



Federal Aviation Administration

Memorandum

Date: July 14, 2008

From: Acting Manager, Chicago Aircraft Certification Office, ACE-115C

To: Manager, Small Airplane Directorate, ACE-100
Thru: Manager, Standards Office, ACE-110

Prepared by: Gregory J. Michalik, (847) 294-7135

Subject: Request for Review and Concurrence with Equivalent Level of Safety (ELOS) for the Air Tractor AT-802 with Wipline Model 10000 Amphibious Floats in the FireBoss Configuration, to 14 CFR Part 23, § 23.49, Stalling Speed: ACE-08-11

This memorandum requests your office to review and provide concurrence with the proposed finding of Equivalent Level of Safety (ELOS) to the stalling speed requirements of § 23.49 of 14 Code of Federal Regulations (CFR) part 23, as modified by the § 21.25(a) special purpose certification basis defined in Type Certificate Data Sheet (TCDS) A19SW.

Background:

The Air Tractor AT-802 is a two-place restricted category single engine turbine aircraft designed for agricultural and wildland firefighting. The Wipaire FireBoss configuration modifies the aircraft to include amphibious floats that contain scooping systems which allow the aircraft to refill the 800 gallon hopper while skimming across a body of water while on the step. This system dramatically increases the productivity of this airplane for firefighting by eliminating the need to land, stop, fill, start, and takeoff again. The AT-802 has flight controls and instrumentation in the rear cockpit to allow for pilot training.

The certification basis for the AT-802, and for this project, is 14 CFR part 23 through amendment 42, with exceptions based on restricted category special purpose operations as noted in 14 CFR § 21.25(a)(1) and (b)(2). The certification basis was developed through an FAA G-1 Issue Paper dated 12/18/92 and defines sections of 14 CFR part 23 as appropriate or inappropriate for the special purpose of wildlife conservation (fire fighting) per 14 CFR § 21.25. Exemption No. 5574 allows for operation at weights with stall speeds above 61 knots, provided that the aircraft can jettison the contents of the hopper down to weights meeting the 61 knot requirement. The AT-802 FireBoss configuration has a higher empty weight resulting from the

installation of the amphibious floats and firefighting equipment and is not able to meet the 61 knot requirement at full fuel with required crew, as specified in exemption 5574.

Applicable regulation:

Section 23.49 – Stalling Speed

- (b) V_{S0} at maximum weight may not exceed 61 knots for--
(1) Single-engine airplanes

Exemption No. 5574 [§ 23.49(b)(1)] 61 knot Stall Speed - This exemption allows maximum weights where stall speeds are higher than 61 knots provided that 61 knots can be obtained with required crew and full fuel in flight by the jettisoning of any additional weight.

Compensating Features:

The AT-802 FireBoss, in addition to all of the crashworthiness design features of the basic AT-802, has the ability to execute engine-out landings not only to runways and solid surfaces, but to any reasonable size body of water. Considering the operational purpose of the aircraft, such a body of water is within range of the aircraft for a significant percentage of time that the aircraft is airborne. Additionally, the floats provide increased energy absorption and therefore crashworthiness in the event of a ground impact.

The installation of floats, as well as aerodynamic treatment of the airframe, in the form of wing, empennage, and canopy mounted vortex generators, and wing mounted flow energizers, provides stall speeds that are lower than the basic AT-802 at any given weight and configuration, by approximately 4 knots, as shown in figure 1.

