



Federal Aviation Administration

Memorandum

Date: May 16, 2016

To: Manager, Project Support Branch, ACE-112

From: Manager, Small Airplane Directorate, ACE-100

Prepared by: James Brady, Regulations and Policy, ACE-111

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Seabird Aviation Australia Pty., Ltd, Models Seeker SB7L-360A and SB7L-360A2, Pitot Heat Indication Systems, FAA Project #'s: TC00381CE-A and AT00698CE-A

ELOS Memo#: TC00381CE-A-S-1

Regulatory Ref: 14 CFR 23.1326(b)(1) at amendment 23-49

This memorandum informs the certificate management aircraft certification office of an evaluation made by the Accountable Directorate on the establishment of an equivalent level of safety finding for the Models Seeker SB7L-360A and SB7L-360A2 airplanes.

Background:

Section 23.1326 was incorporated into part 23 through amendment 23-49. The section was proposed under Notice of Proposed Rulemaking (NPRM), Notice No. 94-21([59 FR 37620](#)) and issued on 07/14/94. Section 23.1326 was published as a final rule ([61 FR 5151](#)) in the Federal Register on 02/9/1996 and became effective on 03/11/96.

Section 23.1323, Airspeed indicating system, paragraph (d), states the following:

“If certification for instrument flight rules or flight in icing conditions is requested, each airspeed system must have a heated pitot tube or an equivalent means of preventing malfunction due to icing.”

Furthermore, § 23.1326, Pitot heat indication systems, states the following:

“If a flight instrument pitot heating system is installed to meet the requirements specified in §23.1323(d), an indication system must be provided to indicate to the flight crew when that pitot heating system is not operating. The indication system must comply with the following requirements:

- (a) The indication provided must incorporate an amber light that is in clear view of a flightcrew member.
- (b) The indication provided must be designed to alert the flight crew if either of the following conditions exist:
 - (1) The pitot heating system is switched “off.”
 - (2) The pitot heating system is switched “on” and any pitot tube heating element is inoperative.”

This rule requires a caution annunciation whenever the pitot heat is off or there is a failed heating circuit in the pitot tube heater. The second annunciation is fully justified in that it represents a failure condition. The first annunciation can have a positive safety effect if it causes pilots to activate the pitot heat in all environmental conditions. This eliminates the loss of the pitot static system because of the pilot error of failing to operate pitot heat when conditions warrant it. Advisory Circular (AC) [AC 23-17C](#), Systems and Equipment Guide for Certification of Part 23 Airplanes and Airships, page 245, states the following:

“A caution annunciation when the pitot heat is off has two negative issues as follows:

- a. It violates the “dark cockpit” where caution and warning lights only represent failure conditions.
- b. Adherence to a “dark cockpit” will cause pitot heat operation in all environmental conditions, which will shorten the life of the system.”

The Models Seeker SB7L-360A and SB7L-360A2 airplanes are 2-seat, strut braced, high wing, single engine, pusher configuration, and for maximum takeoff weight respectively are 2039-pound (925 kg) and 2147-pound (974 kg) each. They are specifically designed for use as an aerial observation and surveillance platform operating up to an altitude of 15,000 ft. The mission profile is low level, low speed, day and night visual flight rules, aerial patrol, observation, and survey missions. The airplanes are not permitted to perform flight into known icing conditions. Instrument Flight Rules (IFR) capability was added to its certification to increase the level of safety by allowing operators to safely reposition aircraft under IFR conditions.

ELOS guidance for part 23 certified airplanes is contained in AC 23-17C. [AC 23-17C](#), page 246, states the following:

“. . . . An aircraft design that does not include a caution annunciation when the Pitot heat is Off may be eligible for an ELOS finding that preserves a “dark cockpit” provided a placard or flight manual prescribes when to operate the pitot heat.” The phrase “may be eligible” means that design may be considered for an ELOS, however, not all design configurations are eligible as noted below:

- 1. Commuter category airplanes are not eligible.
- 2. Airplanes approved for Flight into Known Icing per 14 CFR, part 23, § 23.1419 are not eligible.

3. Airplanes with service ceilings or maximum operating altitudes above 18,000 feet are not eligible because of controlled airspace. If a plane can fly at or above 18,000 feet it must be certified for Instrument Flight Rules (IFR) operation.
4. The eligibility of other IFR approved airplanes, including those with the service ceilings below 18,000 feet, is determined jointly by the ACOs and the Small Airplane Directorate.”

The Models Seeker SB7L-360A and SB7L-360A2 airplanes are class I, non-commuter category airplanes, not approved for flight into known icing, and have a service ceiling below 18,000 feet. Therefore, they are eligible for an ELOS to § 23.1326(b)(1). They are FAA validations of the same model numbers from Australia and the Australian Civil Aviation Safety Authority (CASA) issued special conditions in Issue Paper No: A2-001(1) dated 28 April 2015 for this regulation.

Applicable regulation:

14 CFR 23.1326(b)(1)

Regulations requiring an ELOS finding:

14 CFR 23.1326(b)(1)

Description of compensating design features or alternative Methods of Compliance (MoC) which allow the granting of the ELOS (including changes, limitations, or equipment needed for equivalency):

Seabird Aviation proposes to use a pitot heat indication system that does not show any indication when the pitot heat system is switched off. It will display a green light when the system is switched on and the pitot tube heating element is operative. It will display an amber light when the system is switched on but the pitot tube heating element is inoperative.

The placard and/or the Airplane Flight Manual (AFM) will address the conditions for pitot heat system operation, failures, and system checks. The design of the pitot heat indication system prevents the shortening of the life of the pitot heating system as a safety enhancement. It will reduce the probability of a system failure occurring when operating the system while flying in adverse weather conditions.

An aircraft design that includes an annunciation when the pitot heat system is switched on and operating correctly is a safety enhancement. An annunciation which shows a green light when the system is switched on and the pitot tube heating element is operative may be eligible for a ELOS as it does not violate the caution and warning light color philosophy. An illuminated green annunciator is interpreted as an “All Good” status indication, not a caution or warning indication.

Explanation of how design features or alternative Methods of Compliance (MoC) provide an equivalent level of safety intended by the regulation:

The Seabird Seeker design preserves the “dark cockpit” concept and provides a flight manual description when to operate the pitot heat. The system annunciates with a green light when it is switched on and operating properly. The system does provide a caution (amber) light when

switched on and the system is inoperative. The airplane design meets all the requirements for an ELOS for this type of airplane as shown in [AC 23-17C](#), page 245.

Therefore, the Seabird Seeker is eligible for an ELOS to § 23.1326(b)(1).

FAA approval and documentation of the ELOS finding:

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper S-1. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The Accountable Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number must be listed in the Type Certificate Data Sheet under the Certification Basis section (TCs & ATCs) or in the Limitations and Conditions section of the STC. An example of an appropriate statement is provided below.

An Equivalent Level of Safety Finding has been made for the following regulation:

14 CFR 23.1326, Pitot heat indication systems, paragraph (b)(1), amendment 23-49
(documented in ELOS Memo TC00381CE-A-S-1)

//SIGNED//

Pat Mullen, Acting Manager, Small Airplane Directorate,
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May 16, 2016
Date

ELOS Originated by: Project Support Branch	Manager, Project Support Branch: Jacqueline Jambor	Routing Symbol: ACE-112
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