

***Proposed Equivalent Safety Finding related to CS.1145(a) at Amdt 3
"Ignition switches"***

Introductory Note:

The hereby presented Equivalent Safety Finding (ESF) has been classified as an important Equivalent Safety Finding and as such shall be subject to public consultation, in accordance with EASA Management Board decision 12/2007 dated 11 September 2007, Article 3 (2.) of which states:

"2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency."

Statement of Issue:

CS 29.1145 requires switches accessible by the flight crew for the control of the engine ignition systems.

Subparagraph (a) of CS 29.1145 reads:

CS 29.1145 Ignition switches

(a) Ignition switches must control each ignition circuit on each engine.

...

This means that the ignition systems shall be controlled separately, so that each circuit's operation can be checked separately and circuits selected or deactivated individually in the event of an ignition system malfunction.

Design proposal:

A helicopter currently under type certification, with two electronically controlled turbine engines (each engine is controlled by means of a distinct Electronic Engine Control Unit - EECU), is provisioned with a STOP/IDLE/FLIGHT (S/I/F) switch per engine. Each engine S/I/F switch is wired to its engine EECU.

Each engine is provided with two ignition circuits directly controlled by the EECU for that engine.

S/I/F switches do not allow direct and separate control of each individual ignition circuit for each engine. When engine S/I/F switch is set to STOP, both ignition circuits are de-activated by its relevant EECU. When it is set to IDLE or FLIGHT, the EECU is automatically selecting one of the two igniters or both of them depending on ground/flight conditions.

Consequently, the proposed ignition control switches architecture does not strictly comply with the applicable CS.1145(a) rule.

The Applicant claims an ESF to the CS 29.1145(a) demonstrating that the proposed automated control of engine ignition through the EECU is providing a level of safety equivalent to an architecture providing the crew with capability to control each individual ignition circuit. This would be based on the following ESF criteria:

Proposed ESF criteria:

An equivalent level of safety to CS 29.1145(a) may be demonstrated if the ignition system architecture proposed (switches, control logic, alerts) provides the necessary:

- means to control, either by crew action and/or by system behavior, each ignition circuit of each engine. The “off” capability will always be possible via crew action;
- capability for the crew to conduct the flight and manage both normal (ground start) and abnormal situations (i.e. adverse weather conditions, in-flight restart) and/or any limitations (i.e. engine, operational), either by crew action and/or by system behavior;
- means to check the health condition of the ignition circuits;
- engine-to-engine isolation.