25 Nov 2010

European Aviation Safety Agency

COMMENT RESPONSE DOCUMENT (CRD) TO NOTICE OF PROPOSED AMENDMENT (NPA) 2009-02B

for an Agency Opinion on a Commission Regulation establishing the Implementing Rules for air operations of Community operators

and

draft Decision of the Executive Director of the European Aviation Safety Agency on Acceptable Means of Compliance and Guidance Material related to the Implementing Rules for air operations of Community operators

"Part-OPS"

CRD c.8 – Comment Response Summary Table (CRST) Part-SPA

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Subpart A - ~~D – Section I –~~ General r~~R~~equirements		
SPA.GEN.100~~OPS.SPA.001.GEN~~ Competent authority	1/ wording of the title is not accepted.	1/ Rule title kept but because the rule content now better reflects the rule title.
(a) The authority issuing a specific approval shall be: **(1) for commercial operators the competent authority issuing the air operator certificate (AOC); and** **(2) for non-commercial operators the competent authority of the State in which the operators are established or residing.** **(b) Notwithstanding (a)(2) above, for non-commercial operators using aircraft registered in a third country, the requirements for the approval for operations in performance based navigation(PBN), minimum operational performance specifications (MNPS) and reduced vertical separation minima(RVSM) airspace shall not apply if these approvals are issued by a third country State of Registry.** ~~Notwithstanding OPS.GEN.005, for the purpose of this Subpart, the~~	1/ by referring only to the State of Registry there can be no Member State competent authority for cases of the operation of aircraft covered by Article 4(1)(c) of Regulation 216/2008.	1/ Changes proposed to clarify that for non-commercial operators those approvals mentioned in ICAO Annex 6 Part II are issued by the State of Registry. For a 4(1)(c) operator, this would be the non-European Sate of Registry.

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~~competent authority for non-commercial operators conducting operations in PBN/MNPS and RVSM airspace shall be the State of registry.~~		
~~**OPS.SPA.005.GEN Scope**~~	1/ The reference to OPS.GEN.005 is not understood. It may be that OPS.GEN.001 is meant but, if so, there is no distinction between non-commercial operators of complex and those of non-complex aircraft as in that requirement.	1/ Deleted, because the scope and applicability is addressed in the Cover Regulation for Air Operations.
~~This part establishes the requirements to be met by an operator to qualify for the issue or continuation of specific operational approvals.~~		
SPA.GEN.105~~OPS.SPA.020.GEN~~ Application for a specific approval		
(a) Applicants for the initial issue of a specific approval shall provide the competent authority with the documentation required ~~by~~ **in** the applicable ~~subpart~~ **Subpart, together with** ~~and~~ the following information:		
(1) ~~T~~**t**he official name and**/or** business name, address and mailing address of the applicant; and	1/ It has to be open for a private pilot/owner to apply too.	1/ Text amended accordingly.

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(2) ~~A~~**a** description of the intended operation.		
(b) ~~Without prejudice to OR.GEN.015, a~~**A**pplicants for a specific approval shall **provide the following evidence** ~~demonstrate~~ to the competent authority ~~that~~:		
(1) ~~they comply~~ **compliance** with the requirements of the applicable ~~section~~**Subpart**;		
(2) **that** the aircraft and required equipment ~~comply with~~ **fulfil** the applicable airworthiness requirements **in accordance with Regulation (EC) No 1702/2003 and are approved when required by the relevant Subpart**~~/approvals~~;	1/ Text proposal: "comply with the applicable airworthiness requirements and are approved when required by the relevant section /approvals"	1/ Text revised accordingly.
(3) **that** a training programme has been established for flight crew and, as applicable, **other** personnel involved in these operations; ~~and~~	1/ Due to the type of operations of our company (test and ferry flights) and taking into consideration the wide variety of aircraft operated by our company, the different equipment fits for each of those aircraft, the extreme short period of time those aircraft are operated, and the fact that the majority of our crews are employed on a contract per flight basis, requiring an operator training	1/ This is not a question of practicable or not but a safety requirement. As such it is also applicable to operators specialised in ferry flights.

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	programme is not practicable.	
(4) **that** operating procedures in accordance with the applicable ~~subpart~~**Subpart** have been **documented; and**~~specified in the operations manual.~~ **(5) that the relevant elements defined in the operational suitability data (OSD) established in accordance with Part-21 are taken into account.**	1/ The content of AMC OPS.SPA.020.GEN (b)(4) should be transferred to this paragraph.	1/ AMC1-SPA.GEN.105(b)(4) should be kept. (5) has been included to provide a link with the OSD.
(c) **Operators shall retain r**~~R~~ecords relating to the requirements of (a) and (b) above ~~shall be retained by the operator~~ **at least for the duration of the operation requiring a specific approval, or, if applicable,** in accordance with OR.OPS.**MLR.**220.~~MLR.~~	1/ OR OPS is not applicable to NCO. It is preferable to write directly the requirement: "(c) Records relating to the requirements of (a) and (b) above shall be retained by the operator in accordance with OR.OPS.220.MLR at least for the duration of the SPA operation. 2/ Why is this 5 years. - Why not 3 - or for the duration of the approval?	1/ Text revised accordingly. 2/ It is the intention to use OR.OPS.MLR for all records. For NCO, OR.OPS does not apply, therefore the amended text.
SPA.GEN.110~~OPS.SPA.025.GEN~~ Privileges of an operator holding a specific approval		

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The scope of the activity that the operator is approved to conduct shall be ~~specified in the operations manual~~**documented** and **specified:** **(a) for non-commercial operators in** ~~approval certificate~~ **the list of specific approvals;** ~~or~~**and**~~,~~ **(b)** for commercial operators~~,~~ in the operations specifications to the ~~air operator certificate~~**AOC**.	1/ Add after "operations manual": "when required by Annex IV to Regulation (EC) No 216/2008 (Essential requirements for air operations), or in a procedures manual".	1/ Already addressed in AMC1-SPA.GEN.105(b)(4). The addition of "List of specific approvals" aligns with AR.OPS.
SPA.GEN.115~~OPS.SPA.030.GEN~~ Changes to operations subject to a specific approval		
~~(a)~~ **When the conditions of a specific approval are affected by changes,** ~~The~~ operator**s** shall **provide the relevant documentation to the competent authority and obtain prior approval for the operation.**~~notify the competent authority of any change on the items listed in OPS.SPA.020.GEN (a) and (b) and any of the requirements in the applicable section before such change takes place.~~	1/ Text proposal: The operator shall notify the competent authority of any change on the items listed in OPS.SPA.020.GEN (a) and (b) and any other change affecting of the requirements in the applicable section of this Subpart, before such changes takes place. 2/ Amend a) to read as 'The operator shall notify the competent Authority of any change that affects the conditions of the approval'	1-2/ Text revised as a~~n~~ prior approval item.

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~~(b) The competent authority may prescribe the conditions under which the organisation may operate during such changes, unless the competent authority determines that the specific approval shall be suspended or revoked.~~		Rule deleted because it is already addressed above.
~~(c) In the case of a change to a specific approval, operators shall provide the competent authority with the relevant parts of the operations manual and all other relevant documentation.~~		Rule deleted because it is already addressed above.
SPA.GEN.120~~OPS.SPA.035.GEN~~ Continued v~~V~~alidity of a specific approval	1/ Non-CAT operator specific approvals shall be renewed at least every 3 years by the competent authority. 2/ Proposed text: Recommend inclusion of the following text - A specific approval will be issued for a specified time frame to include a commencement and expiry date.	1-2/ The limited duration would not be needed in the proposed oversight mechanisms for non-commercial and commercial operators.
Specific approvals shall be issued for an unlimited duration ~~.~~ ~~They~~**and** shall remain valid subject to the operator remaining in compliance with **the requirements associated with the specific approval** ~~this subpart~~**and taking into account the relevant elements defined in the OSD established in accordance with Part-21.**~~, OR.GEN.030, OR.GEN.035 (a)(1),(b) and (c).~~		Text added to provide a link to the OSD.

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~~Section II – Operations in areas with specified navigation performance~~Subpart B – Performance-based navigation operations (PBN)	1/ Acronym "MNPS" should be introduced just after "minimum navigation performance specifications" in order to understand the use of this acronym further in the text. 2/ This mixes up two different types of airspace: that which comes under "Performance Based Navigation" (PBN) as defined in ICAO DOC 9613 and "Minimum Navigation Performance Specification Airspace" (MNPS), which is not PBN and applies just to the North Atlantic.	1-2/ PBN and MNPS have been split into two Subparts. The term SPN is not used anymore.
SPA.PBN.100 PBN operations~~OPS.SPA.001.SPN Operations in areas with specified performance based navigation (SPN)~~ ~~(a) An a~~ircraft shall only be operated in designated airspace, on routes or in accordance with procedures where **performance-based navigation (PBN)**~~navigation~~ specifications are established, if the operator has been **granted an approval** ~~approved~~ by the competent authority **to conduct such operations. No specific approval is required for operations in area navigation 5 (RNAV5 (basic navigation, B-RNAV)) designated airspace.**	1/ § (b): The sentence is not understandable: it seems that some words are missing when introducing the part "minimum navigation performance specifications are established". Moreover the acronym "MNPS" should be introduced just after "minimum navigation performance specifications" in order to understand the use of this acronym	1/ (b) is now contained in SPA.MNPS.100 2-3/ B-RNAV has been excluded from the approval. For the remaining PBN operations, a self-declaration is not intended. 4/ GM1-SPA.PBN.100 PBN provides further information.

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GM1-SPA.PBN.100 PBN operations ~~(b) An aircraft shall only be operated in designated airspace, based on ICAO Regional Air Navigation Agreement, minimum navigation performance specifications are established, if the operator has been approved by the competent authority~~	further in the text. 2/ This section does not permit self-declared compliance for private operations based on meeting installation, database, operational and pilot training criteria. We believe it should. This has been the case successfully for B-RNAV in Europe and RNP-1 in the USA. 3/ An RNAV (GPS) approach and en-route navigation with LNAV (BRNAV) is less complex/critical compared to flying a VOR/NDB approach and navigating along an airway established by VOR/NDB. It does not justify the additional administrative burden for a special approval 4/ define which navigation specifications and type of approaches are possible without any SPA.	
SPA.PBN.105 PBN operational approval ~~(c)~~ To obtain a~~n~~ PBN operational ~~such~~ approval ~~by~~ from the	1/ Delete the reference to 'experience requirements'. 2/ 3) (vi) specific regional	1/ Not accepted. Experience requirements are relevant. 2-3/ Text revised accordingly.

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competent authority, the operator shall provide evidence that: (~~1~~a) ~~demonstrate that~~ the relevant airworthiness approval of the RNAV system has been obtained~~navigation equipment meets the required performance in terms of navigation functionality, accuracy, integrity, availability and continuity~~; (~~2~~b) ~~establish and maintain~~ a training programme for the flight crew involved in these operations has been established; and (~~3~~c) ~~establish~~ operating procedures have been established specifying: (~~i~~1) the equipment to be carried, including its operating limitations and appropriate entries in the ~~M~~**m**inimum ~~E~~**e**quipment ~~L~~**l**ist (MEL); (~~ii~~2) flight crew composition and experience requirements; (~~iii~~3) normal procedures; (~~iv~~4) contingency procedures; (~~v~~5) **monitoring and** incident reporting;~~(vi) specific regional operating procedures, in case of MNPS;~~ and (~~vii~~6)electronic navigation data management~~navigation database integrity, in case of PBN~~.	operating procedures in case of MNPS Comment: The requirement does not only apply to MNPS. Proposal: Delete the reference to MNPS. 3/ Navigation Database Integrity is not a matter of operating procedures. 4/ The content of operating procedures should be defined in the corresponding AMC 20 material. Proposal: Define the content of the operating procedures in the AMC 20 material 5/ (c)(3): operating procedures should be as detailed as in OPS.SPA.001.RVSM (b)(2) 6/ Single private non-commercial aircraft-owner or a small aero-c1ub: these requirements are not feasible and impracticable to achieve. It has to be the pilot's responsibility to keep currency.	4/ The AMC 20 material should deal with those procedures common to all operators, and not attempt to cover all possible types of operation 5/ The IR slightly differ from the corresponding rule in Subpart SPA.RVSM due to the different AMC material attached to this IR. 6/ These rules apply to any operator planning to conduct PBN operations (except B-RNAV). However, the Authority is bound to apply a proportionate approach.

