# Memorandum

U.S. Department
of Transportation

Federal Aviation
Administration

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**Subject:** ACTION: Review and Concurrence, Equivalent Level of Safety (ELOS) to 14 Code of Federal Regulations (CFR) 23.1545(b)(4): Finding Number: ACE-05-16

**Date:** October 24, 2005

**From:** Manager, Airplane Certification Office, ASW-150

**Reply to Attn. of:**

**To:** Manager, Small Airplane Directorate, ACE-100

This memorandum requests that your office review and provide concurrence with the proposed finding of equivalent level of safety in accordance with § 21.21(b)(1), to the requirements of § 23.1545(b)(4) for the marking of the flap operating speeds on the airspeed indicator.

**BACKGROUND:**

The SJ30-2 is a 13,500-pound maximum take off weight, five-passenger airplane of conventional metal construction powered by two aft fuselage mounted Williams Rolls FJ44-2A medium bypass turbofan engines. Sino Swearingen Aircraft Corporation (SSAC) intends to obtain an FAA Type Certificate, under 14 CFR Part 23 Commuter Category, for single pilot all weather operation of the SJ30-2. The airframe incorporates wing sweep and area ruling to reduce transonic drag, high lift devices for short field performance, and a cabin designed for a maximum pressurization differential of 12 psi. Maximum operating Mach number is 0.83 and maximum altitude is 49,000 feet.

The SJ30-2 incorporates a Honeywell Epic flat panel LCD display as the primary flight display (PFD). This PFD displays airspeed information in the form of an airspeed tape with digital numbers in the middle of the middle of the tape that represent the current airspeed. Trend vectors are incorporated in the display along with $V_{MO}/M_{MO}$ warning and a Low Speed Awareness warning. Flap speeds are not incorporated into the display. The SJ30-2 uses placards on the Flap Lever Quadrant to inform the pilot of maximum speeds for the three flap settings (10 degrees: 200 KNOTS) (20 degrees 200 KNOTS) (Landing 170: KNOTS).

**APPLICABLE REGULATION:**

The applicable regulation is 14 CFR § 23.1545:

The pertinent part of the regulation is 14 CFR § 23.1545(b)(4), states:

§ 23.1545 Airspeed indicator.

(b) The following markings must be made:
(4) For the flap operating range, a white arc with the lower limit at Vso at the maximum weight, and the upper limit at the flaps extended speed $V_{FE}$ established under § 23.1511.

**APPLICANT'S POSITION:**

SSAC requests that the FAA grant an equivalent level of safety finding from § 23.1545(b)(4) based on compliance to §25.1545, for the marking of flap operating speeds, and the required Type Rating requirement of the pilot.

**FAA POSITION:**

The Certification Basis approved for this airplane at the time of application, is 14 CFR 23 (through Amendment 23-55) with a Special Condition that addresses many of the unique high performance features of the airplane that are the same as Transport Category airplanes instead of Normal or Communicator Category airplanes. This approved Certification Basis included § 23.1545.

**COMPENSATING FEATURES:**

The SJ30-2 is a turbine aircraft that requires the pilot to be Type Rated in the same manner as required for operation of Transport Category airplanes. Referring to § 25.1545, this rule defers to §25.1583(a). Section 25.1583(a) specifies that airspeed limitation necessary for safe operation must be furnished and does not specify the means. This has been addressed in Transport Category airplanes with placards in the cockpit and with the limitations section of the Approved Airplane Flight Manual.

Section 23.1545(b)(4) is targeted for small single engine airplanes, reciprocating twin-engine airplanes, and turbo-prop twin-engine aircraft. Electronic displays incorporating the airspeed display in Transport Category airplanes historically do not address the flap operating range, either with a white arc or any other form of flap speed limitation indication, as they were not required to do so. The white arc for flap operating speeds is a requirement form the round-dial airspeed indicator era, and is inappropriate for the electronic displays in this class of airplane.

The SJ30-2 training requirements and operational procedures are basically identical to those of Transport Category airplanes, and an equivalent level of safety finding should be applied in this case, with respect to the markings of the flap operating speeds. The speeds are available via the use of placards and limitations in the Approved Airplane Flight Manual. This should be considered sufficient, as similar the Transport Category airplanes with electronic instruments with integral airspeed displays which are operated in a similar manner with placards.

**RECOMMENDATION:**

Based on the SSAC showing of the compensating features of their design, and the requirement for a type rating for the airplane pilot, we recommend the issuance of this equivalent level of safety finding to § 23.1545(b)(4), for the airplane Model SJ30-2.

**CONCURRENCES:**

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| *Michele M. Owsley* | *10/26/05* |
| Manager, Airplane Certification Office, ASW-150 | Date |

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| *Patrick R. Mullen* | *11/1/05* |
| *for* Manager, Standards Office, Small Airplane Directorate, ACE-110 | Date |

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| *William J. Timberlake* | *11/1/05* |
| *for* Manager, Small Airplane Directorate, ACE-100 | Date |