

Comment				Comment summary	Suggested resolution	Comment is an observation or is a suggestion*	Comment is substantive or is an objection**	EASA comment disposition	EASA response
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1	Swiss FOCA	3.3.1,3.3.2,3.3.3		<p>The paragraph 1.1. defines as scope of the CM to clarify the classification of some failure conditions and this is welcome as well the relevant text of the CM.</p> <p>I think we should not repeat in the CM the guidance on how to demonstrate compliance with the safety requirements and especially I would not repeat the quantitative safety objectives for CS 27 CAT A VFR.</p> <p>While the following text is provided: “FAA AC 29-2C that provides guidance for showing compliance with this provision defines that a probability of in the order of 1x10⁻⁷ to 1x10⁻⁹ should be demonstrated for a failure condition that is classified as HAZARDOUS”</p> <p>I think this is not beneficial and might be in the near future inconsistent with the approach of the safety continuum harmonisation with FAA or misleading with some of the CRIs issued at project level. We consider that CM is not suitable to reinforce the text of guidance already existing and well defined once the severity is specified.</p>	<p>We suggest to replace the text “FAA AC 29-2C that provides guidance for showing compliance with this provision defines that a probability of in the order of 1x10⁻⁷ to 1x10⁻⁹ should be demonstrated for a failure condition that is classified as HAZARDOUS” with the following:</p> <p>“The demonstration of compliance with applicable safety objectives and (J)DAL, is provided in relevant guidelines applicable to the project and is out of the scope of this CM” or anything equivalent”.</p>	Yes	No	Accepted	<p>The text in paragraph 3.3.1:</p> <p><i>“FAA AC 27-1B that provides guidance for showing compliance with this provision defines that a probability of in the order of 1x10⁻⁷ to 1x10⁻⁹ should be demonstrated for a failure condition that is classified as HAZARDOUS”</i></p> <p>is replaced with the following one:</p> <p><i>“Details on how to demonstrate compliance with the hazardous classification and the applicable DALs are provided in the AMC to CS 27.1309 that is applicable to the project and they are not the intent of this CM. »</i></p> <p>Similar wording is introduced in the other paragraphs (3.3.2, 3.3.3, and 3.3.4) that are affected by this comment.</p>
2	Swiss FOCA	Appendix 1		<p>Guidance considering “Already night VFR approved” does not consider the possible net safety benefit introduced by modern equipment in place of old pieces failure prone and this might be inconsistent with future guidelines concerning net safety benefit.</p>	<p>To add the sentence : applicant could seek for early coordination with EASA in case it can be claimed that a net safety benefit is introduced with the change, and the guidance of this CM is preventing the modification of the rotorcraft.</p>	No	Yes	Partially accepted	<p>Due to the nature of all EASA CMs that is explained in the first page of the document, there is always the possibility for the applicants to seek for early coordination with EASA in case they want to follow a different approach.</p> <p>However, the replacement of an old technology instrument with a new one is not prevented. Actually this is one of the scopes of this CM.</p> <p>Recognizing the associated net safety benefit, no reclassification of the functional failure “misleading attitude indication” is required for all the cases that are considered in the first row of this table.</p>
3	GAMA	General		<p>The proposed CM does change what is needed for night VFR certification. By EASA’s own admission, it is recognized that traditional mechanical technology was approved based on different assumptions (i.e. assumptions are changed). The increase in hazard severity changes the ability to certify new aircraft with the same level of equipment as older aircraft.</p> <p>There does not appear to be safety or accident data supporting the EASA position. There is no indication that failure of attitude indicators has contributed to accidents or incidents and that the historic reliability provided by single attitude indicators used for night VFR operations is inadequate. As such there appears to be no justification for increasing the reliability requirements for these indicators and installations. The only justification appears to be based on an academic FHA exercise.</p>	<p>A RMT with supporting safety data should be initiated so the impact of this change can be fully assessed and required equipment for night VFR identified.</p>	No	Yes	Not accepted	<p>The objective of this CM is clarified in paragraph 2 “Background”. Its intent is not to change what is required for certification and makes no changes to the Certification Specifications or the associated Acceptable Means of Compliance. However the scope of this CM is to provide updated guidance on EASA’s interpretation of the appropriate classification of failure conditions relating to the installation of ADIs that are required by the operational rules. It is possible for EASA’s policy and interpretation of CSs and AMC to change over time as experience is gained and as technology changes.</p> <p>Paragraph 3.1 provides the background behind the previously accepted EASA policy on the hazardous classification for the misleading attitude indication. The new policy takes into account the increasing capability of modern rotorcraft operated under VFR and the failure conditions that are introduced by the glass cockpit technology.</p>