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Subpart C – Operations with specified minimum navigation performance (MNPS)		PBN and MNPS have been split into two Subparts.
SPA.MNPS.100 MNPS operations **Aircraft shall only be operated in designated minimum navigation performance specifications (MNPS) airspace in accordance with Regional Supplementary Procedures, where minimum navigation performance specifications are established, if the operator has been granted an approval by the competent authority to conduct such operations.**		
SPA.MNPS.105 MNPS operational approval~~**OPS.SPA.010.SPN Equipment requirements for operations in MNPS areas**~~ **To obtain an MNPS operational approval from the competent authority, the operator shall provide evidence that:** (a) ~~An aircraft conducting MNPS operations shall be equipped with navigation equipment that complies with the ICAO Regional Air Navigation Agreement.~~**the navigation equipment meets the required performance;** (b) ~~Navigation~~ **navigation** ~~equipment~~ **display, indicators and controls** ~~shall be~~ **are** visible and operable by either pilot seated at his/her duty station;~~.~~ **(c) a training programme for the flight crew involved in**	1/ Suggested new text:(b) Navigation display, indicators and flight crew controls shall be visible and operable by either flight crew member seated at his/her duty station. Comment/suggestion: Navigation equipment would indicate the whole equipment of which many parts are not visible to the flight crew.	1/ Text amended accordingly. Text aligned with the text for SPA.PBN.

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these operations has been established; and **(d) operating procedures have been established specifying:** **(1) the equipment to be carried, including its operating limitations and appropriate entries in the minimum equipment list (MEL);** **(2) flight crew composition and experience requirements;** **(3) normal procedures;** **(4) contingency procedures including those specified by the authority responsible for the airspace concerned; and** **(5) monitoring and incident reporting.**		
~~OPS.SPA.030.SPN Flight crew requirements for operations in PBN or MNPS areas~~ ~~For commercial air transport operations the minimum flight crew shall consist of at least two pilots.~~	1/ This way single pilot aircraft are excluded. This is not correct. 2/ RNAV (GNSS) approaches (also known as RNP(APCH) with PBN terminology) are authorised even with single pilot. 3/ What if a HEMS helicopter is certified for SP IFR? This rule would stop the introduction of IFR in HEMS operation.	1-3/ Text deleted because flight crew composition requirements are to be found in OR.OPS.FC.

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Subpart D - Operations in airspace with reduced vertical separation minima (RVSM)		
SPA.RVSM.100 RVSM operations~~OPS.SPA.001.RVSM Operations in airspace with reduced vertical separation minima (RVSM)~~		
~~(a) An a~~**A**ircraft shall only be operated in designated airspace where a reduced vertical separation minimum of 300 m (1 000 ft) applies ~~above~~ between flight level (FL) 290 and FL 410, inclusive, if ~~:~~ ~~(1) the aircraft has been issued with an RVSM airworthiness approval by the Agency in accordance with Part-21; and~~ ~~(2)~~ the operator has been granted an approval ~~approved~~ by the competent authority to conduct such operations.	1/ RVSM can be applied between FL290 and FL410 inclusive in accordance with ICAO.	1/ Text revised accordingly.
SPA.RVSM.105 RVSM operational approval		
~~(b)~~ To obtain ~~such~~ an RVSM operational approval ~~by~~ from the competent authority, the operator shall provide evidence that: (a) the RVSM airworthiness approval has been obtained; (b) procedures for monitoring and reporting height-keeping errors have been established; (~~1~~c) ~~establish and maintain~~ a training programme for the flight crew involved in these operations has been established; and	1/ Delete the reference to 'experience requirements'. 2/ The maintenance programme should be deleted from the list of the operating procedures items. 3/ Single private non-commercial aircraft-owner or a small aero-	1/ Not accepted. Experience requirements are relevant. 2/ Text revised accordingly. 3/ These rules apply to any operator planning to flight in RVSM airspace. However, the Authority is bound to apply a

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(d~~2~~) ~~establish~~ operating procedures have been established specifying: (1~~i~~) the equipment to be carried, including its operating limitations and appropriate entries in the **m**inimum **e**quipment **l**ist (MEL); (~~ii~~2) flight crew composition and experience requirements; (~~iii~~3) flight planning; (~~iv~~4) pre-flight procedures; (~~v~~5) procedures prior to RVSM airspace entry; (~~vi~~6i)in-flight procedures; (~~vii~~7)post-flight procedures; ~~(viii) maintenance programme;~~ (~~ix~~8) incident reporting; and (9~~x~~) specific regional operating procedures. ***AMC1-SPA.RVSM.105 RVSM operational approval*** ***AMC2-SPA.RVSM.105 RVSM operational approval*** ***GM1-SPA.RVSM.105 RVSM operational approval***	c1ub: these requirements are not feasible and impracticable to achieve. It has to be the pilot's responsibility to keep currency. 4/ Our operations may involve flights that remain outside EU airspace, and are with aircraft registered in non-EASA Member States. To obtain RVSM airworthiness approvals in accordance with Part-21 for each of those individual aircraft is not practicable.	proportionate approach. 4/ Part-21 has been deleted. Regulation 1702/2003 already contains all relevant requirements. "viii maintenance programme" deleted, because it needs to be addressed by airworthiness requirements.
SPA.RVSM.110~~OPS.SPA.010.RVSM~~ RVSM e~~E~~quipment requirements ~~for operations in RVSM airspace~~		

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~~(a)~~ In addition to the equipment required by ~~OPS.GEN~~**other Parts**, aircraft used for operations in RVSM airspace shall be equipped with: (**a**~~1~~) two independent altitude measurement systems; (**b**~~2~~) an altitude alerting system; (**c**~~3~~) an automatic altitude control system; and (**d**~~4~~) a **s**econdary **s**urveillance **r**adar (SSR) transponder with altitude reporting system that can be connected to the altitude measurement system in use for altitude control. ***AMC1-SPA.RVSM.110 RVSM equipment requirements***		
SPA.RVSM.115 RVSM height-keeping errors		Text moved from AMC to IR.
(a) Operators shall report recorded **or** communicated occurrences of ~~height keeping~~ **height-keeping** errors caused by malfunction of aircraft equipment or of operational nature, equal to or greater than: (1) a total vertical error (TVE) of ±90 m (±300 ft)**;**~~,~~ (2) an altimetry system error (ASE) of ±75 m (±245 ft)**;**~~,~~ and (3) an assigned altitude deviation (AAD) of ±90 m (±300 ft). **(b)** Reports of such occurrences shall be sent to the competent authority within 72 hours. Reports shall include an initial analysis of causal factors and measures taken to prevent repeat		

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occurrences. (~~b~~**c**) When height-keeping errors are recorded or received, the operator shall take immediate action to rectify the conditions that caused the errors and provide follow-up reports, if requested by the competent authority.		
~~**OPS.SPA.030.RVSM Flight crew requirements for operations in RVSM airspace**~~ ~~For commercial air transport operations the minimum flight crew shall consist of at least two pilots.~~		Text deleted because flight crew composition requirements are to be found in OR.OPS.FC.
Subpart E – Low visibility operations (LVO)		The revised text is displayed in Subpart E – revised rule text.
~~**Section IV – Low visibility operations**~~	1/ It is suggested that the IRs in Subpart SPA.LVO are revisited to decide whether the functional grouping of the rules is as logical as it was in the original text, EU-OPS and JAR-OPS 3. 2/ For a single private non-commercial aircraft-owner or a small air-club these requirements are unfeasible and impracticable to achieve.	1/ Taking into account the comments received on the IR and AMC/GM the whole Section has been replaced by a new Subpart better aligned with EU-OPS and JAR-OPS 3. 2/ Noted. However, there is no safety justification to exempt NCO operations from SPA.LVO.

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OPS.SPA.001.LVO Low visibility operations (LVO)		
(a) An aircraft shall only be operated in conditions lower than standard Category I, take-off in less than 400 m Runway Visual Range (RVR) or with the aid of Enhanced Vision Systems (EVS), if the operator has been approved by the competent authority.	1/ A stakeholder comes to the conclusion that an EFVS approach is classified as a CAT I approach, which does not require a radio-altimeter to determine the DH, nor to determine the 100 feet EVS. We therefore propose not to classify EVS operations as LVO. 2/ many stakeholders recommend realigning with EU-OPS in particular for LVTO.	1/ EU-OPS unambiguously classifies EVS operations as a LVO, e.g. refer to the text in Appendix 1 to OPS 1.450 and Appendix 1 to OPS 1.455. Furthermore, EU-OPS allows EVS operations below CAT I. In line with the NPA, EU-OPS and the position taken in the RG01 and RG03, EVS operations require an operational approval. 2/ Text is aligned with EU-OPS; for safety considerations, an approval for LVTO is required for take-offs with a RVR below 400m.
(b) To obtain such approval by the competent authority, the operator shall: (1) establish and maintain a training programme for the flight crew involved in these operations; (2) establish operating procedures specifying: (i) the equipment to be carried, including its operating	1/ Many stakeholders recommended deleting the reference to 'experience requirements". 2/ operating procedures should be detailed as in the section for RVSM.	1/ The revised text uses this reference in connection with establishing the aerodrome operating minima to comply with OPS 1/3.430. 2/ The revised rule text aligns with the content of EU-OPS and

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limitations and appropriate entries in the Minimum Equipment List (MEL); (ii) flight crew composition and experience requirements; (iii) normal procedures; (iv) contingency procedures; and (3) establish a system for recording approach and/or automatic landing success and failure to monitor the overall safety of the operation.	3/ Delete (3) since this is a new requirement and totally impractical for a day to day operation.	specifies in more detail operating procedure requirements. 3/ The content of (3) is kept for CAT II and CAT III operations in line with OPS 1.440.
OPS.SPA.010.LVO Aircraft requirements for LVO		
(a) In addition to the equipment required by OPS.GEN, aircraft involved in LVO shall be equipped with a radio altimeter. (b) Aircraft shall be certificated for operations with decision heights below 200 ft or no decision height.	1/ Several commentators pointed out that there is no need to have a radio altimeter for LVTO. 2/ Several commentators pointed out that the certification for DH 200 ft or below would unnecessarily restrict LVTO.	1-2/ Accepted, the revised text takes this into account.
OPS.SPA.020.LVO LVO operating minima		
(a) The radio altimeter shall be used to determine the decision height.	1/ Many stakeholders requested that this rule should not apply to the determination of minima which	1-2/ The new SPA.LVO.110 transposes Appendix 1 to OS 1.455 (b)(2)(ix) and is aligned

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	is subject to a calculation method. Proposal: Amend to read as 'The radio altimeter shall be used during low visibility operations'. 2/ Proposed text revision: "The radio altimeter shall be used to determine the decision height for operations other than Lower than standard Cat I operations or Approaches utilising EVS". 3/ Depending on the underlying terrain, the radio altimeter may not represent the correct operational decision height. Radio altimeters are typically not used for decision heights of 200 ft or higher. "The radio altimeter should only be used for identifying the DH if the underlying terrain has been evaluated and a radio altimeter height adjusted for terrain irregularities is made available to the operator. A barometric altimeter can be used at 200 ft or higher.	with EU-OPS 1.440. The revised text requires a radio altimeter for call outs below 200ft. 3/ The amended GM1-SPA.LVO.110 clarifies that for operations were call-outs below 200ft above the threshold are necessary, the operator has to ensure that the terrain ahead of the runway threshold has been surveyed and that the use of a radio altimeter would not endanger the safety of operation.