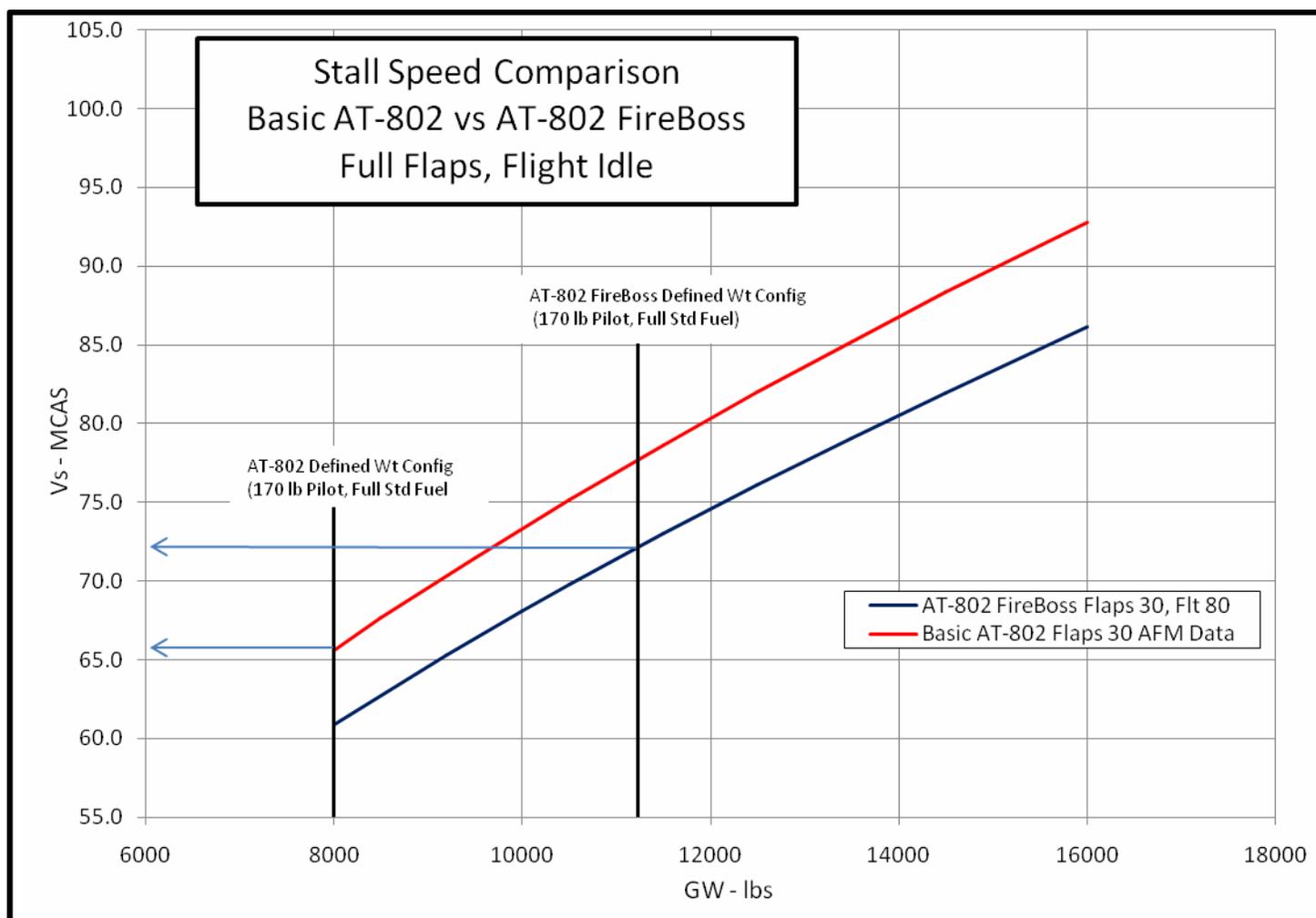


Figure 1 – Stall Speed Comparison

As seen in figure 1, the AT-802 FireBoss, in the required crew, full std fuel defined weight configuration (11,236 lb), stalls at 72.2 mph (62.9 kts), 1.9 kts above the limit established in Exemption No. 5574. This weight, and stall speed, can be achieved from any hopper loading via a single salvo action by the pilot, immediately dumping the water load. For comparison, the basic AT-802 on wheels, without amphibious floats and firefighting mods, in the required crew, full standard fuel defined weight configuration, weighs 8000 pounds and stalls at 65.6 miles per hour.

Applicant Position:

The ability of the AT-802 FireBoss to land on water as well as hard surfaces, combined with the additional crashworthiness provided by the float installation, is sufficient to offset the 1.9 knot exceedence of the 61 knot stall speed limit in the defined weight configuration called out as part of the AT-802 certification basis, and, therefore, provides an Equivalent Level of Safety.

Additionally, the AT-802 FireBoss provides increased stall margins at any given flying weight, and therefore an increased level of safety, compared to the basic AT-802.

Recommendation:

We concur that the AT-802 FireBoss compensating features provide an Equivalent Level of Safety as envisioned in the regulations and certification basis, and, therefore, meets the requirements therein.

Original signed by:
Mary Ellen A. Schutt

Acting Manager, Chicago Aircraft
Certification Office, ACE-115C

6-4-08

Date

Concurred by:

Patrick R. Mullen for

Manager, Standards Staff, ACE-110

7-14-08

Date

John Colomy

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

7-14-08

Date

cc: ACE-116C R/F

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