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4	GAMA	2	5	First sentence of page 5, refers to both CS-27 and CS-29 not being “harmonized” from an attitude indicator standpoint. The way this is stated suggests that this some sort of oversight in the rules, whereas they are purposely different given their difference in categories and expected level of safety.	Recommend to remove statement or reword as the requirements are purposely different and one should not expect a CS-27 aircraft to meet the same requirements or level of safety standards than a CS-29 aircraft.	Yes	No	Accepted	A re-wording of the text is proposed (see text in italics below): <i>However, the same approach is not agreed in the CSs for rotorcraft as detailed below:</i> <ul style="list-style-type: none"> <i>For a large CS-29 rotorcraft, an attitude indicator is required in order to be approved for VFR by CS 29.1303 “Flight and Navigation Instruments”.</i> <i>For small CS-27 rotorcraft, CS 27.1303 does not require the installation of an attitude indicator in order to be approved for VFR, including night VFR operations. For a small CS-27 rotorcraft, such an indicator is only required for IFR approval (see Appendix B to CS-27 that in turn requires compliance with CS 29.1303).</i>
5	GAMA	2	5	Reference to NVIS certification adds confusion as NVIS is not required for night flight. NVIS seems added only to state there are no safety objectives to support the need for attitude indicators.	Recommend to delete reference to NVIS as not directly related to Night VFR flight requirements	Yes	No	Not accepted	It is common EASA and FAA policy to recommend the installation of an attitude indicator for NVIS airworthiness approvals (see FAA AC 27-1B and AC 29-1C Miscellaneous Guidance No. 16). The same approach is followed by TCCA. Therefore, for a CS 27 rotorcraft the NVIS approval may be the reason behind the installation of an ADI. This is the reason why NVIS is mentioned in this paragraph.
6	GAMA	3.1	5	VFR operations require outside reference to the surface / horizon with ground lights or celestial illumination. If VFR helicopters are operating in conditions that require a reference to an attitude indicator they are not operating VFR. If VFR helicopters are legally operating in conditions that are poor enough to easily/rapidly put the crew in eminent danger of IIMC, then those minimums should be increased to a point where the IIMC risk is greatly reduced. Unfortunately IIMC w/ controlled flight into terrain accidents are all too common. Requiring IFR equipment in VFR only helicopters may encourage pilots to fly in poor conditions and convey a false sense of security for operations in poor weather conditions in helicopters limited to Day / Night VFR.	A RMT with supporting safety data should be initiated to properly assess the implications of requiring this equipment.	No	Yes	Not accepted	The scope of this EASA CM is not to impose the installation of an attitude indicator for VFR night for those cases where this equipment is not required by the CS or the operational rules. Instead, the scope is to provide guidance on the acceptable failure classification for those cases where this equipment is installed to comply with operating rules and to facilitate the replacement of old technology ADIs with digital ones, taking into account the associated overall safety benefit that is brought by the new technology.
7	GAMA	3.1	5	Many crews operating VFR helicopters marginally equipped for an IMC encounter are not trained or current in IMC procedures and thus would derive little benefit from an attitude indicator with higher reliability.	A RMT with supporting safety data should be initiated to properly assess the implications of requiring this equipment.	No	Yes	Not accepted	Flight crew training is out of the scope of this CM. For more details on the intent of this CM please see the EASA response to comment #6.

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8	GAMA	3.1	5	The requirement to have an attitude indicator is to <u>assist</u> in reduced reference conditions. CM presents cases where the VFR operation is pushed outside of its defined envelope so as to solely rely on the instrument, making the misleading information a higher criticality	Classifying the failure criticality should be left to the process associated with the existing rule (27/29.1309) which will identify and justify the failure classification as part of the safety assessment (e.g. FHA) as this CM is not intended to introduce new certification requirements.	Yes	No	Not accepted	In fact this CM does not replace the certification process which identifies and justifies the failure classification. It provides the EASA policy that has been applied in recent projects and will be applied in future ones. In addition, it provides alleviations to allow replacement of mechanical instruments with digital ones.
