



U.S. Department
of Transportation

**Federal Aviation
Administration**

Memorandum

Subject: **ACTION:** Review and Concurrence, Equivalent Level of
Safety – Rans S-7 – ELOS Number ACE-01-06

Date: September 6, 2001

From: Joel Ligon, FAA Program Manager ACE-117W
Original signed by William Schinstock

Reply to
Attn. of:

To: Manager, Small Airplane Directorate ACE-100

The RANS S-7 airplane uses the Transport Canada TP10141E “Design Standards for Ultra-Light Aeroplanes” as its certification basis. Paragraph 145 states “Longitudinal control shall allow: (a) Speed increase from $1.1 V_{S1}$ to $1.5 V_{S1}$ and from $1.1 V_{SO}$ to V_F in less than 3 seconds. This applies for both power-off and full power conditions.”

JAR-VLA paragraph 145 is a similar regulation. It states “It must be possible at any speed below $1.3 V_{S1}$, to pitch the nose downwards so that a speed equal to $1.3 V_{S1}$ can be reached promptly. (1) This must be shown with the aeroplane in all possible configurations, with power on at maximum continuous power and power idle, and with the aeroplane trimmed at $1.3 V_{S1}$.”

14 Code of Federal Regulations, § 23.145(a), states “With the airplane as nearly as possible in trim at $1.3 V_{S1}$, it must be possible, at speeds below the trim speed, to pitch the nose downward so that the rate of increase in airspeed allows prompt acceleration to the trim speed with - (1) Maximum continuous power on each engine; (2) Power off; and (3) Wing flap and landing gear - (i) retracted, and (ii) extended.”

The RANS S-7 has good pitch control and pitches down rapidly at low speeds in all configurations of flaps and power. However, even using a zero g pushover, the airplane will not accelerate from $1.1 V_{SO}$ to V_{FE} in only 3 seconds. This maneuver takes approximately 4.5 seconds with power on or off. It would seem that this controllability regulation is testing the drag of the airplane rather than the adequacy of the pitch control. The fact that zero g can be attained with the use of the pitch control is equivalent in safety to the ability to accelerate in only 3 seconds. The fact that regulations that are used on current airplanes only state the airplane must accelerate promptly, adds credibility to the argument that the specific time is not as important to safety as the ability to pitch down during slow flying conditions.

The use of JAR-VLA 145 (a) in place of Transport Canada TP10141E paragraph 145 (a) is considered an equivalent level of safety.

Consequently, the Wichita ACO recommends approving this equivalent level of safety (ELOS) finding.

Concur



Mgr. Small Airplane Standards Staff, ACE-110

Date: 9/10/01

Concur



Mgr., Small Airplane Directorate, ACE-100

Date: 9/14/01