



Federal Aviation Administration

Memorandum

Date: September 27, 2016

To: Manager, Project Support Office, ACE-112

From: Manager, Small Airplane Directorate, ACE-100

Prepared by: Albert Mercado, Project Support Office, ACE-112

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Epic Aircraft Industries, Model E1000, 14 CFR part 23, Amendment 23-62: Project TC11773SE-A

ELOS Memo#: TC11773SE-A-F-2

Regulatory Ref: 14 CFR 23.45, 23.51, 23.63, 23.67, 23.73, 23.77, 23.161, 23.181, 23.221, 23.251, 23.253, 23.571, 23.785, 23.831, 23.1195, 23.1197, 23.1199, 23.1201, 23.1527, 23.1545, and 23.1583

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 Epic Aircraft (Epic) model E1000.

Background:

Airplane Certification Basis:

The E1000 will be certified to 14 CFR part 23¹, as amended by amendments 23-1² through 23-62³.

Airplane Description:

The E1000 is a single engine, pressurized, six passenger airplane. Its airframe is constructed primarily of composite materials, and it is powered by a Pratt and Whitney PT6-67A turboprop engine with four-bladed Hartzell propeller. The design calls for a stick pusher/shaker for stall/spin protection. The proposed cockpit design will use three Garmin G1000 displays or similar glass cockpit.

Amendment 23-62 amended the applicable regulations for part 23 turbofan- and turbojet-powered airplanes to reflect the current needs of industry, accommodate future trends, address emerging technologies, and provide for future airplane operations. During the first certification projects that incorporated amendment 23-62, the FAA discovered some unintentional errors. Many of these

¹ F.R. Doc. 64-12987, effective February 1, 1965

² 30 FR 82597, effective July 29, 1965

³ 76 FR 75736, effective January 31, 2012

errors are out of scope of a technical amendment, so the Small Airplane Directorate created Issue Paper F-2 to address the intent of amendment 23-62.

Applicable regulations:

§§ 23.45, 23.51, 23.63, 23.67, 23.73, 23.77, 23.161, 23.181, 23.221, 23.251; 23.253, 23.571, 23.785, 23.831, 23.1195, 23.1197, 23.1199, 23.1201; 23.1527, 23.1545, and 23.1583.

Regulations requiring an ELOS finding:

§§ 23.45, 23.51, 23.63, 23.67, 23.73, 23.77, 23.161, 23.181, 23.221, 23.251; 23.253, 23.571, 23.785, 23.831, 23.1195, 23.1197, 23.1199, 23.1201; 23.1527, 23.1545, and 23.1583.

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)

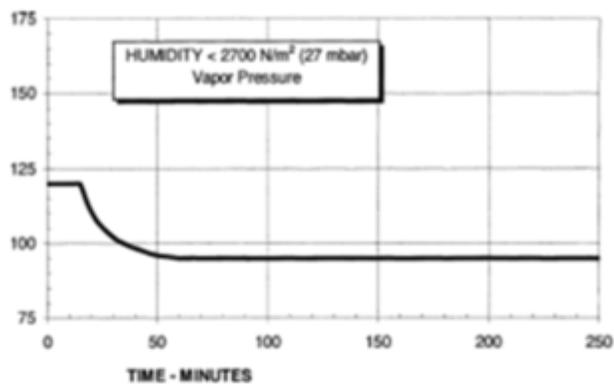
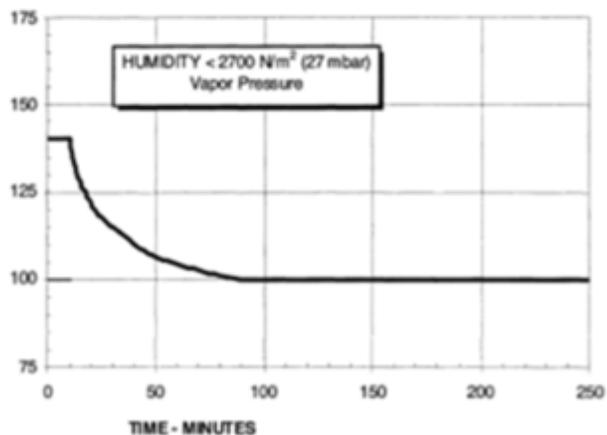
The FAA has determined that an ELOS finding is the appropriate means for showing that the E1000 meets the intent of amendment 23-62. The following table documents the ELOS to amendment 23-62 for the E1000.

