



# Federal Aviation Administration

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## Memorandum

Date: December 18, 2012

To: Scott Horn, Acting Manager, Rotorcraft Certification Office, ASW-170  
THRU: Larry Kelly, Manager, Standards Staff, ASW-110

From: Kim Smith, Manager, Rotorcraft Directorate, ASW-100

Prepared by: James Blyn, Aerospace Engineer, ASW-170

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Bell Helicopter Textron, Inc.'s Supplemental Type Certificate for the Engine & Glass Cockpit Upgrade on Bell 412EP, ODA STC Project No. ST0025RC-RD

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ELOS Memo No. ST0025RC-RD/P-2

Regulatory Ref: 14 CFR 29.1555(c)(1)

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 Bell Helicopter Textron, Inc. (BHTI) Model 412EP Engine and Glass Cockpit Upgrade project.

### Background

BHTI intends to modify the 412EP Helicopter by Supplemental Type Certificate (STC) to include the PT6T-9 Engine, and a Glass Cockpit using the Bell BasiX-Pro® integrated avionics system first introduced in the Bell Model 429. The new modern glass cockpit uses four Display Units (DUs) to display the required engine instruments.

The Model 412EP Engine and Glass Cockpit Upgrade (412EPI) has a usable fuel capacity marking, however the marking is not located at the fuel quantity indicator as required by 14 CFR 29.1555(c)(1).

The Bell 412EPI displays fuel quantity on an electronic display unit, which offers advantages to improve the presentation and readability of the usable fuel. The fuel quantity indicator appears primarily as part of either the Engine Indication and Crew Alerting System (EICAS) format or the compressed EICAS format with the fuel indicator itself centered in the lower portion of the electronic display. The EICAS format is available on the two inboard DUs, and the compressed EICAS format can be displayed on any or all of the 4 DUs. The fuel quantity can also be presented on the fuel system schematic page and on the weight and balance page on either of the

inboard DUs. The proposed usable fuel capacity marking is electronically displayed on the fuel system schematic page and the weight and balance page only, with a physical placard located on the pedestal near the floor at the right pilot station.

While the flexibility of electronic displays are considered advantages over traditional mechanical indicators, the requirements of 14 CFR 29.1555(c)(1) are prescriptive. If not met, compliance must be shown as documented through a finding of an Equivalent Level of Safety (ELOS).

### **Applicable regulation(s)**

14 CFR 29.1555(c)(1)

### **Regulation(s) requiring an ELOS finding**

14 CFR 29.1555(c)(1)

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

The compensating factors which allow the granting of the ELOS are as follows:

- The Bell 412EPI STC does not change the fuel capacity from the Bell 412EP.
- The Bell 412EPI STC relocates the Bell 412EP fuel capacity placard from the instrument panel to the right side of the pedestal, in plain view, to assist ground crews refueling the aircraft.
- An electronic placard of fuel capacity is displayed on the pages to be referenced by the flight crew when managing refueling (fuel schematic page and weight and balance page).
- When auxiliary tank(s) are installed, the electronic placard can be modified to match the fuel capacity of the installed configuration by maintenance action on the display.
- The electronic placard will display in either kilograms or pounds to match the label used on the fuel quantity gauges and can also be updated to match the current fuel type.

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

The FAA agrees with the compensating factors for this design and recognizes the value and benefit of displaying an electronic fuel capacity marking on the fuel schematic page and the weight and balance page of the DUs. The display provides the capability of updating the capacity marking to match the aircraft configuration and to also ensure the capacity marking is displayed using the same units of measurement of the gauging system as opposed to relying on a static placard. Additionally, the fuel capacity placard located on the pedestal is located where it can be easily viewed by ground crew while standing on the ground with the right pilot door open. The FAA finds that the combination of electronic fuel capacity placards and remotely located physical placards meets the intent of 14 CFR 29.1555(c)(1).

**FAA approval and documentation of the ELOS finding:**

The FAA has approved the aforementioned equivalent level of safety finding in project issue paper P-2. This memorandum provides standardized documentation of the ELOS finding that is nonproprietary and can be made available to the public. The Accountable Directorate has assigned a unique ELOS Memorandum number (ST0025RC-RD/P-2) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number must be listed in the Limitations and Conditions section of the STC. An example of an appropriate statement is provided below.

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

14 CFR 29.1555(c)(1) Control Markings (documented in ELOS Memo ST0025RC-RD/P-2)

Signed by – *Larry M. Kelly*  
for \_\_\_\_\_

Manager, Rotorcraft Directorate,  
Aircraft Certification Service

1/15/2013

Date

ELOS Originated by ACO: Rotorcraft Certification Office	ACO Acting Manager Scott A. Horn	Routing Symbol ASW-170
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