


EASA	NOTIFICATION OF A PROPOSAL TO ISSUE A CERTIFICATION MEMORANDUM
	<p>EASA Proposed CM No.: EASA Proposed CM – FT – 001 Issue: 01 Issue Date: 03rd of December 2013 Issued by: Rotorcraft, Balloons and Airships section Approved by: Head of Products Certification Department Regulatory Requirement(s): FAA AC 29-2C Change 2 MG16</p>

In accordance with the EASA Certification Memorandum procedural guideline, the European Aviation Safety Agency proposes to issue an EASA Certification Memorandum (CM) on the subject identified below.

All interested persons may send their comments, referencing the EASA Proposed CM Number above, to the e-mail address specified in the "Remarks" section, prior to the indicated closing date for consultation.

EASA Certification Memoranda clarify the European Aviation Safety Agency's general course of action on specific certification items. They are intended to provide guidance on a particular subject and, as non-binding material, may provide complementary information and guidance for compliance demonstration with current standards. Certification Memoranda are provided for information purposes only and must not be misconstrued as formally adopted Acceptable Means of Compliance (AMC) or as Guidance Material (GM). Certification Memoranda are not intended to introduce new certification requirements or to modify existing certification requirements and do not constitute any legal obligation.

EASA Certification Memoranda are living documents into which either additional criteria or additional issues can be incorporated as soon as a need is identified by EASA.

Subject

Helicopter Night Vision Image System

Log of Issues

Issue	Issue date	Change description
01	03.12.2013	First issue.

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1. INTRODUCTION

1.1. PURPOSE AND SCOPE

The purpose of this Certification Memorandum is to provide specific clarification and additional guidance for certification of Night Vision Image System (NVIS) on helicopters.

1.2. REFERENCES

It is intended that the following reference materials be used in conjunction with this Certification Memorandum:

Reference	Title	Code	Issue	Date
AC MG 16	Advisory Circular AC 29-2C Change 2 MG16	---	---	2006

1.3. ABBREVIATIONS

The following abbreviations are used in this Certification Memorandum:

Abbreviation	Meaning
AC	A dvisory C ircular
AP DOA	A lternative P rocedures to D esign O rganisation A pproval
CM	C ertification M emorandum
CRI	C ertification R evision I tem
DOA	D esign O rganisation A pproval
EASA	E uropean A viation S afety A gency
FAA	F ederal A viation A dministration
ICA	I nstructions for C ontinued A irworthiness
MMEL	M aster M inimum E quipment L ist
NAA	N ational A viation A uthority
NVG	N ight V ision G oggle(s)
NVIS	N ight V ision I mage S ystem
RFSM	R otorcraft F light M anual S upplement
STC	S upplemental T ype C ertificate
TC	T ype C ertificate
TCDS	T ype C ertificate D ata S heet
TGL 34	JAA T emporary G uidance L eflet 34

1.4. DEFINITIONS

The following definitions are used in this Certification Memorandum:

Definition	Meaning
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2. BACKGROUND

This Certification Memorandum provides guidance to Night Vision Image System initial certification and later additional changes.

3. EASA CERTIFICATION POLICY

3.1. GENERAL

The NVIS certification has been increasing in the latest years. The existing advisory guidance is dated 2006, but the developments on showing of compliance were such that new clarifications were necessary, especially in the field of continued airworthiness. Previous to publication of this Certification Memorandum, updates of guidance coming from certification experience were provided on a case by case basis to each European applicant that intended to perform a NVIS certification project through dedicated Certification Review Items (CRI). This Certification Memorandum complimentary to AC MG16, provides an insight into the content of these CRIs and the agreements between EASA and the design approval holder to be made after each NVIS approval.

3.2. CLASSIFICATION OF CHANGES

3.2.1. First modifications of non NVIS certified helicopters

Any new modification that changes an aircraft from non NVIS to NVIS-compliant is considered a major change under Part 21.A.91¹ because it has an appreciable effect on operational characteristics of the aircraft. Additionally, NVIS lighting modifications are major due to the fundamental effect NVGs have on visual perception and the inherent characteristics of NVIS technology.

3.2.2. Follow-up modifications of already NVIS certified helicopters

For changes to already certified NVIS, 21.A.91 defines the criteria of minor vs. major changes. For NVIS certified helicopters, it has been found that some changes that in first instance seem to be minor according to 21.A.91 could have a potential major effect on the cockpit lighting characteristics and thus on pilot vision through the NVGs. For instance a radio installation could shine directly in the NVG if the screen is not NVG compatible, or a cable cutter could reflect external lighting and affect the pilot NVG aided vision. Therefore the change classification should take into account the effects on cockpit/cabin lighting characteristics and the NVIS. Unfortunately it is difficult to provide a list of minor vs. major lighting changes, mainly because each helicopter will exhibit different lighting characteristics due to the cockpit layout, and the location and type of instruments fitted and this will have a bearing on pilot NVG aided vision. Due to this fact EASA agreed since years that each TC/STC holder of an NVIS approval should propose its own criteria for classification of lighting changes having only limited impact on the NVIS approval, thus to be considered minor. This list depends greatly on the experience and knowledge of the specific kind of NVIS approval.