9	GAMA	3.3	6/7	This section details the expected justification in meeting the assigned classification for misleading attitude indication. This is already part of the existing 27/29.1309 rule supported by such processes as ARP4761	Classifying the failure criticality should be left to the process associated with the existing rule (27/29.1309) which will identify and justify the failure classification as part of the safety assessment (e.g. FHA) as this CM is not intended to introduce new certification requirements.	Yes	No	Not accepted	See EASA response to comment #8.
10	GAMA	3.1	5/6	<p>Section 3.1 third paragraph states that one of the reasons for the increased hazard assessment is availability of technology that can meet the elevated requirement. Hazard assessments are not a function of the technology.</p> <p>With that stated, reaching the reliability numbers is not an easy task for a single installation, even given today's technology. Most existing attitude systems require dual sensors cross compared to achieve <1E-7 for misleading. Most electronic attitude sensors are more in the 1E-6 to 1E-7 range for misleading indication from a single channel, most electromechanical indicators are more in the 1E-5 to 1E-6 range.</p> <p>Less than 1E-5 for loss is also very difficult to achieve when the indicator and the reliability of power distribution systems is considered. <1E-5 for loss typically requires redundancy in the architecture, again imposing a significant increase on existing requirements.</p> <p>Due to this EASA is effectively removing to the ability to use the traditional technology solution for a single attitude indicator installation (electromechanical indicators and earlier strap-down designs). These technologies have a proven safety record and no data has been presented to justify disqualifying their use. A traditional technology solution would require a dual installation with the pilot required to cross-compare 2 indicators to support the reliability numbers cited.</p>	<p>The CM will impose the installation of complex systems in small aircraft to operate night VFR. This is beyond the scope of a CM which is not to impose new requirements.</p> <p>A RMT with supporting safety data should be initiated and required equipment for night VFR identified.</p>	No	Yes	Not accepted	<p>Section 3.1 third paragraph does not suggest that because new equipment technology is today available that can meet higher standards, a higher level of reliability is to be required.</p> <p>The sentence was aimed to highlight that with the introduction of glass cockpit technology there may be more functional failures that could lead to a misleading attitude indication than with a mechanical one. For this technological reason and for the observed operational practice, EASA decided to raise the failure classification of misleading attitude indication at night.</p> <p>As far as the use of conventional mechanical technology is concerned, this CM does not discourage their use if applicants elect to do so (see the different cases considered in the Appendix 1 for a complete picture of all possible cases). However, if mechanical instruments are installed on a new type there is no technical reason to justify a different classification with respect to the case where new equipment technology is embodied.</p>
11	GAMA	3.3	6/7	If a dual attitude installation is forced with pilot cross comparison required based on the newly identified hazard level, pilot workload increases and outside visual scan time decreases which would decrease safety in VFR night operations. This is the consequence of applying inordinate reliability numbers to most incumbent technology.	There is the possibility of unintended consequences as a result of the CM. A RMT with supporting safety data should be initiated so these consequences can be fully assessed.	No	Yes	Not accepted	EASA believes that there is a misunderstanding here in the objectives. The proposed severity classification (hazardous) has to be met by the system design characteristics. Therefore, the intent is to install systems that by design are able to reduce the probability of a misleading indication. In addition, a misleading indication is by the definition very unlikely to be detected by the flight crew.

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12	GAMA	3.3	6	The EASA assessment of hazard level and associated reliability does not take into account exposure time from last verified operation. IFR flight assumes no external verification of attitude for the entire flight duration up to landing. At any time during night VFR flight when a horizon is discernable and the attitude indicator is seen operating correctly, this provides confirmation of correct attitude indicator operation. Although night flight may have moments or short periods of less than optimal visual reference, for which the attitude indicator provides assistance, any period of reliance on the attitude indicator should be brief – in the order of seconds to minutes. Certainly not a flight hour or more. Therefore the reliability numbers cited per flight hour are incorrect by a factor of 10 to 100. If a pilot is dependent on the attitude indicator for longer periods, the flight is clearly an IFR flight as opposed to a VFR flight. We believe the historical classification of MAJOR for misleading attitude in Day/Night VFR took this into consideration.	Exposure time to be taken into account when determining the associated hazard level. The hazard when considering the definition of VFR and the level of exposure in non-VFR conditions is more consistent with a hazard of MAJOR.	No	Yes	Not accepted	EASA doesn't agree with this comment for the following two reasons: 1. As a general approach, the exposure time does not affecting the hazard classification. It may affect the compliance demonstration that the safety objectives are achieved. 2. The reasons behind the Hazardous classification are explained in the CM paragraph 3.1. For these reasons the Major classification is not deemed appropriate anymore by EASA.