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(b) An operator shall not use an aerodrome for operations in accordance with this section, unless: (1) the aerodrome has been approved for such operations by the State in which it is located; (2) low visibility procedures (LVP) have been established at that aerodrome where LVO are to be conducted.	1/ Add (3) the operator has been authorised by the State where the aerodrome is located. 2/ Does this apply to EVS as well? 3/ Does this apply to LVTO?	1/ The possible authorisation of a State of the aerodrome is not subject of this rules nor is it required in current OPS regulations. 2-3/ Yes. The new rule transposes the content of EU-OPS/JAR-OPS3.
(c) The pilot-in-command shall ensure that: (1) appropriate LVPs are in force according to information received from Air Traffic Services, before commencing a Low Visibility Take-off, a Lower than Standard Category I, an Other than Standard Category II, or a Category II or III approach, and (2) the status of the visual and non-visual facilities are sufficient prior to commencing a Low Visibility Take-Off, an Approach utilising EVS, a Lower than Standard Category I, an Other than Standard Category II, or a Category II or III approach.	1/ It is the responsibility of the aerodrome operator to ensure that LVPs are in force. 2/ Many airports outside the European region do not (yet) use the terminology of LVP or LVO but do have procedures and equipment in place that adhere to the requirements of LVP. Operators should be allowed to ascertain that these procedures and equipment adhere to the LVP requirements and after properly documenting this, use LVO/LVTO at that particular aerodrome.	1/ Accepted, revised text is aligned with OPS 1.445. 2/ Accepted, an additional clarification is added to the rule text in SPA.LVO.115

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OPS.SPA.030.LVO Flight crew requirements for LVO		
(a) The minimum flight crew for operations in meteorological conditions lower than standard Category I or with the aid of enhanced vision systems (EVS) shall consist of at least two pilots. (b) Flight crew members shall be properly qualified prior to commencing LVO operations.	1/ LVTO (low visibility take-offs) with helicopters may be conducted in single pilot operation if the pilot is qualified to do so. 2/ some stakeholders do not see a need for two pilots using an EVS system in non-commercial operations. 3/ paragraph 4 of GM OPS.SPA.001.LVO(b)(2) requires two pilots in EVS operations only for RVR below 550m 4/ It is suggested that for single pilot HEMS IFR operations, when the Aircraft is certificated for Single Pilot IFR, the technical crew member shall be qualified to perform the duties requiring two pilots.	1/ The revised text does not require 2 pilots for LVTO. 2-3/ The revised rule text requires 2 pilots for operations with a RVR below 550m. 4/ There is no exemption for HEMS operations provided.
Subpart F - Extended range operations with two-engined aeroplanes (ETOPS)		

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SPA.ETOPS.100 ETOPS **In commercial air transport operations, two-engined aeroplanes shall only be operated over routes that contain a position further from an adequate aerodrome that is greater than the threshold distance determined in accordance with CAT.OP.AH.140, if the operator has been granted an ETOPS approval by the competent authority.**		Changes made to align text with SPA requirements.
SPA.ETOPS.105 ETOPS operational approval aerodrome **To obtain an ETOPS operational approval from the competent authority, the operator shall provide evidence that:** **(a) the aeroplane / engine combination holds an ETOPS type design and reliability approval for the intended operation;** **(b) a training programme for the flight crew and all other operations personnel involved in these operations has been established and the flight crew and all other operations personnel involved are suitably qualified to conduct the intended operation;** **(c) the operator's organisation and experience are appropriate to support the intended operation; and** **(d) operating procedures have been established.**		Changes made to align text with SPA requirements.

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SPA.ETOPS.110 ETOPS en-route alternate aerodrome **(a) An ETOPS en-route alternate aerodrome shall be considered adequate, if, at the expected time of use, the aerodrome is available and equipped with necessary ancillary services such as air traffic services (ATS), sufficient lighting, communications, weather reporting, navigation aids and emergency services and has at least one instrument approach procedure available.** **(b) Prior to conducting an ETOPS flight, the operator shall ensure that an ETOPS en-route alternate aerodrome is available, within either the operator's approved diversion time, or a diversion time based on the minimum equipment list (MEL)generated serviceability status of the aeroplane, whichever is shorter.**		
SPA.ETOPS.115 ETOPS en-route alternate aerodrome planning minima		Moved from OPS 1.297 as agreed in RG01/4.
(a) The operator shall only select an aerodrome as an ETOPS en-route alternate aerodrome when the appropriate weather reports or forecasts, or any combination thereof, indicate that, between the anticipated time of landing until one hour after the latest possible time of landing, conditions will exist at or above the planning minima calculated by adding the additional limits of		

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Table 1. **(b) The operator shall include in the operations manual the method for determining the operating minima at the planned ETOPS en-route alternate aerodrome.**		
Table 1: Planning minima for the ETOPS en-route alternate aerodrome		
Subpart G ~~Section V~~ - Transport of dangerous goods		
~~OPS.~~SPA.~~001.~~DG.100 Approval to transport dangerous goods		
(a) Except as provided for in **Part-NCO, Part-**~~OPS.~~**NCC, Part-CAT and Part-SPO**~~.GEN.(b)~~, **the**~~an~~ operator shall only transport dangerous goods by air~~,~~ if ~~the operator~~**it** has been approved by the competent authority.		Reference updated Editorial change
(b) To obtain such approval ~~by the competent authority~~, the operator shall in accordance with the Technical Instructions:		Editorial change
(1) establish and maintain a training programme for all personnel involved and demonstrate to the competent authority that adequate training has been given to all personnel;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(2) establish operating procedures to ensure the safe handling of dangerous goods at all stages of air transport containing information and instructions on:		
(i) the operator's policy to transport dangerous goods;		
(ii) the requirements for acceptance, ~~packing, marking,~~ handling, loading, stowage and segregation of dangerous goods;	8 comments received (6 MS + 2 Associations): The shipper is responsible for the packing and marking of dangerous goods, not the operator.	Reference to packing and marking deleted since these are not the operator's responsibilities. Operators have no responsibility for that in the Technical Instructions, EU-OPS or JAR-OPS. However, operators are required to train their personnel in the applicable requirements.
(iii) ~~special notification requirements~~ **the information** in the event of an **aircraft** accident or ~~occurrence~~ **incident** when dangerous goods are being carried;	5 comments (MS) suggest adding a new paragraph to reflect the requirements of EU-OPS 1.1215(d).	Noted. The proposed addition is addressed by amendment of this paragraph.
(iv) the response to emergency situations involving dangerous goods;		
(v) the removal of any possible contamination;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(vi) the duties of all personnel involved, especially with relevance to ground handling and aircraft handling;		
(vii) inspection for damage, leakage or contamination; and		
(viii) **dangerous goods accident and** incident reporting.		Amended to align with EU-OPS 1.1225 and Part 7; 4.4 of the Technical Instructions.
~~**(c) An application for an approval to carry dangerous goods shall include information on the classes of dangerous goods intended to be carried.**~~	6 comments received (MSx3 and INDx3): Approvals are granted to an operator to transport dangerous goods in accordance with the Technical Instructions. There is no requirement within the Technical Instructions, EU-OPS or JAR-OPS for the operator to specify which dangerous goods will be carried. Therefore, this paragraph should be deleted.	Paragraph deleted as unnecessary and there being no current requirement for the information.
~~OPS.~~SPA.~~040~~DG.105 Dangerous goods information and documentation		
The operator shall, in accordance with the Technical Instructions:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~(a) provide personnel with the necessary information enabling them to carry out their responsibilities;~~		Text moved to the relevant GEN provision of the relevant technical Parts since it applies to all operators, not just those approved to carry dangerous goods.
~~(b) provide passengers with the necessary information on the transport of dangerous goods;~~		This requirement is moved to the relevant XXX.GEN provisions of the technical Parts since it applies to all operators, not just those approved to transport dangerous goods.
(~~c~~**a**) provide written information to the pilot-in-command**/commander**:		
(1) about dangerous goods to be carried on the aircraft;		
(2) for use in responding to in-flight emergencies;		
(~~d~~**b**) use an acceptance checklist;		
(~~e~~**c**) ensure that dangerous goods are accompanied by the required dangerous goods transport document(s)**, as completed by the person offering dangerous goods for air transport,**	The text needs to take account of electronic documentation	Text amended to take account of electronic information. The text takes into account that the

A: Rule	B: Summary of comments	C: Reasons for change, remarks
except when the information applicable to the dangerous goods is provided in electronic form;		operator needs to ensure that a person offering DG has completed the transport. This addition was part of the definition of "dangerous goods transport document" and is transferred into this provision to improve clarity.
(~~f~~**d**) ensure that **where a dangerous goods transport document is provided in written form,** a copy of the ~~information to the pilot-in-command and the dangerous goods transport~~ document is retained on the ground **where it will be possible to obtain access to it within a reasonable period**~~for the duration of the flight~~ **until the goods have reached their final destination**;	It was suggested that the text concerning the NOTOC be combined with OPS.SPA.040.DG(g).	Text combined with SPA.DG.105(g) and also amended to align with the requirements of the Technical Instructions
(~~g~~**e**) ensure that a copy of the information to the pilot-in-command**/commander is retained on the ground and that this copy, or the information contained in it,** is **readily accessible to the aerodromes of last departure and next scheduled arrival, until after the flight to which the information refers**~~available at the intended destination aerodrome~~;	The text needs to provide for the information to be available, not necessarily the document itself, to allow for the ability for the information to be held electronically.	Text amended to provide for a copy of the document to be held on the ground. Text also amended to align with the requirements of the Technical Instructions to require the document or the information on it to be readily accessible at both the aerodromes of

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		departure and arrival.
(~~h~~**f**) retain the acceptance checklist, transport document and information to the ~~pilot in command~~**pilot-in-command/commander** for at least ~~3~~ **three** months after completion of the flight; and		
(~~i~~**g**) retain the training records of all personnel for at least ~~3~~ **three** years.		
~~**Subpart D – Section VI – Helicopter operations without an assured safe forced landing capability**~~		
	OPS SPA 001 SFL should be allowed only for operators holding a commercial certificate. Firstly because we do not require private pilot to ensure a safe forced landing when above a non-congested hostile environment. Moreover, it is based on specific procedures, specific training, on the analysis of usage monitoring system and enhanced	Accepted. The requirement for the safe-forced-landing provisions is derived from Annex 6 Part III, Section II and has no relevance to either AW or GA. The Performance Subparts of JAR-OPS 3 including the provision of JAR-OPS 3.517 and its associated Appendices and Guidance are placed in

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	maintenance. It would be nonsense to require it for private pilot and will make the whole system fails. We suggest transferring it into CAT. It has to be consistent with ETOPS.	CAT.POL.H and SPA.SFL was removed. No further comments with regard to SFL for AW have been entered in this text; SFL will now only be available to CAT as it is not required in AW or GA.
	The IND and MS comments and a large number of individuals (most of them duplicated many time over) were indicating the absence of reciprocals in SFL.	Noted. The issue is already included in the rulemaking inventory as a future rulemaking task.
	A number of comments were presented which requested an increase in numbers for old 3.005(e) Appendix to seven.	Noted. The target Appendix was provided after careful consideration of the risks involved; the number has not changed from the original in JARs and has been extant for almost a decade without comment. Any increase in the numbers should only result from a proposal to EASA and, if deemed

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		worthy, followed by an NPA.
• ~~**OPS.SPA.001.SFL Operations without an assured safe forced landing capability**~~		
~~(a) A helicopter shall only be operated without an assured safe forced landing capability if the operator has been approved by the competent authority, specifying the type of helicopter and operation.~~	1 manufacturer suggests a wording change: Wording modification proposal: (a) For operations in accordance with OPS.CAT.355.H, a helicopter shall only be operated without an assured safe forced landing capability if the operator has been approved by the competent authority, specifying the type of helicopter and operation. Reason: consistency with OPS.CAT.355.H (e) and new proposed (f) where it is mentioned that operations without an assured SFL capability have to be conducted under the conditions contained in Subpart D Section VI.	Noted. The exposure concept is reinstated only in CAT as provided in JAR-OPS 3.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~(b) To obtain such approval the operator shall:~~		
~~(1) provide appropriate power unit reliability statistics for the helicopter type and engine type;~~	Modify text: (b)(1): the manufacturer provides [...].	Noted. Operational requirements are aimed at operators and not manufacturers; the application for use of exposure can only come from the operator; the manufacturers have been prepared to supply documentation to the operator so that it can be included in a package from the applicant. A more formal system of reliability assessment may be required.
	Neither JAR-OPS 3.005(i) [operations to a Public Interest Site] nor JAR-OPS 3.005(e) [operations over hostile terrain] require operators to comply with the full requirements of Appendix 1 to 3.517(a): JAR-OPS 3 required compliance with only sub para (a)(2)(i) & (ii).	Accepted. The text of Appendices 3.005(e) and 3.005(i) have been transposed to CAT.POL.H.225 and CAT.POL.H.420 respectively.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	The EASA rule requires full compliance with OPS.SPA.001.SFL See para (b)(1). Justification: This rule impacts disproportionately on smaller operators. Proposed Text (if applicable): OPS.SPA.001.SFL(b)(1) "except for operations to a public interest site or operations in Performance Class 3 when operating outside congested hostile environment, provide appropriate power unit.... OPS.SPA.001.SFL(b)(2) ") "except for operations for a HEMS operating site, a public interest site or operations in Performance Class 3 when operating outside a congested hostile environment, assess the risk involved for."	
~~(2) except for a HEMS operating site, assess the risk involved for:~~		
~~(i) the type of helicopter to be used; and~~	To obtain such an approval the operator shall:	Accepted. The text of JAR-OPS 3 has been

