Proposed Equivalent Safety Finding (ESF) to CS-29 Appendix B para. VIII., point (c) Thunderstorm lights

Introductory Note:
The hereby presented Equivalent Safety Finding has been classified as important 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.), 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:

For helicopters to be certified in compliance with airworthiness criteria for instrument flight, CS-29, in Appendix B para. VIII., point (c), requires that in addition to the instrument lights required by CS 29.1381(a), thunderstorm lights which provide high intensity white flood lighting to the basic flight instruments must be provided. The thunderstorm lights must be installed to meet the requirements of CS 29.1381(b).

Such additional lights are intended to provide a means to prevent the effect of pilot dazzling or temporary blinding by lightning discharge while the rotorcraft is being operated under thunderstorm conditions solely by reference to instruments. They allow to reduce the lighting levels contrast between the inside of the cockpit and the outside of the aircraft in case of a flash of lightning, by locally increasing the cockpit illumination in the area where the basic flight instruments are installed and on which the pilot's eyes are primarily focused during IFR flight. This helps natural eyes' re-adaption to the cockpit lighting environment and prompt sensorial perception recovery of the most intensively lighted zone of the basic flight instruments as illuminated by the thunderstorm lights.

Originally, the requirement of additional thunderstorm lights aimed at addressing traditional helicopter cockpits equipped of analogical instruments lighted by either low intensity integrated-lights or external cockpit lighting system.

However modern helicopter cockpits integrate nowadays more and more self-illuminating electronic screens and instrument displays with adjustable brightness function. With such technology, some Applicants claimed that adding thunderstorm lights is no longer justified. Furthermore, it is argued that an increased external illumination of screens where the basic flight instruments are displayed might rather impair the contrast of their symbology and the overall parameters readability, or cause detrimental reflections even though the displays are typically provided with antiglare and antireflection coatings.

Equivalent Safety Finding:

When claimed to not install thunderstorm lights, EASA has agreed that demonstration of an Equivalent Safety Finding to the requirement CS-29 Appendix B para. VIII., point (c), can be shown on the basis of the following compensating factors:

- The basic flight instruments are presented on electronic screens of self-illuminating primary flight displays;
- The brightness of these electronic displays can be adjusted independently of the other cockpit screens and instruments;
- Notwithstanding compliance with the requirements of CS 29.771(a), CS 29.773(a) and CS 29.1381, a comparative simulation testing with and without thunderstorm lights must demonstrate that the increased brightness feature of the electronic displays already provides safe prompt recovery of the basic instruments readability after blinding glare of the crew from a flash of lightning and would not be further improved by the use of additional high intensity white flood lighting;
- The RFM normal procedures must state when and how it is required that the crew adjusts the brightness of the electronic displays (i.e. in which flight conditions and to which level).
