



Federal Aviation Administration

Memorandum

Date: September 27, 2016

To: Manager, Regulations & Policy Office, ACE-111

From: Manager, Small Airplane Directorate, ACE-100

Prepared by: Ross Schaller, Regulations & Policy Office, ACE-111

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Game Composites Ltd., Model GB1 Airplane; 14 CFR part 23, Amendment 23-62; Project TC00699CE-A

ELOS Memo#: TC00699CE-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 Game Composites Ltd. model GB1 airplane.

Background:

Airplane Certification Basis:

The GB1 airplane is being concurrently validated through the Technical Implementation Procedures For Airworthiness and Environmental Certification Between The Federal Aviation Administration of the United States of America And The European Aviation Safety Agency Of The European Union, Revision 4, dated September 22, 2014. The European Aviation Safety Agency (EASA) is the certifying authority.

The type certification basis for the Game Composites GB1 model airplane is part 23, amendment 23-62. The certification basis for this model includes 14 CFR part 36, as amended by amendment 36-1 through amendment 36-30.

Airplane Description:

The GB1 airplane is a two-place, tandem canopy cockpit, acrobatic category only single-engine airplane. It features conventional landing gear and low-wing planform and is constructed mostly carbon composite materials. The engine is a Lycoming AEIO-580-B1A, fitted with a model MTV-9-B-C/C203-25 3-blade MT-propeller. The airplane is for Day-VFR operations, (non-icing). The maximum takeoff weight is 2,200 pounds in acrobatic category. Its never exceed

speed (V_{NE}) is 230 knots, design cruise speed (V_C) is 200 knots and design maneuvering speed (V_A) is 175 knots. Its maximum altitude is 15,000 feet.

Amendment 23-62 ([76 FR 75736](#), December 2, 2011) 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 errors are out of scope of a technical amendment, so the Small Airplane Directorate created Issue Paper F-2 to show an ELOS to 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)

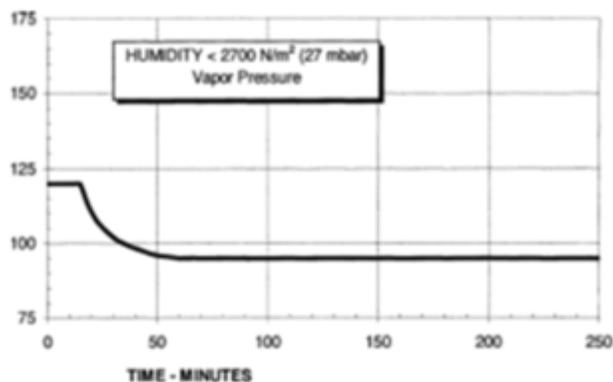
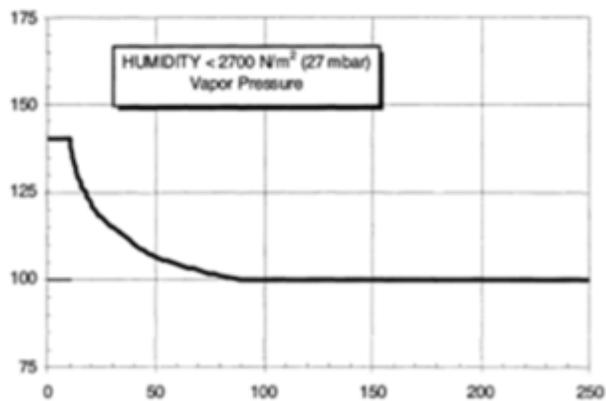
The FAA has determined that an ELOS finding is the appropriate means for showing that the GB1 airplane meets the intent of amendment 23-62. The following table documents the ELOS to amendment 23-62 for the GB1 airplane.

<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:	(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: (1) For reciprocating engine-power airplanes of more than 6,000 pounds

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
	<p>maximum weight:</p> <ul style="list-style-type: none"> (i) Sections 23.65(b) and 23.67(b)(1) and (2), where appropriate, for takeoff and (ii) Section 23.67(b)(2), where appropriate, and § 23.77(b), for landing, <p>(2) For single-engine turbines:</p> <ul style="list-style-type: none"> (i) Section 23.65(b), for takeoff, and (ii) Section 23.77(b) for landing. <p>(3) For multiengine turbine airplanes of 6,000 pounds or less maximum weight:</p> <ul style="list-style-type: none"> (i) For takeoff, § 23.65(b) and <ul style="list-style-type: none"> (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. (ii) For landing, § 23.77(b) and <ul style="list-style-type: none"> (A) If a turbopropeller-powered airplane, § 23.67(b)(2), where appropriate. (B) If a jet airplane, § 23.67(c)(2), where appropriate.
§ 23.63(d)(1) change to read:	<p>(d) * * *</p> <p>(1) If a normal, utility, or acrobatic category, turbopropeller-powered airplane:</p> <ul style="list-style-type: none"> (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.
§ 23.63(d)(2) change to read:	<p>(d) * * *</p> <p>(2) If a jet or commuter category airplane:</p> <ul style="list-style-type: none"> (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.
<i>§ 23.67, Climb: One engine inoperative</i>	
§ 23.67(a) change:	“reciprocating engine-powered” to “reciprocating multiengine-powered”
§ 23.67(b) change:	“reciprocating engine-powered” to “reciprocating multiengine-powered” and “turbopropeller-powered” to “multiengine turbopropeller-powered”
§ 23.67(c) change:	“jets” to “multiengine jets”
§ 23.67(d) change:	“jets” to “multiengine jets”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
§ 23.67(d)(1)(i) change:	“propeller” to “propeller, if applicable,”
§ 23.67(d)(2)(i) change:	“propeller” to “propeller, if applicable,”
§ 23.67(d)(3)(i) change:	“propeller” to “propeller, if applicable,”
§ 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)”

<u>CFR 14 Reference</u>	<u>Equivalent Interpretations</u>
§ 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”
<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 GB1 airplane meets the intent of amendment 23-62. The previous table documents the ELOS to amendment 23-62 for the GB1 airplane.

FAA approval and documentation of the ELOS finding:

The FAA has approved the aforementioned ELOS finding in project issue paper F-2. 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

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9/27/2016

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

Date

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