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	(b) provide appropriate power unit reliability statistics for the helicopter type and engine type. This should be for the combination of helicopter and engine installed. Due to commercial sensitivity, manufacturers are not prepared to issue primary reliability data to operators. It is proposed that the procedure used for JAR-OPS 3.517(a) compliance is adopted. NPA OPS 38 to JAR-OPS 3 states that the manufacturer must provide the State of Design, or State of First Certification in the case on non EU manufacturers, with the engine reliability data. When this data is verified by the competent authority, the manufacturer issues a Service Letter to all operators stating that the helicopter meets the reliability requirements. The operators then utilise this letter when seeking this approval.	reinstated.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~(ii) the type of operations conducted.~~		
~~(3) establish operating procedures specifying:~~		
~~(i) the take-off and landing techniques to be applied at the aerodrome/operating site; and~~	The commentator states that there is a problem with the application of PIS in Germany. This problem is political and not one that has been introduced by the regulation. Once the State accepts the applicability of PISs, the problem will have been resolved.	Noted. This requirement was already contained in Appendix 1 to JAR-OPS 3.005(i) sub-paragraph (e). The intent was to treat the PIS as any other surveyed site, the only exception being that the PIS does not meet the dimension or the obstacle environment to allow for CAT A procedures, hence the requirement to establish which causes the non-compliance (obstacles or dimension) and address that appropriately in the Part C and by applying the site specific procedure, either to mitigate the risk due to the site dimension not meeting CAT A requirements or the obstacle accountability.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~(ii) site specific procedures in the case of public interest sites.~~		
~~(4) implement a Usage Monitoring System; and~~	A UMS only makes sense if the helicopter is "on condition" maintenance. As long there are "hard times" as TBO it makes no sense. OEM´s also do not issue any limits for CS-27 helicopters.	Not accepted. The requirement for UMS is provided to ensure that the engines are used only in accordance with the limits provided by the manufacturer.
~~(5) implement a set of conditions to obtain and maintain the approval for a particular helicopter type; and~~		
~~(6) establish and maintain a training programme for the crew involved in these operations.~~		
• ~~**OPS.SPA.005.SFL Applicability**~~		
~~Operations without an assured safe forced landing capability shall only be conducted in the following situations:~~		
~~(a) at a HEMS operating site, when operating under an approval in accordance with OPS.SPA.001.HEMS;~~		
~~(b) operations to/from helidecks with helicopters which have a maximum passenger seating configuration (MPSC) of more~~	Wording implies that this alleviation is only open to helicopters with an MPSC of more	Accepted The restoration of the original

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~than 19;~~	than 19.	rules of JAR-OPS 3 will resolve the issue.
~~(c) for Performance Class 2 take-off or landing outside a congested hostile environment:~~		
~~(1) during the take-off phase, before reaching 200 ft above the take-off surface; and~~	1 MS comments that subparagraph (d)(1) requires amending as detailed below. Justification: JAR-OPS 3.540 b) 1 includes the additional proviso "before reaching Vy". Proposed text: (d) for Performance Class 3 operations, when operating outside a congested hostile environment: (1) during the take-off phase, before reaching Vy or 200 ft above the take-off surface.	Accepted. This will rectify itself when the text of JARs in reinstated.
~~(2) during the landing phase, below 200 ft above the landing surface.~~		
~~(d) for Performance Class 3 operations, when operating outside a congested hostile environment:~~	This alleviation has been incorporated into Part OPS.SPA. Most of the clauses have been bound up into the requirement but	Accepted. The original Appendix has been included in CAT.POL.H.420.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	the original guidance on when_it might be applicable is missing. It might be clearer if there was guidance attached to OPS.SPA.005.SFL paragraph (d)(3). The JAR guidance was as follows:	
	"IEM to Appendix 1 to JAR-OPS 3.005(e) Helicopter operations over a hostile environment located outside a congested area See Appendix 1 to JAR-OPS 3.005(e) 1 The subject Appendix has been produced to allow a number of existing operations to continue. It is expected that the alleviation will be used only in the following circumstances: 1.1 Mountain Operations; where present generation multi-engined aircraft cannot meet the requirement of Performance Class	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	1 or 2 at altitude. 1.2 Operations in Remote Areas; where existing operations are being conducted safely; and where alternative surface transportation will not provide the same level of safety as single-engined helicopters; 2 The State issuing the AOC and the State in which operations will be conducted should give prior approval. 3 If both approvals have been given by a single State, it should not withhold, without justification, approval for aircraft of another State. 4 Such approvals should only be given after both States have considered the technical and economic justification for the operation."	
~~(1) during the take-off phase, before reaching 200 ft above the take-off surface;~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~(2) during the landing phase, below 200 ft above the landing surface; and~~		
~~(3) en-route in a specified, remote or mountain, area with turbine powered helicopters with a MPSC of 6 or less.~~	Many comments proposed that the limit be raised from six to seven.	Noted. This goes beyond the requirements of JAR-OPS 3.005(e); this should be the subject of a proposal for NPA so that it can be exposed to the population of interested parties.
	Proposal to introduce the new (d)(4) condition: (d)(4) en-route in a specified, other than remote or mountain, area with helicopters other than complex motor-powered, provided the flight time over hostile areas does not exceed 5 –minute~~s~~ periods and 50 % of the overall flight time. Rationale: - Reason for this proposal is that the current JAR-OPS 3 alleviation, which is only valid for remote or mountains areas, is too restrictive for single-engine helicopters, and	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	would result, if maintained, in excluding single-engine helicopters from a lot of CAT operations in non-mountain areas, as soon as there is for example a small forest to cross. Maintaining unchanged the JAR-OPS 3 text would very likely condemn CAT with single-engine helicopters in countries filled with forests like Sweden or Finland. - The proposal consists in transferring in Part OPS the French '5 minutes-50 %' condition which has been part of the French CAT Operational Regulation 'OPS 3' since April 2004, and used up to now by operators without any safety problem. - It is also based on a Eurocopter analysis on the Ecureuil twin/single helicopters family which has shown that single-engine helicopters do not cause more accidents than twin-engine helicopters.	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~(e) at a public interest site, with multi-turbine powered helicopters with a MPSC of 6 or less:~~	Please remove "with multi-turbine helicopters"! Justification: There is no reason for such a restriction. Think of the catastrophic gear box failure of the recent brand new Bond Helicopters Super Puma, where the rotor separated. Leave the decision on the helicopter to be used to the operators.	Not Accepted The clause was only ever applicable to twins.
	Proposed modification: at a public interest site with multi-turbine powered helicopters with an MPSC of 6 or less other than 'complex motor-powered'. Consistency with the 'complex motor-powered helicopter' definition.	Not accepted. This addition would deny access to PIS for the BK117 and its derivatives and the AW139; there is no justification for this as they were part of the original scope of the rule. The problem with PISs is not the aircraft (they are capable of operating in PC1) but the site itself.
~~(1) located in a congested hostile environment;~~	Comment: OPS.SPA.005.SFL (e) The OPS.SPA.005.SFL, para (e) (see also the AMC OPS.SPA.005.SFL (e)), does not take into account the operations in	Noted. The reason for the change was the introduction of ground level exposure into JAR-OPS 3 at AL5.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	a "non congested hostile environment" at a public interest site, with multi-turbine powered helicopters with an MPSC of 6 or less. Justification: See Appendix 1 to JAR-OPS 3.005 (i). Helicopter operations at a public interest site, para (2) (i) for operations in a "non congested hostile environment" (omission).	When the text is restored, this clause will be left out of the rule because it has become redundant.
~~(2) established as public interest site before 1 July 2002; and~~	(2) established as public interest site before 1 July 2002 at the date of entry into force of this Regulation. <u>Reason</u>: limiting the benefit of operating without an SFL capability to public interest sites (hospitals, lighthouses) established as such before 1 July 2002 is too restrictive.	Not accepted This date was justified with the introduction of the provision for public interest sites which was introduced into JAR-OPS 3. The reasons for it are contained in the Guidance Material for PIS.
	The rule introduces a subtle change to the equivalent JAR-–OPS 3 code concerning Public Interest sites. At OPS.SPA.005.SFL para (e)(2) the	Accepted. JAR-OPS 3.005(i) has now been reintroduced into

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	text uses the term ""Public Interest Site", which changes the intent of the JAR that, for the same purpose, used the term "Heliport". A hospital landing site may have been established for many years as a heliport, but may not necessarily have been established as a Public Interest site. Such a heliport might need to become a Public Interest site with the introduction of new aircraft with a helipad profile that can no longer achieve a Class 1 profile, for example. The rule now prevents categorisation of existing Heliports as Public Interest sites. Justification: Overly-restrictive rule. Proposed Text (if applicable): OPS.SPA.005.SFL(2) "Established as ~~public interest site~~ *a heliport* before 1 July 2002"	CAT.POL.H.225.
~~(3) where the dimensions or obstacle environment do not permit Performance Class 1 operations.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
• ~~OPS.SPA.035.SFL Helicopter Flight Manual Limitations~~		
~~For helicopters certificated in Category A, a momentary flight through the height velocity (HV) diagram is allowed during the take-off and landing phases, when the helicopter is operated under the approval in accordance with this section.~~	Whilst this derogation is welcome, it only applies to those operators who have applied for a received an approval under Section VI of Subpart D of Part OPS. Unless this derogation is applicable to all operations, all Part 29 helicopters (the position is unclear for those helicopters which have been approved under Appendix C to Part 27) will have to apply the limitation of the HV diagram. This will restrict the operations of complex helicopters to fly for Aerial Work.	Accepted. It is also noted from comments that the HV diagram is also mandated for Part 29 helicopters certificated in CAT B. This alleviation was originally required for twins only as part of JAR-OPS 3; it is clear that the scope of EASA now requires that this alleviation be applied for all helicopters. There is a need to reinstate Appendix 1 to JAR-OPS 3.005(c). In addition, a similar derogation is required for GA and AW. Alternatively, the HV diagram can be taken out of the limitations section of Part 29 helicopters.
	The derogation to allow helicopters certificated in Category A to	Accepted

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	conduct momentary flight through the height velocity (HV) curve is welcomed, and the explanation for this at NPA 2009-2A page 42 is noted. However as it stands, it only applies to those operators who have applied for and received an approval under applicability of OPS.SPA.005.SFL. This derogation derives from the requirement in Appendix 1 to JAR-OPS 3.005(c). The intention to initiate a rulemaking task on CS-29 is also noted but this will not assist current operations beyond OPS.SPA.001.SFL such as many commercial (aerial work) activities. It is not clear how other operations under commercial (aerial work), requiring similar clearance, will be able to do so in the future. Unless this derogation is made applicable to all operations, all Part 29 helicopters (the position is unclear for those helicopters which have been approved under Appendix C to Part 27) will have to	Further explanation.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	apply the limitation of the HV diagram in accordance with Annex IV 4.a of the Basic Regulation. This will severely restrict the operations of complex helicopters flying for commercial (aerial work).	
Subpart ~~D~~ H ~~– Section VII~~ – Helicopter operations with night vision imaging systems		
~~OPS.~~SPA.NVIS.~~00~~100~~.NVIS~~ Night ~~V~~vision ~~I~~imaging ~~S~~system (NVIS) operations		
(a) ~~A h~~**H**elicopter**s** shall only be operated in night VFR operations with the aid of ~~night vision imaging systems (~~NVIS~~),~~ if the operator has been approved by the competent authority.	1. DGAC F asked if not possible have reduced minima for NVIS flight as similar to reduction in minima found in HEMS. 2. LBA asked why the NPA is considering only helicopters and not all aircraft as JAA TGL 34 reports	1. This was rejected since NVIS was always considered as an aid to night VFR and not a means to increase operations due to reduction of minima. 2. The possibility to open up NVIS for all types of aircraft was discussed and was recommended in the subgroup aerial work of the working group OPS.001. Leaflet TGL 34 (JAA Administrative & Guidance Material), was developed for helicopter CAT use only and