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
<i>§ 23.45, General (Performance)</i>	
§ 23.45(h)(4) change:	“§ 23.67(c)(4)” to “§ 23.67(d)(4)”
<i>§ 23.51, Takeoff speeds</i>	
§ 23.51(c)(4) change:	“§ 23.67(c)(1) and (c)(2)” to “§ 23.67(d)(1) and (d)(2)”
<i>§ 23.63, Climb: General</i>	
§ 23.63(c), including (c)(1) and (c)(2), change to read:	<p>(c) For each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, (2) single engine turbines, and (3) multiengine turbine airplanes of 6,000 pounds or less maximum weight, compliance must be shown at weights as a function of airport altitude and ambient temperature within the operational limits established for takeoff and landing, respectively, with:</p> <p>(1) For reciprocating engine-power airplanes of more than 6,000 pounds maximum weight:</p> <p style="padding-left: 40px;">(i) Sections 23.65(b) and 23.67(b)(1) and (2), where appropriate, for takeoff and</p> <p style="padding-left: 40px;">(ii) Section 23.67(b)(2), where appropriate, and § 23.77(b), for landing,</p> <p>(2) For single-engine turbines:</p> <p style="padding-left: 40px;">(i) Section 23.65(b), for takeoff, and</p>

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
	<p>(ii) Section 23.77(b) for landing.</p> <p>(3) For multiengine turbine airplanes of 6,000 pounds or less maximum weight:</p> <p>(i) For takeoff, § 23.65(b) and (A) If a turbopropeller-power airplane, § 23.67(b)(1), and (2), where appropriate. (B) If a jet airplane, § 23.67(c)(1), and (2), where appropriate.</p> <p>(ii) For landing, § 23.77(b) and (A) If a turbopropeller-powered airplane, § 23.67(b)(2), where appropriate. (B) If a jet airplane, § 23.67(c)(2), where appropriate.</p>
<p>§ 23.63(d)(1) change to read:</p>	<p>(d) * * *</p> <p>(1) If a normal, utility, or acrobatic category, turbopropeller-powered airplane:</p> <p>(i) Section 23.67(b)(1), and (2), where appropriate, for takeoff, and (ii) Section 23.67(b)(2), where appropriate, and § 23.77(c), for landing.</p>
<p>§ 23.63(d)(2) change to read:</p>	<p>(d) * * *</p> <p>(2) If a jet or commuter category airplane:</p> <p>(i) Section 23.67(d)(1), (2), and (3), where appropriate, for takeoff, and (ii) Section 23.67(d)(3), and (4), where appropriate, and § 23.77(c) for landing.</p>
<p>§ 23.67, <i>Climb: One engine inoperative</i></p>	
<p>§ 23.67(a) change:</p>	<p>“reciprocating engine-powered” to “reciprocating multiengine-powered”</p>
<p>§ 23.67(b) change:</p>	<p>“reciprocating engine-powered” to “reciprocating multiengine-powered” and “turbopropeller-powered” to “multiengine turbopropeller-powered”</p>
<p>§ 23.67(c) change:</p>	<p>“jets” to “multiengine jets”</p>
<p>§ 23.67(d) change:</p>	<p>“jets” to “multiengine jets”</p>
<p>§ 23.67(d)(1)(i) change:</p>	<p>“propeller” to “propeller, if applicable,”</p>
<p>§ 23.67(d)(2)(i) change:</p>	<p>“propeller” to “propeller, if applicable,”</p>
<p>§ 23.67(d)(3)(i) change:</p>	<p>“propeller” to “propeller, if applicable,”</p>

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
§ 23.67(d)(4)(i) change:	“propeller” to “propeller, if applicable,”
<i>§ 23.73, Reference landing approach speed</i>	
§ 23.73(b) change to read:	“Each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplane of more than 6,000 pounds maximum weight, (2) turbine powered airplane of 6,00 pounds or less maximum weight, and (3) single engine turbine powered airplane of more than 6,000 pounds maximum weight,”
§ 23.73(c) change:	“jets of more than” to “multiengine turbine powered airplanes over”
<i>§ 23.77, Balked landing</i>	
§ 23.77(b) change to read:	“Each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplane of more than 6,000 pounds maximum weight, (2) turbine powered airplane of 6,000 pounds or less maximum weight, and (3) single engine turbine powered airplane of more than 6,000 pounds maximum weight,
<i>§ 23.161, Trim</i>	
§ 23.161(d) change:	“§ 23.67(a), (b)(2), or (c)(3),” to “§ 23.67(a), (b)(2), (c)(2), or (d)(3),”
<i>§ 23.181, Dynamic stability</i>	
§ 23.181(c) change:	“(b)(2)” to “the fixed position testing of (b)”
<i>§ 23.221, Spinning</i>	
§ 23.221(a)(2)(ii) change:	“§ 23.201(e)” to “§ 23.201(f)”
§ 23.221(b) change:	“§ 23.807(b)(7)” to “§ 23.807(b)(6)”
§ 23.221(c) change:	“§ 23.807(b)(6) to “§ 23.807(b)(5)”
<i>§ 23.251, Vibration and buffeting</i>	
§ 23.251(a) change:	“turbojets” to “jets”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
<i>§ 23.253, High speed characteristics</i>	
§ 23.253(b)(2) change:	“turbojets” to “jets”
<i>§23.571, Metallic pressurized cabin structures</i>	
§ 23.571 change:	“... evaluated under one of the following” to “... evaluated under paragraphs (a), (b), or (c). In addition, the requirements of paragraph (d) must be met when applicable.”
<i>§ 23.785, Seats, berths, litters, safety belts, and shoulder harnesses</i>	
§ 23.785(c) add to end of paragraph:	“Commuter category jet airplanes, must also comply with the requirements of § 23.562.”
<i>§ 23.831, Ventilation</i>	
§ 23.831(d) add to the end of the paragraph:	<p>“The cabin cooling system must be designed to meet the following conditions during flight above 15,000 feet mean sea level (MSL):</p> <p>(1) After any probable failure, the cabin temperature-time history may not exceed the values shown in Figure 1 of this paragraph.</p> <p>(2) After any improbable failure, the cabin temperature-time history may not exceed the values shown in Figure 2 of this paragraph.”</p>