13	Airbus Helicopters	§3.1	5	Question to EASA: is it acceptable not to provide administrative FHA update when the functions are not impacted? (systematic update of FHA?)		Yes	No	Noted	This comment does not appear to pertain to the content of the CM but to its implementation at project level. The effects of the new policy for already approved projects has to be discussed and agreed on case by case with the certification team.
14	Airbus Helicopters	§3.1	6	Clarification needed: "misleading attitude indication for night VFR... [HAZARDOUS]", AH interpretation of misleading attitude indication for such case is related to potential slow-over, significant offset (more than 5°). EASA to confirm or to clarify		Yes	No	Noted	The reasons behind the Hazardous classification are explained in paragraph 3.1. AH comment seems to address the technical reasons that may result in a failure that has the potential to be undetected, in particular in the case of a digital instrument that is driven by a sensor of latest technology. Although the case presented by AH is one of the possible failure scenarios, the scope of the CM is not to enter into the details of the thresholds between a misleading failure that is undected and one that is recognized by the crew as failed. These are topics to be agreed at project level.
15	Airbus Helicopter	§3.3.2	7	Question to EASA: why single and multi-engines are dealt differently where AC27-1B does not segregate activities for those cases and does not impose quantitative demonstration?		Yes	No	Noted	The reason why single and multi-engine CS-27 rotorcraft are dealt with separately is because the CS 27.1309 is different for these two cases (see CS 27.1309 (b) applicable to multi-engine vs CS 27.1309 (c) applicable to single-engine).
16	Airbus Helicopters	§3.3.3	7	Typo: CS-29 b1 text is not correct (the one proposed is the one of CS-27.1309 b)		Yes	No	Accepted	The correct text has been re-introduced.

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17	Airbus Helicopters	§3.4	7	Question to EASA: is it expected to have as a minimum set of requirements the ones listed in the section? Or that EASA Expert Panel 1 should be invited systematically to assess compliance demonstration of those listed requirements?		Yes	No	Noted	In the spirit of the EASA CMs, the list in paragraph 3.4 is provided to guide the applicants to perform a comprehensive assessment of all the requirements that are affected by the ADI installation. It is not meant to be prescriptive as the scope of the CM is not to substitute the standard certification procedures. The same applies to the EASA LOI that is defined through Part 21.
18	Airbus Helicopters	§3.4	8	Clarification needed: for CS-29, sub-paragraphs of 29.1309/1321/1333 are to be refined to be considered as the minimum set of req Question to EASA: could NVIS NVGs be considered as an alternate attitude indicator? Question to EASA: should impact be considered for OSD/FCD/SIMD? If so, are there recommendations from EASA?		Yes	Yes	Partially Accepted	The list has been detailed with the applicable subparagraphs. As far as the questions raised on NVG and MMEL are concerned, please note the following: <ul style="list-style-type: none"> - NVG cannot be considered as an alternate attitude indicator. - The CM only highlights that impacts on the MMEL are possible due to the different hazard classification. A detailed assessment of the impacts on OSD/FCD/SIMD is out of the scope of this CM.
19	Airbus Helicopters	§5	9	Typo/Format: is possible to add a fourth column to isolate the expected actions? Clarification needed: is it possible either to remove the line of not impacting changes or at least to mention that the list might be not exhaustive? Is it possible to confirm that the list of the second line (where FC classification is expected to be modified to HAZ for misleading) is exhaustive, if so to remove the first line to avoid confusion or to insert a positive statement clarifying that all cases not listed in the current second line are not affected		Yes	No	Partially accepted	The “expected action” is defined at the end of each “Explanatory Note”. The following clarification has been added at the end of the Appendix 1: <i>“This Appendix does not contain all possible design cases. For advice on other design cases than those included in this Appendix, the Agency should be contacted.”</i>