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		therefore this OPS NVIS is limited to CAT operations only. The issue of a dedicated NVIS for other than CAT and other then helicopters should be subject to a future rulemaking task.
(b) To obtain such approval by the competent authority, the operator shall:		
(1) **operate in commercial air transport (CAT) and hold a CAT air operator certificate (AOC) in accordance with Part-OR**~~establish and maintain in addition to the requirements contained in Part OR.OPS a specific training and checking programme for the crew involved in these operations~~; ~~and~~		
(2) **demonstrate to the competent authority:**~~establish operating procedures specifying:~~		
(i) compliance with the applicable requirements contained in this Subpart**;**~~,~~ **and**~~(i) the equipment to be carried, including its operating limitations and appropriate entries in the MEL;~~		Covered by SPA.NVIS.140.
(ii) **the successful integration of all elements of the NVIS.**~~(ii) crew composition and experience~~		Covered by SPA.NVIS.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~requirements;~~		
~~(iii) procedures for crew members wearing night vision goggles;~~		Covered by SPA.NVIS.140.
~~(iv) procedures for the transition to and from an NVIS flight;~~		Covered by SPA.NVIS.140.
~~(v) use of the radio altimeter on an NVIS flight;~~		Covered by SPA.NVIS.140.
~~(vi) in-flight procedures for assessing visibility to ensure that operations are not conducted below the minima for non assisted night VFR flight.~~		Covered by SPA.NVIS.140.
~~OPS.~~SPA.NVIS.~~010~~110~~.NVIS~~ Equipment requirements for NVIS operations		
~~In addition to the equipment required by OPS.GEN and OPS.CAT or OPS.COM, helicopter involved in NVIS operations shall be equipped with a radio altimeter and a low height warning system giving visual and audio warnings selectable by the pilot and discernable during NVIS operation.~~	1 IND proposed a change in wording: In addition to the equipment required by OPS.GEN and, when applicable, OPS.CAT or OPS.COM, …". This to avoid that equipment required by OPS CAT or OPS COM becomes mandatory as a basis for NVIS operations	The comment was valid, however it had been superseded by adopting the original text of JAR TGL 34. The tailoring of JAA TGL 34 to other then CAT (GEN and areal work) is recommended to be part of a new rulemaking task.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(a) Before conducting NVIS operations each helicopter and all associated NVIS equipment shall have been issued with the relevant airworthiness approval in accordance with Regulation (EC) No 1702/2003.		
		The Agency has on its inventory a task to evaluate all (additional) airworthiness requirements related to operations requiring a specific approval, and address them in a consistent manner. Therefore in future review as part of that task the text may be placed elsewhere. In the meantime the text is retained in Part-SPA, as otherwise it is feared that the requirement may not be transposed before the Implementing Rules enter into effect, and thus the requirement not being applied.
(b) *Radio altimeter*. The helicopter shall be equipped with a radio altimeter and a low height warning system giving visual and audio warnings selectable by the pilot and discernable during head-up NVIS operation.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(1) The radio altimeter shall: **(i) be of an analogue type display presentation that requires minimal interpretation for both an instantaneous impression of absolute height and rate of change of height;** **(ii) be positioned to be instantly visible and discernable from each cockpit crew;** **(iii) have an integral visual low height warning that operates at a height selectable by the pilot; and** **(iv) have an integral fail/no track indicator with repeater light to give unambiguous warning of radio altimeter fail or no track conditions.**		
(2) The visual warning system shall: **(i) provide clear visual warning at each cockpit crew station of height below the pilot-selectable warning height; and** **(ii) have an instrument panel coaming repeater light at each cockpit crew station to ensure adequate attention-getting-capability for head up operations.**		
(3) The audio warning system shall: **(i) be unambiguous and readily cancellable;** **(ii) not extinguish any visual low height warnings**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
when cancelled; and **(iii) operate at the same pilot selectable height as the visual warning.**		
(d) *Aircraft NVIS compatible lighting*. To mitigate the reduced peripheral vision cues and the need to enhance situational awareness, the following shall be provided: **(1) NVIS-compatible instrument panel flood-lighting, if installed, that can illuminate all essential flight instruments;** **(2) NVIS-compatible hand-held utility lights;** **(3) portable NVIS compatible flashlight; and** **(4) a means for removing or extinguishing internal NVIS non-compatible lights.**		
(e) *Additional NVIS equipment*. The following additional NVIS equipment shall be provided: **(1) a back-up or secondary power source for the night vision goggles (NVGs);** **(2) an NVIS adjustment kit or eye lane;** **(3) a helmet with the appropriate NVG attachment.**		
(f) All required NVGs on an NVIS flight shall be of the same type, generation and model.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(g) Continuing airworthiness **(1) Procedures for continuing airworthiness shall contain the information necessary for carrying out ongoing maintenance and inspections on NVIS equipment installed in the helicopter, and shall cover, as a minimum:** **(i) helicopter windscreens and transparencies;** **(ii) NVIS lighting;** **(iii) NVGs; and** **(iv) any additional equipment that supports NVIS operations.** **(2) Any subsequent modification or maintenance to the aircraft shall be in compliance with the NVIS airworthiness approval.**		
~~OPS.~~SPA.NVIS.1~~0~~20~~.NVIS~~ NVIS operating minima		
(a) Operations shall not be conducted below the **visual flight rules (**VFR**)** weather minima for the type of night operations being conducted.	1. proposed to add an "NVIS visual range" of 1 500 m as mandatory in addition to the night VFR minima 2. proposed to have a reduced minima for NVIS operations based on their experience of flying NVIS	1. The comment was not accepted. Even if a safe operation could be attained with a "NVIS visual range" of 1 500 m using NVIS, The operator should be able to continue the flight in accordance

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		with the applicable VFR minima in case anything goes wrong with the NVIS. 2. Comment not accepted. Alleviations regarding operation minima with NVIS are not acceptable. The minima given are absolute; the operator should define higher values for those pilots with lesser experience.
(b) The operator shall establish the minimum transition height from where a change to/from aided flight may be continued.		
~~OPS.~~SPA.NVIS.~~.0~~130~~.NVIS~~ Crew requirements for NVIS operations		
(a) *Selection*. The operator shall establish criteria for the selection of crew members for the NVIS task. **(b) *Experience*. The minimum experience for the commander shall not be less than 20 hours~~'~~ VFR at night as pilot-in-command/commander of a helicopter before**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
commencing training. **(c) *Operational training.* All pilots shall have completed the operational training in accordance with the NVIS procedures contained in the operations manual.** **(d) *Recency*. All pilots and NVIS technical crew members conducting NVIS operations shall have completed three NVIS flights in the last 90 days. Recency may be re-established on a training flight in the helicopter or an approved full flight simulator (FFS), which shall include the elements of (f)(1)(ii) below.**		
(e) *Crew composition*. The minimum crew shall **be the greater of that specified:** **(1) in the aircraft flight manual (AFM);** **(2) for the underlying activity; or** **(3) in the operational approval for the NVIS operations**~~consist of at least one pilot and one NVIS technical crew member~~.	Several comments proposed that for flights limiting usage of NVG only and between helicopters a single pilot operation could be granted. 1 MS asked to justify the reason of always having an NVIS technical crew member.	The comment was accepted in principle and now the new text states that the minimum crew is the greater of that specified in the certification requirements, particular kind of operation and specific operation manual. This is also similar to text in US NVIS CONOPS RTCA DO 268.
(f) Crew training and c~~C~~hecking **(1) Training and checking shall be conducted in accordance with a detailed syllabus approved by the competent authority and included in the operations**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
manual.		
(2) Crew members. **(i) Crew training programmes shall: improve knowledge of the NVIS working environment and equipment; improve crew co-ordination; and include measures to minimise the risks associated with entry into low visibility conditions and NVIS normal and emergency procedures.** **(ii) The measures referred to in (i) above, shall be assessed during:** **(A) night proficiency checks; and** **(B) line checks.**		
SPA.NVIS.140 Information and documentation		
The operator shall ensure that, as part of its risk analysis and management process, risks associated with the NVIS environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Subpart ~~D~~ I ~~– Section VIII~~ – Helicopter hoist operations	A number of comments were concerned with the examination of the engine reliability for singles – this was then related to SAR. These were not accepted for the following response:	The comment is unspecific but could be understood as a proposal to remove the performance requirements from HEMS all together, rather than maintaining the current alleviation from HHO at a HEMS operating site. SAR is still the responsibility of the national authority, however the Member States shall undertake to ensure that such services have due regard as far as practicable to the objectives of the Basic Regulation and its IRs.
~~OPS.~~SPA.HHO.~~00~~100.~~HHO~~ Helicopter hoist operations (HHO)	A number of comments were concerned with the absence of appropriate regulations for AW.	Noted. The subject of HEC needs to be considered as a separate activity. HHO was always considered as a CAT activity – hence the requirement for engine-failure accountability. HEC Class D only is addressed in this set of requirements and, in view of that, it is a CAT activity. HEC Classes A, B and C are addressed under Part-SPO by requiring the operator to

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		establish appropriate SOP. This Subpart could be extended in the future to also encompass HEC class A, B and C operations.
(a) ~~A h~~**H**elicopter**s** shall only be operated for the purpose of **commercial air transport** hoist operations~~,~~ if the operator has been approved by the competent authority.		
(b) To obtain such approval by the competent authority, the operator shall:		
(1) operate in commercial air transport (CAT) and hold a CAT air operator certificate (AOC) in accordance with Part-OR; and		
(**2**~~1~~) **demonstrate to the competent authority compliance**~~comply~~ with the ~~applicable~~ requirements contained in **this Subpart**~~OPS.GEN, OPS.CAT, OPS.COM andPart-OR, except for the variations contained in this Section~~**.**~~;~~		
~~(2) establish and maintain in addition to the requirements contained in Part-OR.OPS a specific training and checking programme for the crew involved in these operations; and~~		Covered by SPA.HHO.130
~~(3) establish operating procedures specifying:~~	There were several comments requesting the reintroduction of the	Partially accepted. The requirement for a

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	requirement for an OM Supplement. An authority commented that there was a lack of guidance on the provision of procedures.	supplement would not be an objective rule, as it would prevent an integrated operations manual. Text amended to be more objective. Moved to SPA.HHO.140. The provision of which should as minimum be addressed by procedures is now contained in SPA.HHO.140.
~~(i) performance criteria;~~	A number of comments were concerned with the applicability of engine-failure accountability. The comments were partially accepted with the following response:	Partially accepted. The fundamental requirement regarding a HHO is that the helicopter shall be capable of sustaining a critical engine failure without hazard to the suspended person/cargo, third parties or property. This requirement basically excludes CAT B helicopters in this type of operations. HHO does not rely upon the Performance Classes but is specifically addressed by this Appendix and as HEC Class D.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		However with reference to JAA TGL 43 it is proposed that, in particular specified cases for mountain rescue, alleviation should be considered in accordance with the recommendations in this TGL. As mountain rescue should be considered a similar service in the sense of Article 1 of the Basic Regulation, it therefore cannot be addressed by the Agency. However this does not prevent a Member State from using the material of TGL 43 in the application of the Basic Regulation. Covered by SPA.HHO.125.
~~(ii) if applicable, the conditions under which offshore HHO transfer may be conducted including the relevant limitations on vessel movement and wind speed;~~		Moved to SPA.HHO.140.
~~(iii) weather limitations for HHO;~~		Moved to SPA.HHO.140.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~(iv) criteria for determining the minimum size of the HHO site, appropriate to the task;~~	A comment made reference to the lack of guidance for the size of the HHO site. This was not accepted with the following response:	Not accepted. The rule itself does not specify any limitation neither regarding weather nor minimum size of the HHO site. However the operator is required to establish procedures specifying limiting weather factors and criteria for determining minimum size of the HHO site. Even a HEMS mission should be carried out in accordance with procedures laid down beforehand by the operator, which also concern weather and sites. Moved to SPA.HHO.140.
~~(v) crew composition and experience requirements; and~~		Covered by SPA.HHO.130.
~~(vi) the method by which crew members record hoist cycles.~~		Moved to SPA.HHO.140.
~~OPS.~~SPA.HHO.~~010~~110~~.HHO~~ Equipment requirements for HHO		
(a) The installation of all helicopter hoist equipment**,** including any radio equipment to comply with ~~OPS.~~SPA.**HHO.~~0~~1**15**,**~~.HHO~~ and	A comment asked that the instruction be more precise and	Noted. For HHO – i.e. HEC Class D – the personnel carrying

