



Federal Aviation Administration

Memorandum

Date: FEB 15 2008

To: Manager, Small Airplane Directorate, ACE-100

From: Manager, Wichita Aircraft Certification Office

Prepared by: James Galstad

Subject: Equivalent Level of Safety (ELOS) to 14 CFR, part 23, § 23.1555(d)(1); Cessna Aircraft Company, CJ4 525C; Finding No. ACE-08-01

This memorandum requests your office to review and provide concurrence with the proposed finding of equivalent level of safety to the Usable Fuel Quantity Marking requirements of 14 CFR, part 23, § 23.1555 (d)(1).

BACKGROUND:

The Cessna 525C is a 16,770 pound multiengine, 10 place, airplane powered by two Williams International FJ44-4A engines at 3,400 lbs of thrust each. The Model 525C is a derivative airplane to be on type certificate (TC) A1WI with the prior certificated Models 525, 525A and 525B. The Model 525 incorporates the Rockwell Collins Proline 21 Avionics package, which incorporates digital fuel quantity indication. Cessna Aircraft Company requests the Federal Aviation Administration (FAA) to give them credit for the system by accepting it as a safety device equivalent to 14 CFR, part 23, § 23.1555 (d)(1), Control Markings.

APPLICABLE REGULATIONS:

Section 23.1555 (d)(1) requires that for fuel systems having no selector controls, the usable fuel capacity of the system must be marked at the fuel quantity indicator. The airplane for flight planning must demonstrate the ability to provide sufficient information as it relates to useable fuel and fuel usage.

REGULATIONS REQUIRING AN ELOS:

In considering the current design, the applicant has requested an ELOS for the Model 525C, CJ4, regarding Usable Fuel Capacity Marking. The FAA has determined that an appropriate level of safety can be provided by the issuance of an ELOS, in accordance with the provisions of 14 CFR, part 21, § 21.21(b)(1).

DESCRIPTION OF COMPENSATING FEATURES:

The Proline 21 avionics package incorporates multi-function display readout of fuel quantity and fuel flow indications as well as measured fuel through the Flight Management System (FMS). This design differs from previous Cessna 525 models in that there are no analog gauges or dials, illustrating current fuel quantity status as it relates to total potential usable fuel. There is no fuel gauge that illustrates EMPTY, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and FULL. This is mitigated by providing both current useable fuel remaining and fuel flow. Therefore, accurate flight planning may be performed.

EXPLANATION OF COMPENSATING FEATURES:

The model 525C Citation CJ4 fuel quantity indicating system consists of a digital fuel quantity display, calibrated in appropriate units (lbs or kgs) to indicate the amount of fuel available to each engine, a low fuel level float switch, and a Crew Alerting System (CAS). The low fuel level float switch is set to activate at approximately 200 lbs. usable fuel remaining in each wing. When the low level float switch activates, the fuel quantity digits turn amber and the CAS system posts a "FUEL LEVEL LOW L-R" message.

In addition to the fuel quantity display, the engine fuel flow is also displayed and calibrated in appropriate units (pph, kgh) to indicate the amount of fuel being burned by each engine.

The intent of 14 CFR, part 23, § 23.1555(d)(1) is to ensure that the total amount of usable fuel available can be determined by the crew, by looking at the fuel quantity indicator in combination with the fuel placard, and without having to refer to other reference material. Currently many part 23 certified aircraft use an analog fuel quantity indicator that displays (EMPTY, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and FULL marks) which, with the placard, allows the crew to determine the available usable fuel.

By providing a direct reading of fuel quantity available calibrated in appropriate units (lbs. or kgs), a low fuel level indicator to alert the crew of a low fuel quantity, and a direct reading of the engine fuel flow to compute flight time based on the remaining quantity, the Citation Model 525C, provides an equivalent level of safety to the requirement of 14 CFR, part 23, § 23.1555(d)(1).

RECOMMENDATION:

The Wichita ACO concurs with the requested ELOS as described above. Concurrence of the Small Airplane Directorate is requested.

Concurred by:

Margaret Kline

12-14-07

Manager, Wichita Aircraft Certification Office, ACE-115W Date



2/15/2008

Manager, Standards Office, ACE-110

Date

Acting



2/15/08

Manager, Small Airplane Directorate,
Aircraft Certification Service, ACE-100

Date