, 81 Fed. Reg. 96,572, 96,698 (Dec. 30, 2016).)

Under § 23.1308, the FAA requires each electrical and electronic system with a catastrophic, hazardous, or major failure condition to have protection from a HIRF environment, which consists of the transmission of radio-frequency (RF) energy from “radar, radio, television, and other ground-based, shipborne, or airborne RF transmitters.” (AC 20-158A, at 3.) To ensure the RF energy does not lead to adverse effects on the performance of the electronic device, the FAA requires the equipment to undergo testing to determine if any adverse effects occur on the aircraft or system after being exposed to a HIRF environment. The degree of testing required depends on whether the equipment tested has a catastrophic failure condition, or either a hazardous or major failure condition. (§ 23.1308; AC 20-158A, at 16, 18.)

AOPA strongly believes the Policy takes an appropriate, risk-based approach to ensuring an STC applicant complies with the HIRF and lightning protection requirements in part 23. For electrical and electronic systems with catastrophic failure conditions, the Policy allows the applicant to conduct bench testing instead of full aircraft testing, which is currently required under AC 20-136B and 20-158A. The STC applicant would also be required to comply with certain design parameters that provide the minimum level of protection from HIRF and lightning risks. The changes are supported by existing fleet data for transport category aircraft and commensurate with the environment expected to be encountered in service. The changes would also set a more suitable standard for smaller airplanes while not reducing the acceptable level of safety for the design and installation.

The Policy represents an important change to enable more avionics manufacturers to enter the certified market. Currently, many companies producing avionics are reluctant to pursue certification because compliance with these airworthiness standards is costly. By making the means of compliance more appropriate for the size of the aircraft, the Policy will significantly lower costs for manufacturers seeking certification without compromising safety. This advances the FAA’s safety continuum philosophy, the concept that one level of safety may not be appropriate for all certification levels. This risk-based approach is necessary for modernizing the existing GA fleet. AOPA applauds the FAA for these efforts and urges the agency to finalize and adopt the Policy.

Electronic Software and Hardware Verification

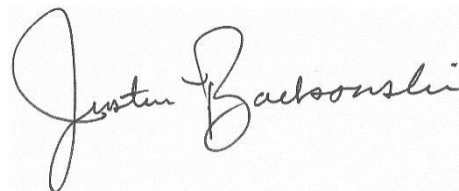
AOPA also encourages the FAA to finalize and implement a policy providing an alternative to RTCA DO-178B, *Software Considerations in Airborne Systems and Equipment Certification*, for verifying software and airborne electronic hardware. Under § 23.1309, an STC applicant must ensure that equipment installed in a certified aircraft is designed and installed such that the airplane performs as intended under the airplane’s operating and environmental limitations, and the airplane, its systems, and its occupants are not adversely affected. To demonstrate compliance, the FAA requires the STC applicant to, among other things, conduct a thorough verification of the electronic software and hardware through DO-178B. (See AC 23.1309-1E.) Under existing policy, all equipment containing software must be developed in accordance with DO-178B, regardless of whether the equipment is installed in a transport or normal category airplane.

Although the FAA allows other acceptable means of compliance, the FAA has not defined or explained the alternatives to DO-178B which would be permitted and under what circumstances. AOPA strongly believes that permitting a clear pathway for avionics manufacturers to use ASTM F3153-15, *Standard Specification for Verification of Avionics Systems*, as an alternative to DO-178B in certain cases would significantly complement the draft policy on satisfying the HIRF and lightning protection standards. F3153-15 allows for system-level testing of an avionics system to verify its intended function and compliance with safety objectives. Compared to DO-178B, F3153-15 could dramatically decrease certification costs and the price of the equipment, ensuring modern technology reaches the GA fleet without compromising safety.

Moreover, the FAA has already allowed the use of the F3153-15 standard in certain applications in lieu of DO-178B, particularly for simple systems where the rigorous processes identified in DO-178B may be unnecessary. Applying DO-178B to *all* electronic software, regardless of the complexity of the software, is not warranted. Indeed, applying the same design standards for electronic software in both transport and normal category airplanes is also inconsistent with the FAA's risk-based approach to aircraft certification. AOPA strongly urges the agency to finalize and implement its policy on allowing an alternative method of compliance to DO-178B for verifying electronic software.

AOPA appreciates the FAA's efforts thus far to streamline certification and approval requirements for modernizing the existing GA fleet. AOPA urges the FAA to adopt the Policy and stands ready, willing, and able to assist the FAA and industry in any way possible to bring more modern equipment to the certified market.

Sincerely,

A handwritten signature in black ink that reads "Justin T. Barkowski". The signature is written in a cursive style with a large initial "J" and "B".

Justin T. Barkowski
Director, Regulatory Affairs