A: Rule	B: Summary of comments	C: Reasons for change, remarks
any subsequent modifications~~ and, where applicable, its operation~~ shall have an airworthiness approval appropriate to the intended function. Ancillary equipment ~~must~~ **shall** be designed and tested to the appropriate standard as required by the competent authority.	contested that only those parts down to the hook had to have approval.	device system (PCDS) is subject to airworthiness approval.
(b) Maintenance instructions for HHO equipment and systems shall be established by the operator~~,~~ in liaison with the manufacturer and included in the operator's helicopter maintenance programme as required **by Regulation (EC) No 2042/2003**~~in Part-M~~.	A comment made reference to the lack of cooperation from manufacturers with respect to this provision.	Not accepted. "The maintenance instructions for HHO equipment and systems shall be established by the operator, in liaison with the manufacturer." It is the responsibility of the operator to establish the instructions. However, even if the manufacturer has little or nothing to bring to the maintenance instructions a consultation with the manufacturer is reasonable.
~~OPS.~~SPA.HHO.~~0~~115.~~HHO~~ HHO communication		
Two-way radio communication shall be established with the organisation for which the HHO is being provided and, where possible, **a means of** communicati~~o~~n**g** with ground personnel **at the HHO operating site** ~~of that organisation~~ for:	A comment stated that the intent of this text was to require communication with ground personnel at the operating site (it is unclear whose organisation).	Accepted. The NPA text does not clearly enough specify that the "ground personnel" should be at the HHO site. Whether those "ground personnel" are engaged

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	Perhaps this should be stated in the requirement: "Two-way communication...with ground personnel at the HHO Site for:"	with the organisation for which the HHO is being provided or engaged with the operator is insignificant.
(a) day and night offshore operations; and		
(b) night onshore operations**, except for HHO at a helicopter emergency medical services (HEMS) operating site**.	A comment stated that for HHO at a HEMS operating site there would be no ground personnel and the text should reflect his.	Partially accepted. It is not justifiable that the requirement of a two-way communication might stop a HEMS mission at night. It is proposed to handle this as engine failure accountability in connection with HHO/HEMS. "Except for HEMS at the HEMS operating site...."
~~OPS.~~SPA.HHO.125~~.HHO~~ Performance requirements for HHO ~~operations~~		
Except for HHO ~~operations~~ at a HEMS ~~O~~**o**perating ~~S~~**s**ite, HHO ~~operations performed as Commercial Air Transport (CAT)~~ shall be capable of sustaining a critical ~~power unit~~**engine** failure with the remaining engine(s) at the appropriate power setting~~,~~ without hazard to the suspended person(s)/cargo, third parties, or property.	A comment pointed out that this requirement was not consistent with the text of the AMC.	The inconsistency has been removed by a clear reference that this Subpart only applies to CAT

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~OPS.~~SPA.HHO.~~030~~130~~.HHO~~ Crew requirements for HHO ~~operations~~		
(a) *Selection*. The operator shall establish criteria for the selection of flight crew members for the HHO task, taking previous experience into account. **(b) *Experience*. The minimum experience level for the commander conducting HHO flights shall not be less than:** **(1) Offshore:** **(i) 1 000 hours as pilot-in-command/commander of helicopters, or 1 000 hours as co-pilot in HHO of which 200 hours is as pilot-in-command under supervision; and** **(ii) 50 hoist cycles conducted offshore, of which 20 cycles shall be at night if night operations are being conducted, where hoist cycle means one down and up cycle of the hoist hook.**		
(2) Onshore: **(i) 500 hours as pilot-in-command/commander of helicopters, or 500 hours as co-pilot in HHO of which 100 hours is as pilot-in-command under supervision;**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(ii) 200 hours' operating experience in helicopters gained in an operational environment similar to the intended operation; and **(iii) 50 hoist cycles, of which 20 cycles shall be at night if night operations are being conducted.**		
(c) *Operational training and experience*. Successful completion of training in accordance with the HHO procedures contained in the operations manual and relevant experience in the role and environment under which HHO are conducted.		
(d) *Recency*. All pilots and HHO crew members conducting HHO shall have completed in the last 90 days: **(1) when operating by day: any combination of three day or night hoist cycles, each of which shall include a transition to and from the hover; and** **(2) when operating by night: three night hoist cycles, each of which shall include a transition to and from the hover.**		
(e) C*rew composition*. The minimum crew for day or night operations shall be as stated in the operations manual. The minimum crew will be dependent on the type of helicopter, the weather conditions, the type of task, and, in addition for offshore operations, the HHO site environment, the sea state and the movement of the		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
vessel. In no case shall the minimum crew be less than one pilot and one HHO crew member. ~~The minimum crew shall consist of at least one pilot and one HHO technical crew member.~~		
(f) Training and checking **(1) Training and checking shall be conducted in accordance with a detailed syllabus approved by the competent authority and included in the operations manual.** **(2) Crew members** **(i) Crew training programmes shall: improve knowledge of the HHO working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with HHO normal and emergency procedures and static discharge.** **(ii) The measures referred to in (i) above, shall be assessed during visual meteorological condietions (VMC) day proficiency checks, or VMC night proficiency checks when night HHO are undertaken by the operator.**		
SPA.HHO.135 HHO Passenger briefing		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Prior to any HHO flight, or series of flights, HHO passengers shall have been briefed and made aware of the dangers of static electricity discharge and other HHO considerations.		
SPA.HHO.140 Information and documentation		
(a) The operator shall ensure that, as part of its risk analysis and management process, risks associated with the HHO environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated. **(b) Relevant extracts from the operations manual shall be available to the organisation for which the HHO is being provided.**		
Subpart ~~D~~ J - ~~Section IX –~~ Helicopter emergency medical service operations	MS comments were made on problems that are addressed in 43, and the fact that HEMS is considered CAT and needs to be returned to that section. TGL 43 distinguishes between HEMS and mountain rescue. HEMS being subject to the Basic	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	Regulation (BR) and its Implementing Rules, whereas mountain rescue is similar to Search and Rescue and therefore is outside the scope of the BR (Art. 1)	
~~OPS.~~SPA.HEMS.~~001~~100~~.HEMS~~ Helicopter emergency medical service (HEMS)operations~~ (HEMS)~~	It is noted that there has been a large number of duplicate comments from operators from the alpine region. Some comments related to SAR operations, however SAR is outside the Community scope (Art. 1 of Regulation 1108/2009).	
(a) **H**elicopter**s** shall only be operated for the purpose of ~~Helicopter Emergency Medical Service (~~HEMS ~~)~~**o**~~O~~perations~~,~~ if the operator has been approved by the competent authority.		
(b) To obtain such approval by the competent authority, the operator shall:		
(1) **operate in commercial air transport (CAT) and** hold a **CAT** ~~commercial~~ air ~~transport~~ operator certificate **(AOC)** in accordance with Part-OR; **and**	One comment related to this article understood this to mean that State aircraft were excluded from performing HEMS. The Basic Regulation does not	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	apply to State aircraft (Art 1 Regulation 1108/2009).	
(2) **demonstrate to the competent authority** compliance~~y~~ with the requirements contained ~~in OPS.GEN, OPS.CAT and Part-OR, except for the variations contained~~ in this S**ubpart**~~ection.~~**.**~~;~~		Enhancement of the text as the original would imply that the competent authority has to ensure full compliance with Part-CAT and Part-OR before issuing an approval iaw. SPA.HEMS. This section should only contain all the requirements for the additional approval, the other element should already be covered by the AOC, which is one of the conditions to be met. The specific requirements will therefore specify the variation to the AOC for which this approval is required.
~~(3) establish and maintain in addition to the requirements contained in Part OR.OPS a specific training and checking programme for the crew involved in these operations; and~~		Covered by SPA.HEMS.130.
~~(4) establish operating procedures, adapted to the operations area, specifying:~~	In the JAR Appendix an operations manual supplement was required.	Partially accepted. The requirement for a supplement would not be an

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
		objective rule, as it would prevent an integrated operations manual. Text amended to be more objective. Moved to SPA.HEMS.140.
~~(i) HEMS operating minima;~~		Covered by SPA.HEMS.120.
~~(ii) performance requirements;~~		Covered by SPA.HEMS.125.
~~(iii) crew composition and experience requirements;~~		Covered by SPA.HEMS.130.
~~(iv) recommended routes for regular flights to surveyed sites with the minimum flight altitude;~~	Comments to this point have demonstrated that operators do not understand that this applies to surveyed sites and therefore there shall be recommended routes, due to obstacle situation etc. In the case of unsurveyed sites, point (v) is applicable.	Restoration of the rule versus AMC/GM solves this misunderstanding. Moved to AMC1-SPA.HEMS.140.
~~(v) guidance for the selection of the HEMS operating site in case of a flight to an unsurveyed site;~~		Moved to AMC1-SPA.HEMS.140.
~~(vi) guidance on take-off and landing procedures at~~		Moved to SPA.HEMS.125.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~unsurveyed HEMS operating sites;~~		
~~(vii) the safety altitude for the area over flown;~~		Moved to AMC1-SPA.HEMS.140.
~~(viii) procedures to be followed in case of inadvertent flight into cloud;~~		Moved to AMC1-SPA.HEMS.140.
~~(ix) procedures for the use of portable equipment on board; and~~		Moved toSPA.HEMS.140.
~~(x) briefing of medical staff prior to any HEMS flight, or series of flights.~~		Covered by SPA.HEMS.130.
~~OPS.~~SPA.HEMS.~~0~~110~~.HEMS~~ Equipment requirements for HEMS operations	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
~~(a)~~ The installation of all helicopter dedicated medical equipment and any subsequent modifications and, where appropriate, its operation shall be approved in accordance with **Regulation (EC) No 1702/2003**~~Part-21~~.	Several duplicate comments were received regarding improvement of the text as certification is only required for the fixture and fittings and not for the medical equipment itself.	Not accepted. Text is correct; only the ‘installation’ needs a Part-21 approval. The text has not been changed.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
SPA.HEMS.115 - Communication		
In addition to that required by CAT.IDE.H, ~~(b)~~ ~~H~~**h**elicopters conducting HEMS flights shall **have** ~~be provided with~~ communication equipment ~~, in addition to that required for commercial air transport operations,~~capable of conducting two-way communication with the organisation for which the HEMS is being conducted and, where possible, to communicate with ground emergency service personnel.	One comment related to the inclusion of guidelines for the non-certified equipment for voice and data transmission.	Not accepted. Text is correct and the equipment is already covered by existing rules.
~~OPS.~~SPA.HEMS.~~0~~120~~.HEMS~~ HEMS operating minima	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
(a) HEMS flights **operated** in performance class 1 and 2 ~~operations~~ shall comply with the weather minima in Table 1 for dispatch and~~, Table 1 and the associated notes for the~~ en-route phase of the HEMS flight. In the event that during the en-route phase the weather conditions fall below the cloud base or visibility minima shown, helicopters certificated for flights only under **v**isual **m**eteorological **c**onditions **(**~~(~~VMC**)**~~)~~ shall abandon the flight or return to base. Helicopters equipped and certificated for **instrument meteorological conditions (**IMC**)** operations may abandon the flight, return to base or convert in all respects to a flight conducted under IFR, provided the flight	One operator requested to lower the operating minima at night if NVIS were to be used.	Not accepted. Alleviation regarding operating minima with use of NVIS is not accepted.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
crew are suitably qualified.		
Table 1:~~OPS.SPA.020 –~~ HEMS operating minima	Some comments related to the fact that one pilot and one HEMS technical crew member should be allowed to use the 2 pilot operating minima.	Not accepted. A HEMS technical crew member is not a pilot and therefore the operation cannot be credited as such.
(see table below)	Most of the duplicate comments requested to change the visibility in note 1 from 800 m to 500 m, and one commentator suggested removing the clause in total.	Not accepted. These duplicate comments only indicated that in one or two of the Member States this is allowed. It is therefore inappropriate to change the current text.

