



Federal Aviation Administration

Memorandum

Date: June 30, 2009

To: Jorge Castillo, Acting Manager, Rotorcraft Standards Staff, ASW-110

From: Mark R. Schilling, Acting Manager, Rotorcraft Directorate, ASW-100

Prepared by: George Schwab, Rotorcraft Standards Staff, ASW-112

Subject: Equivalent Level of Safety (ELOS) Finding for Bell Canada Certification/Type Validation on Model 429 Helicopter.

ELOS Memo No: TC2486RD-R/S-2

Regulatory Ref: 14 CFR part 27-Appendix B, VIII.(b)(5)(i) and (ii)

This memorandum documents an evaluation made by the Rotorcraft Directorate for the establishment of an ELOS for the Bell Model 429 helicopter.

Background

Bell Helicopter Textron Canada, Limited (BHTCL) has applied for an ELOS finding for its Model 429 pilot instrument display as regards 14 CFR part 27-Appendix B VIII.(b)(5)(i) and (ii).

Title 14 part 27-Appendix B, VIII.(b)(5)(i), requires for systems that operate the required flight instruments at each pilot's station, only the required flight instruments for the first pilot may be connected to that system. Also, 14 CFR part 27-Appendix B, VIII.(b)(5)(ii) requires additional instruments, systems or equipment may not be connected to an operating system for a second pilot unless provisions are made to ensure the continued normal functioning of the required instruments in the event of any malfunction of the additional instruments, systems, or equipment which is not shown to be extremely improbable.

Applicable Regulation(s)

14 CFR part 27-Appendix B, VIII.(b)(5)(i) and (ii)

Regulation(s) requiring an ELOS finding

14 CFR part 27-Appendix B, VIII.(b)(5)(i) and (ii)

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)

1. The pilot's display, although connected to both the pilot's and co-pilot's Air Data Attitude Heading Reference System (ADAHRS) data sources does use separate buffered data busses so

that the failure of the cross side pilot (co-pilot) system does not affect the on side pilot's system. The co-pilot system connections follow the same architecture.

2. The ADAHRS offers a third set of data busses (both for Attitude Heading Reference System (AHRS) and Air Data Computer (ADC) made available to other systems which will not interfere with the pilot's displays.
3. This architecture provides the required separation intended by the rule, while ensuring the redundancy needed for integrated systems to provide combined indication functions.
4. A System Safety Assessment has been performed for the proposed architecture such that the probability of loss of display or display of misleading attitude, airspeed or altitude information is extremely improbable.

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:

Title 14 CFR part 27-Appendix B, VIII.(b)(5)(i) and (ii), requires (i) isolation of the pilot's flight instruments from other systems and (ii) additional instruments, systems or equipment may not be connected to an operating system for a second pilot unless provisions are made to ensure the continued normal functioning of the required instruments in the event of any malfunction of the additional instruments. The Rotorcraft Standards Staff has determined that the system architecture, as designed and installed, in lieu of literal compliance with the requirements of 14 CFR part 27-Appendix B, VIII.(b)(5)(i) and (ii), shows an ELOS to the rule through electrical isolation, circuit protection, redundancy and automatic switching of required flight information to the pilot's view in the event of a single failure.

FAA approval and documentation of the ELOS

The FAA has approved the aforementioned ELOS finding in project issue paper S-2. This memorandum provides standardized documentation of the ELOS that is non-proprietary and can be made available to the public. The Rotorcraft Directorate has assigned a unique ELOS Memorandum number (see front page) to facilitate archiving and retrieval of this ELOS. This ELOS Memorandum number should be listed in the Type Certificate Data Sheet under the Certification Basis section. As example:

Equivalent Safety Findings have been made for the following regulations:

14 CFR part 27-Appendix B, VIII.(b)(5)(i) and (ii), Equipment, systems and installation documented in ELOS MEMO TC2486RD-R/S-2.

Signature: Mark R. Schilling
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7-16-09
 Date