Federal Aviation Administration

Memorandum

Date: August 18, 2015

To: Manager, Regulations and Policy, ACE-111

From: Manager, Small Airplane Directorate, ACE-100

Prepared by: Ross Schaller, Regulations and Policy Branch, ACE-111

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Grob Aircraft AG, Model G120TP-A, Cockpit Controls-Landing Gear

ELOS Memo#: ACE-15-13

Regulatory Ref: 14 CFR § 23.777(g)

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 Grob Aircraft AG (Grob) Model G120TP-A airplane. This ELOS supersedes ELOS ACE-15-13, dated June 9, 2015.

Background:

The G120TP-A airplane is a utility and acrobatic category airplane. It has a two-place side-by-side canopy cockpit, and is single-engine. It also features a tricycle type, retractable landing gear, with a conventional low-wing planform mostly constructed from glass fiber composite. The engine is a Rolls-Royce 250-B17F turbopropeller engine, fitted with a model MTV-5-1-D-C-F-R(A)/CFR210-56 5-blade MT-propeller. The airplane will be approved for Day-Night VFR and IFR operations. The airplane will not be approved for flight into known icing. The maximum takeoff weight is 3,340 pounds in utility category, 3,175 pounds in acrobatic category. The Maximum Operating Limit Speed (V_{MO}) is 238 Knots Indicated Air Speed (KIAS). Maximum altitude is 25,000 feet in utility category and 20,000 feet in acrobatic category.

Grob designed this airplane as a high end-trainer with cockpit features to effectively accommodate this advanced training. The G120TP-A offers a standard analog or standard digital cockpit configuration. For either cockpit configuration, the landing gear control is located in a position that is not in compliance with § 23.777(g) requirements. The landing gear lever is located on the flight panel and to the right of the center pedestal. Advisory Circular (AC) 23-17C: *Systems and Equipment Guide for Certification of Part 23 Airplanes and Airships*, provides no guidance on this issue.

Applicable regulations:

14 CFR § 23.777, Cockpit controls

Regulations requiring an ELOS finding:

14 CFR § 23.777(g)

14 CFR § 23.777(g) requires:

> *"The landing gear control must be located to the left of the throttle centerline or pedestal centerline."*

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 intent of § 23.777(g), is to prevent confusion and improper operation of cockpit controls and requires the landing gear control to be located to the **left** of the power controls, if the controls are arranged side by side or in closely staggered positions on a common console.

This does not apply to the G120TP-A airplane where the power controls are mounted on the center console, which is clearly segregated from the landing gear lever located on the lower middle area of the instrument panel. Figure 1 shows the location of the landing gear lever relative to the power controls in the standard analog configuration. The flightcrews' movement to reach and operate the landing gear lever mounted on the instrument panel is clearly different from the action during operation of the power controls on the center console, regardless if the landing gear lever is slightly left or right of the power control centerline. Therefore, it is Grob's position that the location of the landing gear control lever provides an equivalent level of safety with respect to the main intention of § 23.777 (g).

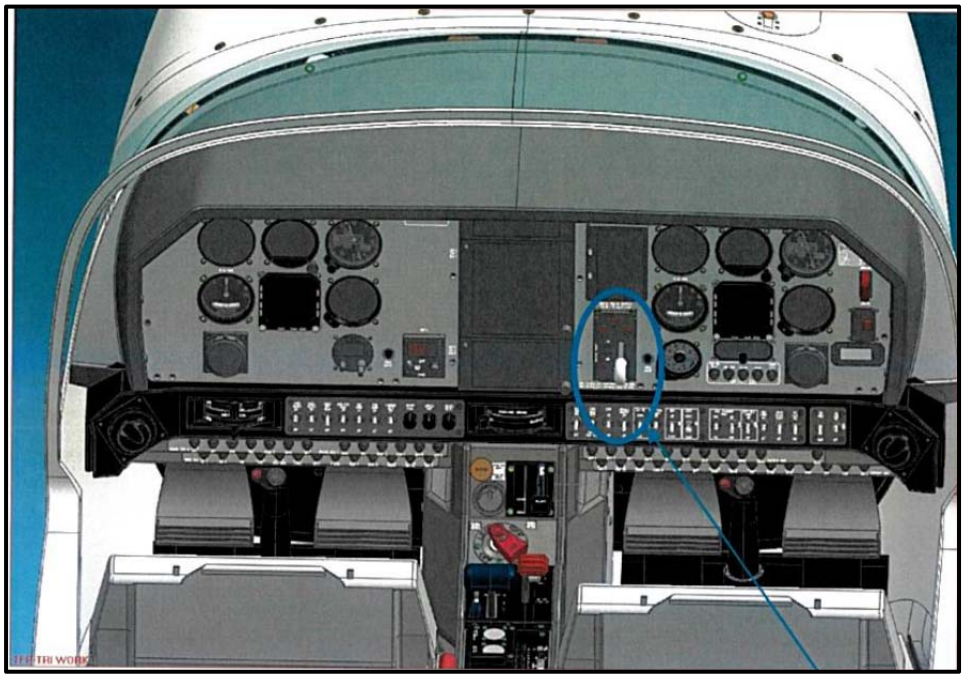

Figure 1 – Landing Gear Lever Position Relative to Power Controls

Establishing cockpit control standards for various types of airplanes is reasonable, particularly in airplanes that don't require type ratings, and may be relevant for auxiliary control positions like landing gear control levers. However, the G120TP-A instrument panel and cockpit controls arrangement, in part, has been driven by its primary purpose as a military trainer. Also, one of the goals of training is to familiarize training flightcrew with right-hand stick and left-hand power controls, which in case of the G 120TP-A has resulted in a side-by-side cockpit with the primary (trainee) pilot seat on the right side. Figures 2 and 3 show the landing gear lever location in the G120TP-A standard analog and standard digital cockpit configurations, respectively. In order to install the communications and navigation (COM/NAV) equipment, which takes the full height of the instrument panel, in a center position to provide equivalent access for the instructor seated in the left hand seat and the trainee seated in the right hand seat, the landing gear lever had to be either located left or right of the COM/NAV.

Figure 2 – Landing Gear Lever Location in the G120TP-A Standard Analog Cockpit

Figure 3 – Landing Gear Location in the G120TP-A Standard Digital Cockpit

Selecting the left position would satisfy § 23.777 (g) requirements; however, it would not be appropriate in terms of ease of access from the primary seat occupied by the trainee or the pilot seated on the right side in case of single pilot operation.

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

The landing gear control is prominent and separated from the power controls to eliminate confusion with these controls. In addition, EASA required the applicant to evaluate the possibility of confusion with the flap lever and to conduct a flight crew evaluation of the design. EASA accepted Grob's position that showed the flap control is also adequately separated from the landing gear control and granted ELOS CS 23.777(g): CRI D-101 Location of Landing Gear Control Lever. Additionally, the FAA conducted a flight test and concluded that an ELOS was appropriate for both cockpit configurations.

FAA approval and documentation of the ELOS finding:

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper F-3. 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.

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

14 CFR § 23.777(g) Cockpit Controls-Landing Gear
(Documented in ELOS Memo ACE-15-13)

//SIGNED// August 18, 2015

Mel Johnson, Acting Manager, Small Airplane Directorate, Aircraft Certification Service — Date

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