2 PILOTS		1 PILOT	
DAY			
Ceiling	Visibility	Ceiling	Visibility
500 ft and above	As defined by the applicable airspace VFR minima	500 ft and above	As defined by the applicable airspace VFR minima
499 - 400 ft	1 000 m*	499 – 400 ft	2 000 m
399 - 300 ft	2 000 m	399 – 300 ft	3 000 m
NIGHT			
Cloud ~~B~~**b**ase	Visibility	Cloud ~~B~~**b**ase	Visibility

A: Rule	B: Summary of comments	C: Reasons for change, remarks
1 200 ft ** | 2 500 m | 1 200 ft** | 3 000 m * **During the en-route phase v**~~V~~isibility may be reduced to 800 m for short periods when in sight of land if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe any obstacles in time to avoid a collision.		
** **During the en-route phase, c**~~C~~loud base may be reduced to 1 000 ft for short periods.		
(b) The weather minima for the dispatch and en-route phase of a HEMS flight **operated** in performance class 3~~ operations~~ shall be a cloud ceiling of 600 ft and a visibility of 1 500 m. **Visibility may be reduced to 800 m for short periods when in sight of land if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe any obstacle and avoid a collision.**	Most of the duplicate comments related to the omission of the note * above to be applied to PC 3 operations as well.	Accepted. Text included
~~OPS.~~SPA.HEMS.~~0~~125.~~HEMS~~ Performance requirements for HEMS operations	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
(a) Performance class 3 operations shall not be conducted over a hostile environment.	Some opposing comments on this issue were received. Most of the commentators requested	Not accepted. There is currently no reason to

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
	alleviation from this requirement indicated that there is an urgent need to transpose TGL 43 into the EASA system. There were other comments that requested that for HEMS no performance class 3 should be allowed at all.	deviate from the requirements already contained in JAR-OPS 3. On the other hand transposition of TGL 43 should be undertaken with urgency so that some misunderstanding of the requirements can be properly addressed.
(b) Take-off and landing	Most of the comments indicate widespread misunderstanding of the rules, from either the operator or the authorities. Proposals are made to change the content to address those misunderstandings.	Not accepted. The fact that several authorities have not implemented the public interest site appendix, does not justify a change in the rules. Exposure during take-off and landing is not equal to PC3; helicopters being unable to meet PC2 requirements at altitude do not justify the use of PC3 in HEMS operations below those altitudes where PC2 would otherwise be possible.
(1) Helicopters conducting operations to/from an aerodrome at a hospital ~~which~~ **that** is located in a hostile environment shall be operated in accordance with performance class 1~~;~~**,** except **when the operator holds**	One NAA commented that a HEMS operating base should be located outside congested area, especially if night operations are conducted.	Not accepted. A congested area requires PC1, so therefore caters for the N-1 situation. Therefore there is no

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
an approval in accordance with CAT.POL.H.225~~as provided for in OPS.SPA.005.SFL~~.		reduced risk with regard to performance, even in the case of night operations.
(2) Helicopters conducting operations to/from an HEMS operating site located in a hostile environment shall be operated in accordance with performance class 2**, and exempt from the approval required by CAT.POL.H.305(a), provided compliance is shown with CAT.POL.H.305, (b)(2)and(3).**		Added text is the result of the preferred option 2(c) of the HSST/WP-07/03.4
(3) The HEMS operating site shall be big enough to provide adequate clearance from all obstructions. For night operations, the site shall be illuminated to enable the site and any obstructions to be identified.		
SPA.HEMS.130 –-Crew requirements		Transposed from AMC to be consistent with OR.OPS.FC and OR.OPS.TC.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~1. The crew~~**(a)** ~~1.1~~ *Selection*. The operati~~o~~**r**~~ns manual should contain specific~~ **shall establish** criteria for the selection of flight crew members for the HEMS task, taking previous experience into account. **(b)** ~~1.2~~ *Experience*. **The minimum experience level for the commander conducting HEMS flights shall not be less than:** **(1)**~~a.~~ ~~E~~**e**ither: **(i)**~~.~~ 1 000 hours **as** pilot-in-command**/commander** of aircraft of which 500 hours ~~is~~**are** as pilot-in-command**/commander** on helicopters; or **(ii)**~~.~~ 1 000 hours as co-pilot in HEMS operations of which 500 hours ~~is~~ **are** as pilot-in-command under supervision~~;~~ and~~,~~ 100 hours pilot-in-command**/commander** of helicopters**;**~~.~~ **(2)**~~b.~~ 500 hours operating experience in helicopters**,** gained in an operational environment similar to the intended operation; and **(3)**~~c.~~**f**~~F~~or pilots engaged in night operations, 20 hours **of** ~~Visual Meteorological Conditions (~~VMC~~)~~ at night as pilot-in-command**/commander.**~~; and~~ **(c)**~~d.~~***Operational training*.** Successful completion of **operational** training in accordance with **the HEMS procedures contained in the operations manual**~~ 1.5.1~~.		Moved from AMC OPS.SPA.001.HEMS(b)(4).

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(d)~~1.3~~ *Recency*. All pilots conducting HEMS operations sh**all**~~ould~~ have completed a minimum of 30 minutes' flight by sole reference to instruments in a helicopter or in a **flight simulation** ~~synthetic~~ training device (**F**STD) within the last **six**~~6~~ months. **(e)**~~1.4~~ Crew composition~~.~~ **(1)**~~a.~~ *Day flight*. The minimum crew by day sh**all**~~ould~~ be one pilot and one HEMS technical crew member. **(i)** This **may** ~~can~~ be reduced to one pilot only **when**~~in exceptional circumstances~~**:** **(A) at a HEMS operating site the ~~/~~commander is required to fetch additional medical supplies. In such case the HEMS technical crew member may be left to give assistance to ill or injured persons while the commander undertakes this flight;** **(B) after arriving at the HEMS operating site, the installation of the stretcher precludes the HEMS technical crew member from occupying the front seat; or** **(C) the medical passenger requires the assistance of the HEMS technical crew member in flight.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(ii) In the cases described in (i), the operational minima shall be as defined by the applicable airspace requirements; the HEMS operating minima contained in Table 1 of SPA. HEMS.120 shall not be used. **(iii) Only in the case described in (i)(A) may the commander land at a HEMS operating site without the technical crew member assisting from the front seat**.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
(2)~~b.~~ *Night flight*. The minimum crew by night sh**all**~~ould~~ be**:** **(i)** two pilots**; or** **(ii)** ~~. However,~~ one pilot and one HEMS technical crew member ~~may be employed~~ in specific geographical areas defined by the operator in the operations manual taking into account the following: **(A)**~~i.~~ **a**~~A~~dequate ground reference; **(B)**~~ii.~~ **f**~~F~~light following system for the duration of the HEMS mission; **(C)**~~iii.~~**r**~~R~~eliability of weather reporting facilities; **(D)**~~iv.~~ HEMS minimum equipment list; **(E)**~~v.~~ **c**~~C~~ontinuity of a crew concept; **(F)**~~vi.~~**m**~~M~~inimum crew qualification, initial and recurrent training; **(G)**~~vii.~~ **o**~~O~~perating procedures, including crew co-ordination; **(H)**~~viii.~~ **w**~~W~~eather minima; **and** **(I)**~~ix.~~ **a**~~A~~dditional considerations due to specific local conditions.		
(f)~~1.5~~ Crew training and checking **(1) Training and checking shall be conducted in**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
accordance with a detailed syllabus approved by the competent authority and included in the operations manual. **(2) Crew members** **(i) Crew training programmes shall: improve knowledge of the HEMS working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with en-route transit in low visibility conditions, selection of HEMS operating sites, and approach and departure profiles.** **(ii) The measures referred to in (i) above shall be assessed during:** **(A) VMC day proficiency checks, or VMC night proficiency checks when night HEMS operations are undertaken by the operator; and** **(B) line checks.**~~1.5.1 Flight crew members~~ ~~a. The specific HEMS training programme for the flight crew members should include the following subjects:~~ ~~i. Meteorological training concentrating on the understanding and interpretation of available weather information;~~ ~~ii. Preparing the helicopter and specialist medical equipment for subsequent HEMS departure;~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~iii. Practice of HEMS departures;~~ ~~iv. The assessment from the air of the suitability of HEMS operating sites; and~~ ~~v. The medical effects air transport may have on the patient.~~		
~~b. crew member checking~~ ~~i. VMC day proficiency checks, or also at night if night HEMS operations are undertaken by the operator, including flying landing and take-off profiles likely to be used at HEMS operating sites.~~ ~~ii. Line checks, with special emphasis on the following:~~ ~~**g**A. Local area meteorology;~~ ~~**h**B. HEMS flight planning;~~ ~~**i**C. HEMS departures;~~ ~~**j**D. The selection from the air of HEMS operating sites;~~ ~~E. Low level flight in poor weather; and~~ ~~F. Familiarity with established HEMS operating sites in operators local area register.~~		
~~1.5.2HEMS Technical crew member~~ ~~The specific HEMS training programme for technical crew members who perform assigned duties relating to~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~assisting the pilot in his duties should include the following items in addition to Part-OR:~~ ~~a. Duties in the HEMS role;~~ ~~b. Navigation (map reading, navigation aid principles and use);~~ ~~c. Operation of radio equipment;~~ ~~d. Use of onboard medical equipment;~~ ~~e. Preparing the helicopter and specialist medical equipment for subsequent HEMS departure;~~ ~~f. Instrument reading, warnings, use of normal and emergency check lists in assistance of the pilot as required;~~ ~~g. Basic understanding of the helicopter type in terms of location and design of normal and emergency systems and equipment;~~ ~~h. Crew coordination;~~ ~~i. Practice of response to HEMS call out;~~ ~~j. Conducting refuelling and rotors running refuelling;~~ ~~k. HEMS operating site selection and use;~~ ~~l. Techniques for handling patients, the medical consequences of air transport and some knowledge of hospital casualty reception;~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~m. Marshalling signals;~~ ~~n. Underslung load operations as appropriate;~~ ~~o. Winch operations as appropriate;~~ ~~p. The dangers to self and others of rotor running helicopters including loading of patients;~~ ~~q. The use of the helicopter inter-communications system.~~		
SPA.HEMS.135 HEMS medical passenger and other personnel briefing		
(a)~~2.~~ *Medical passenger*. **Prior to any HEMS flight, or series of flights, the medical passenger shall have been briefed to ensure that they are familiar with the HEMS working environment and equipment, can operate on-board medical and emergency equipment and can take their part in normal and emergency entry and exit procedures.**~~Prior to any HEMS flight, or series of flights, the medical passenger should be briefed on the following:~~ ~~a. Familiarisation with the helicopter type(s) operated;~~ ~~b. Entry and exit under normal and emergency conditions both for self and patients;~~ ~~c. Use of the relevant onboard specialist medical equipment;~~		REVIEW group decide: There are many examples where the 'medical passenger' is a part of a permanent HEMS team and where there is no need for a briefing prior to any or series of flights, if the 'medical passenger' is trained at regular intervals (comments propose on a 6-monthly recurrent basis).