The logic of classification of changes according to 21.A.91 would be so complemented by adding two additional questions in the loop:

1st question: is the change affecting the internal and external lighting?

- If no, then apply current 21.A.91 policy. The NVIS approval will not be affected.

¹ Annex I, Part 21 to Commission Regulation (EU) No. 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations

- If yes, then the change requires a NVIS check according to GM 16 of AC 27/29. In this case the following should be considered:

2nd question: Has the applicant agreed with the Agency how to classify changes for their effect on NVIS approved helicopters?

- If yes, then the change is classified following the agreement and could be minor.
- If no, then the change is deemed to be major.

In both cases after the necessary testing a statement needs to be made in the approval/ICA/RFM (if applicable) highlighting that the NVIS approval is not affected by the change.

While the number and types of helicopters that are NVIS certified is growing constantly, the awareness concerning the risk of installation of changes that could have a major impact on the NVIS lighting effect to the pilot is still not sufficiently developed. It is therefore important that the final users of the helicopters – the operators – provide great care to this aspect, since finally they will be the ones deciding to change an avionics or to imbed any new equipment producing lighting. As the operators will have through the NVIS approval the complete list of the configuration of the aircraft, they should carefully verify that any future change in the configuration did not affect the NVIS approval.

This is mostly relevant in case of the change is made from a Company different from the original NVIS TC/STC holder.

The following is a list of possible procedural approaches for gaining approval of NVIS cockpit lighting modification.

3.2.2.1. Minor and major changes made by the original (NVIS) STC/TC holder

The existing helicopter NVIS configuration (usually in the ICA) should be amended to include the new change.

3.2.2.2. Minor and major changes made by applicants different from the original NVIS STC/TC holder

- DOA/AP DOA with the appropriate NVIS capability explicitly mentioned in their exposition published in the EASA internet. It is important that also for approvals issued directly by the DOA (minor changes), the operator will have available in his documentation (certificate and RFM/ICA as applicable) the proof of NVIS check.
- DOA/AP DOA without NVIS capability , and applicants not holding a DOA or AP DOA (typically operators): either the NVIS compatibility check is performed with the help of a DOA having NVIS capability (and the subsequent change approval is highlighting the positive NVIS check), or the new change approval certificate and RFM/ICA should stipulate that no NVIS compatibility check has been done, thus invalidating the original NVIS approval. Under this condition, it will be the responsibility of the operator when installing the change to seek a re-validation of the NVIS approval, prior to release to service for NVIS operations.

3.3. DOA NVIS SCOPE OF APPROVAL

Existing holders of a DOA/AP DOA can apply for an extension to include NVIS within the scope of their approval. For DOA holders, this extension will entitle the holder to directly classify and approve minor NVIS changes in accordance with Part 21.A.95 and 21.A.263(c)(1) and (c)(2).

3.4. CONFIGURATION CONTROL

3.4.1. First modifications of non NVIS certified helicopters

Applicants seeking an initial NVIS certification of an already approved Night VFR helicopter, should establish a procedure that allows clear identification of each specific cockpit-cabin lighting configuration. This will form the basis on which future modifications or repairs done by third parties will be assessed for any impact on NVIS compatibility and the overall initial NVIS certification. A configuration file should be established, which should be available to the operator and then to the maintenance facility as it will be used to check if the existing helicopter configuration still matches the NVIS approved one. This is typically done as an Appendix of the ICA, detailed per serial number(s) having the same configuration. Please refer to paragraph 3.6 and to Annex 2 to have a possible model of configuration file. Adequate measures should also be put in place to inform operators of the need for caution in making future modifications that could invalidate the original NVIS certification. Please refer to MG16 of AC27/29 for dedicated statements to be inserted on the certificate approval, RFM and ICA. The same guidance material also highlights additional considerations for MMEL and compatibility with other helicopter kits.

3.4.2. Follow-up modifications of already NVIS certified helicopters

Applicants seeking to introduce minor and major changes to already approved NVIS kits from organisations other than the TC/STC holder, should examine carefully what is already existing as NVIS configuration file, RFM and ICA. Any supplementary information should be made in the same format as the existing data in order to facilitate the work of the operator and CAMO/maintenance facility in reviewing the initial NVIS configuration and successive NVIS approved minor or major changes.