CFR 14 Reference**Equivalent Interpretations**TEMPERATURE
(°F)TIME - TEMPERATURE RELATIONSHIP
FIGURE 1TEMPERATURE
(°F)TIME - TEMPERATURE RELATIONSHIP
FIGURE 2*§ 23.1195, Fire extinguishing systems*§ 23.1195(a)
change:

“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”

§ 23.1197, Fire extinguishing agents§ 23.1197
introduction
sentence, change:

“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”

§ 23.1199, Fire extinguishing containers§ 23.1199
introduction

“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
sentence, change:	
<i>§ 23.1201, Fire extinguishing materials</i>	
§ 23.1201 introduction sentence, change:	“For all airplanes . . .” to “For commuter category airplanes, and all airplanes . . .”
<i>§ 23.1527, Maximum operating altitude</i>	
§ 23.1527(b) change:	“§ 23.775(e)” to “§ 23.775(d)”
<i>§ 23.1545, Airspeed indicator</i>	
§ 23.1545(d) change:	“(b)(4)” to “(b)(3)”
<i>§ 23.1583, Operating limitations</i>	
§ 23.1583(c)(3) change to read:	“For each of the following normal, utility, and acrobatic category airplanes: (1) reciprocating engine-powered airplanes of more than 6,000 pounds maximum weight, (2) single-engine turbines, and (3) multiengine turbines of 6,000 pounds or less maximum weight . . .”
§ 23.1583(c)(3)(i) change:	“§ 23.63(c)(1)” to “§ 23.63(c)(1)(i), (c)(2)(i), or (c)(3)(i), as appropriate”
§ 23.1583(c)(3)(ii) change:	“§ 23.63(c)(2)” to “§ 23.63(c)(1)(ii), (c)(2)(ii), or (c)(3)(ii), as appropriate”
§ 23.1583(c)(4) change:	“jets” to “turbines”
§ 23.1583(c)(4)(i) change:	“§ 23.63(d)(1)” to “§ 23.63(d)(1)(i), or (d)(2)(i), as appropriate”
§ 23.1583(c)(5) change:	“jets” to “turbines”
§ 23.1583(c)(5)(i) change:	“§ 23.63(d)(1)” to “§ 23.63(d)(1)(ii) or (d)(2)(ii), as appropriate”

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

The FAA has determined that an ELOS finding is the appropriate means for showing that the E1000 meets the intent of amendment 23-62. The following table documents the ELOS to amendment 23-62 for the E1000.

FAA approval and documentation of the ELOS finding:

The FAA has approved the aforementioned ELOS. 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.

Equivalent Level of Safety findings has been made for the following regulation(s):

- 23.45 General (Performance)
- 23.51 Takeoff speeds
- 23.63 Climb: General
- 23.67 Climb: One engine inoperative
- 23.73 Reference landing approach speed
- 23.77 Balked landing
- 23.161 Trim
- 23.181 Dynamic Stability
- 23.221 Spinning
- 23.251 Vibration and buffeting
- 23.253 High speed characteristics
- 23.571 Metallic pressurized cabin structures
- 23.785 Seats, berths, litters, safety belts, and shoulder harnesses
- 23.831 Ventilation
- 23.1195 Fire extinguishing systems
- 23.1197 Fire extinguishing agents
- 23.1199 Fire extinguishing characteristics
- 23.1201 Fire extinguishing materials
- 23.1527 Maximum Operating Altitude
- 23.1545 Airspeed indicator
- 23.1583 Operating limitations

(Documented in ELOS Memo TC11773SE-A-F-2)

William Schinstock

9/27/2016

for/Mel Johnson, Acting Manager, Small Airplane Directorate,
Aircraft Certification Service

Date

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