3.5. ROTORCRAFT FLIGHT MANUAL SUPPLEMENT (RFMS)

For NVIS approvals not limited to specific serial numbers, it is probable that there will be a variety of different pre-existing cockpits on which the same STC will be applied. This might also result in the adoption of different limitations or pilot procedures. For these reasons the applicant of a NVIS STC/major change should propose a plan to cover dedicated RFM supplement for each serial number. A possible solution would have a RFM structured in two parts. One covers the basic helicopter configuration, having the generic normal procedures and limitations. A model of this RFM supplement is found in MG16 of AC27/29 The other one should be an Appendix, specific to serial number(s), containing any additional limitations or procedures relative to specific optional equipment installed (if existing), and a reference to the document (configuration file) having the detailed description per serial number. A model of this RFM Appendix is found in Annex 3. Please refer to the chapter 3.6 to have models of configuration files.

3.6. MAINTENANCE

3.6.1. Instructions for Continued Airworthiness (ICA)

Routine continued airworthiness tasks such as scheduled maintenance or non-routine tasks such as repairs, that affect NVIS cockpit compatibility could compromise the initial certification. The Applicant of a NVIS STC/major change should update maintenance manual(s) to include a dedicated NVIS paragraph and instructions in order to cover the following occurrences:

- Scheduled and unscheduled maintenance instructions including cockpit disassembly
- Repairs on NVIS components
- An inspection to check if the existing cockpit and external lights conform to the approved NVIS certification to be made at the opportunity of any equipment change/repair affecting NVIS components or regularly in a period of time not exceeding 2 years . Any discrepancies must be communicated to the NVIS STC/TC holder. In order

to confirm the NVIS certification assumptions, all differences need to be tested against NVIS compatibility.

- The maintenance instruction should include also a NVIS light leak check to be made at the time of the NVIS inspection. The NVIS light leak check should verify that the NVIS lighting has not been degraded from the one at time of certification. The ICA should indicate that the check has to be done by appropriate personnel capable of judging the new cockpit NVIS compatibility compared to the one installed on the first time and be conducted from all crew stations intended to be used (including cabin) in NVG operations.
- The light leakage check should also be done after hard landing or after any lightning strike.
- The following are maintenance items typical to NVIS that should be considered in the scheduled maintenance document as part of ICA manual:
 - Change the windshield/ transparencies if crazed or cracked in a manner to impair vision with NVGs
 - If the NVIS system has also removable filters installed, they should be checked for condition, cleanliness, security, crazing, and moisture between filter and instrument glass. No cracks, crazing or moisture should be allowed. A day light inspection of the filtered avionics should be made to ensure that the filter did not degrade in a way to impair readability or colour in daylight conditions.
 - All NVIS bezel lights / map lights/ post lights/ should be checked for condition and security
 - Wiring diagrams (when changes to wiring are foreseen).

Annex 1 contains a model of daylight and night light leakage check that could be part of the ICA.

Annex 2 contains a model of configuration file and cover page as ICA appendix related to specific configuration or serial numbers.

3.6.2. First Installation on a multiple approval serial number.

It is recommended that the first NVIS installation on an operator fleet should be performed with the assistance of the NVIS TC/STC holder. It is also recommended that the NVIS TC/STC holder should train the operator for performing the light leak check. The training should include as minimum a MG16 type of check (ground and flight test if necessary) as recommended way to verify adequate compatibility. This will ensure the operator to be able to communicate to the TC/STC holder if a degradation is perceived in the NVIS compatibility such to impair safe flight.

3.7. WHO THIS CERTIFICATION MEMORANDUM AFFECTS

Applicants for and approval holders of minor changes, STCs and Major changes concerning NVIS certification, and more specifically:

- DOA with the appropriate NVIS capability, explicitly mentioned in their Terms of Approval;
- Applicants for NVIS minor changes (with or without AP to DOA; DOA without NVIS capability)

4. REMARKS

1. This EASA Proposed Certification Memorandum will be closed for public consultation on the **14th of January 2014**. Comments received after the indicated closing date for consultation might not be taken into account.
2. Comments regarding this EASA Proposed Certification Memorandum should be referred to the Certification Policy and Planning Department, Certification Directorate, EASA. E-mail CM@easa.europa.eu or fax +49 (0)221 89990 4459.
3. For any question concerning the technical content of this EASA Proposed Certification Memorandum, please contact:

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ANNEXES

Annex 01. Example of Maintenance NVIS Inspection Checklist

Annex 02. Example of ICA NVIS configuration appendix

Annex 03. Example of NVIS RFM appendix