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~d. The need for the pilot-in-command'sapproval prior to use of specialised equipment;~~ ~~e. Method of supervision of other medical staff;~~ ~~f. The use of helicopter inter-communication systems; and~~ ~~g. Location and use of onboard fire extinguishers.~~		
(b)~~3.~~ *Ground emergency service personnel*. **The operator shall take all reasonable measures to ensure that ground emergency service personnel are familiar with the HEMS working environment and equipment and the risks associated with ground operations at a HEMS operating site.** ~~• 3.1 An operator should take all reasonable measures to ensure that ground emergency service personnel are familiar with the following:~~ ~~a. Two way radio communication procedures with helicopters;~~ ~~b. The selection of suitable HEMS operating sites for HEMS flights;~~ ~~c. The physical danger areas of helicopters;~~ ~~d. Crowd control in respect of helicopter operations; and~~ ~~e. The evacuation of helicopter occupants following an on-site helicopter accident.~~		
SPA.HEMS.140 Information and documentation		Better reflection of the original text, as comments on

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		OPS.SPA.001.HEMS indicated.
(a) The operator shall ensure that, as part of its risk analysis and management process, risks associated with the HEMS environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated. **(b) Relevant extracts from the operations manual shall be made available to the organisation for which the HEMS is being provided.**	In the JAR Appendix an operations manual supplement was required.	Partially accepted. The requirement for a supplement would not be an objective rule, as it would prevent an integrated operations manual. Text amended to be more objective. Moved from OPS.SPA.001.HEMS.
~~OPS.~~SPA.HEMS.~~0~~145~~.HEMS~~ HEMS operating base facilities	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
(a) If crew members are required to be on standby with a reaction time of less than 45 minutes, dedicated suitable accommodation shall be provided close to each operating base.	The comment wanted to specify in more detail what suitable accommodation should entail: 1. Installations which allow each crew member to rest independently and undisturbed; 2. Separate lockable room for	Not accepted. The suggested requirements are already covered elsewhere in Community regulations.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
	medical supply and disinfection as well as shelter for the aircraft.	
(b) At each operating base the pilots shall be provided with facilities for obtaining current and forecast weather information and shall be provided with satisfactory communications with the appropriate **air traffic services (**ATS**)** unit. Adequate facilities shall be available for the planning of all tasks.		
SPA.HEMS.150 Fuel supply		
(a) When the HEMS mission is conducted under VFR within a local and defined geographical area, standard fuel planning can be employed provided the operator establishes final reserve fuel to ensure that, on completion of the mission the fuel remaining is not less than an amount of fuel sufficient for: **(1) 30 minutes of flying time at normal cruising conditions; or** **(2) when operating within an area providing continuous and suitable precautionary landing sites, 20 minutes of flying time at normal cruising conditions.**	A comment to AMC5 OPS.CAT.205.H addresses the need to make appropriate provisions for HEMS operations. As an alleviation contained originally in Appendix 1 to JAR-OPS 3.005(f) it should also be applicable to HEMS.	Accepted It was not originally intended that Appendix 1 to JAR-OPS 3.005(f) be specifically barred for HEMS (as Appendix 3005(e) was). Paragraphs (c) and (d) are included which permit a standard fuelling amount when operating within a local area and which contains the adequate mitigation.
SPA.HEMS.155Refuelling with passengers embarking, on		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
board or disembarking		
When the commander considers refuelling with passengers on board to be necessary, it can be undertaken either rotors stopped or rotors turning provided the following requirements are met: **(a) door(s) on the refuelling side of the helicopter shall remain closed;** **(b) door(s) on the non-refuelling side of the helicopter shall remain open, weather permitting;** **(c) fire fighting facilities of the appropriate scale shall be positioned so as to be immediately available in the event of a fire; and** **(d) sufficient personnel shall be immediately available to move patients clear of the helicopter in the event of a fire.**		Rule reintroduced from JAR-OPS 3 AMC to be consistent with OPS.CAT.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Part-SPA | AMC/GM		
Subpart A~~ - Section I~~ - General ~~r~~Requirements		
~~AMC OPS.SPA.020.GEN(b)(4) Application for a specific approval~~AMC1-SPA.GEN.105(b)(4)Application for a specific approval		
~~OPERATIONAL PREOCEDURES~~**DOCUMENTATION** **1. Operating procedures should be documented in the operations manual.** 2. If an operations manual is not required~~ by Annex IV to Regulation (EC) No 216/2008 (Essential requirements for air operations)~~, ~~operational procedures~~**operating procedures** may be described in a procedures manual. ***SPA.GEN.105*** *Application for a specific approval*		Subtitle changed to better reflect the content.
~~Section II – Operations in areas with specified navigation performance~~Subpart B – Performance-based navigation operations (PBN)	1/ Delete the detailed text and replace with a simple reference to the EASA AMC 20 documents.	1/ Partly accepted. The GM1 has been kept for further guidance. Reference to AMC 20 has been added to this GM.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~**AMC OPS.SPA.001.SPN(c)(3) Operations in areas with specifiedperformance based navigationOPERATIONAL PROCEDURES**~~ ~~These operational procedures should be an integral part of the operations manual~~		Deleted because this is already specified in SPA.GEN.105(b)(4).
GM1-SPA.PBN.100 PBN operations~~**GM1 OPS.SPA.001.SPN Operations in areas with pecified performance based navigation**~~		
GENERAL 1. **There are two kinds of navigation specifications: area** ~~Radar~~**n**~~N~~avigation (RNAV) ~~specifications~~ and ~~R~~**r**equired ~~N~~**n**avigation ~~P~~**p**erformance (RNP)**. These specifications are similar.** ~~specifications. Indeed, a RNP system is an RNAV system which~~ **The key difference is that a navigation specification that includes a requirement to have an on-board** ~~has an onboard navigation~~ performance monitoring and alerting **system is referred to as an RNP specification. An RNAV specification does not have such a requirement. The performance-monitoring and alerting system provides some automated assurance functions to the** ~~function. This function allows the~~ flight crew**. These functions monitor system performance and alert the flight crew** ~~to detect~~ when the **required** RNP **requirements are** ~~system is~~		

A: Rule		B: Summary of comments	C: Reasons for change, remarks
	not **met,**~~achieving,~~ or cannot **be guaranteed**~~guarantee~~ with a sufficient level of **integrity. RNAV and RNP** ~~integrity, the navigation performance (both lateral and longitudinal). The navigation~~ performance is ~~characterised~~ **expressed** by the **t**~~T~~otal **s**~~S~~ystem **e**~~E~~rror (TSE).~~2. RNAV and RNP specifications are designated as RNAV X (e.g. RNAV 1) or RNP X (e.g. RNP 4). If two Navigation Specifications share the same value for X, they may be distinguished by use of a prefix, e.g. Advanced-RNP 1 and Basic-RNP 1. For both RNAV and RNP designations the expression 'X' refers to the lateral navigation accuracy~~**This is the deviation from the nominal or desired position and the aircraft's true position, measured** in nautical miles**. The TSE should remain equal to or less than the required accuracy** ~~that is~~ expected to be achieved at least 95**%**~~ percent~~ of the flight time by the population of aircraft operating within the airspace, route or procedure.~~ The existing navigation specifications are the relative requirements are summarised in table 1 and table 2 below.~~		
2.	**The structure of RNAV and RNP navigation specifications can be classified by phases of flight as detailed in <u>Table 1</u>. Some of these special approvals are in current use, some are under development, and some apply to emerging standards for which AMC-20material has yet to be defined.**		
3.	**The following RNAV and RNP navigation specifications are considered:**	1/ Wording "Advanced-RNP 1 and Basic-RNP 1" is not current. EASA	1/ Revised text takes this into account.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	should provide definitions, or replace "Advanced-RNP 1" and "Basic-RNP 1".	
a. Oceanic/Remote, RNAV10 (Designated and Authorised as RNP10): **Acceptable means of compliance for RNAV10(RNP10) are provided in EASA AMC 20-12, "Recognition of FAA order 8400.12a for RNP10 Operations". Although RNAV10 airspace is, for historical reasons, also called RNP10 airspace, there is no requirement for on-board monitoring and alerting systems. RNAV10 can support 50NM track spacing. For an aircraft to operate in RNAV10(RNP10) airspace it needs to be fitted with a minimum of two independent long range navigation systems (LRNS). Each LRNS should in principle have a flight management system that utilises positional information from either an approved global navigation satellite system (GNSS) or an approved inertial reference system (IRS) or mixed combination. The mix of sensors (pure GNSS, pure IRS or mixed IRS/GNSS) determines pre-flight and in-flight operation and contingencies in the event of system failure.**		
b. Oceanic/Remote, RNP4		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
This is an emerging RNP standard. Guidance is provided in ICAO DOC 9613. RNP4 is the oceanic/remote navigation specification to support 30NM track spacing. To meet this more accurate navigation requirement, two independent LRNS are required for which GNSS sensors are mandatory. Additional aircraft requirements over and above high frequency (HF)may also be required in order to operate in RNP4 designated airspace, and the appropriate Air Information Publication should be consulted. These requirements may include use of automatic dependent surveillance (ADS) and/or controller pilot direct data link communication (CPDLC).		
c. RNAV5 (B-RNAV) **Acceptable means of compliance for RNAV5 are provided in AMC 20-4, "Airworthiness Approval and Operational Criteria for the Use of Navigation Systems in European Airspace Designated for the Basic-RNAV Operations". No specific approval required.**		
d. RNAV2 **This is a non European en-route standard.** **e. RNAV1 (P-RNAV):**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Acceptable means of compliance for RNAV1 (P-RNAV) are provided in JAA TGL-–10 "Airworthiness and Operational approval for precision RNAV operations in designated European Airspace," planned to be replaced by AMC 20-16.		
f. Basic–RNP1 **This is a future standard yet to be implemented. Guidance material is provided in ICAO Doc 9613.**		
g. RNP APCH (RNP Approach) **Non-precision approaches supported by GNSS and APV (approach with vertical guidance) which are themselves divided in two types of APV approaches: APV Baro and APV SBAS.** **RNP APCH is charted as RNAV (GNSS). A minima line is provided for each of the available types of non-precision approaches and the APV procedure at a specific runway:** • **Non-precision approach –lateral navigation (LNAV) or localiser performance (LP) minima line;** • **APV Baro - LNAV/VNAV (vertical navigation) minima line; and** • **APV SBAS - LPV minima line.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Non-precision approaches to LNAV minima and APV approaches to LNAV/VNAV minima are addressed in AMC 20-27, "Airworthiness Approval and Operational Criteria for RNP approach (RNP APCH) operations including APV Baro VNAV operations". **APV approaches to LPV minima are addressed in AMC 20-28 "Airworthiness Approval and. Operational Criteria for RNAV GNSS approach operation to LPV minima using SBAS".** **Non-precision approaches to LP minima have not yet been addressed in AMC 20.**		
h. RNP AR APCH (approach) **RNP AR criteria have been developed to support RNP operations to RNP minima using RNP less than or equal to 0.3 NM or fixed radius turns (RF). The vertical performance is defined by a vertical error budget based upon Baro VNAV. Equivalent means of compliance using SBAS may be demonstrated.** **RNP AR APCH is charted as RNAV (RNP). A minima line is provided for each available RNP value.** **Acceptable Means of Compliance for RNP AR are provided in AMC20-26 "Airworthiness Approval and Operational Criteria for RNP Authorisation Required (RNP AR) Operations".**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Each RNP AR approach requires a special approval.		
~~3~~**4**. ~~—~~Guidance material for the global performances specifications, approval process, aircraft requirement (e.g. generic system performances, accuracy, integrity, continuity, signal-in-space, RNP navigation specifications required for the on-board performance monitoring and alerting system), requirements for specific sensor technologies, functional requirements, operati**ng** ~~onal~~ procedures, flight crew knowledge and training and navigation databases integrity requirements, can be found in: a. ICAO Doc 9613 Performance**-**Based Navigation **(PBN)** Manual**;**~~,~~ **and** b. **Table 1.**~~EASA AMC 20 as indicated in~~	1/ Table 1 and 2 should be improved to include provisions for RNP AR APCH. 2/ Table 1 of GM1 OPS.SPA.001.SPN should be improved with provisions for RNP APCH below 0.3.	1-2/ The new Table 1 takes this into account.
SPA.PBN.100 PBN operations		
~~GM2 OPS.SPA.001.SPN Operations in areas with specified performance based navigation~~ ~~GENERAL~~ ~~The equipment carriage requirements, operational and contingency procedures and operator specific provision relating to designated airspace or on routes where, based on ICAO Regional Air Navigation Agreements, minimum navigation performance specifications are~~		Deleted because not up-to-date.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~established, can be found in:~~ ~~1. The applicable Community legislation within the context of the Single European Sky and its implementing rules;~~ ~~2. ICAO Doc 7030; and~~ ~~3. Eurocontrol related documentation.~~		
~~AMC OPS.SPA.010.MNPS Equipment requirements for operations in MNPS areas~~ ~~GENERAL~~ ~~1. For operation in MNPS airspace along notified special routes, the aircraft should be equipped with one Long Range Navigation System (LRNS), unless otherwise specified in the ICAO air navigation agreements.~~ ~~2. For unrestricted operations in MNPS areas, the aircraft should be equipped with two independent Long Range Navigation Systems (LRNS).~~		Deleted because not up-to-date.
Subpart D - Operations in airspace with reduced vertical separation minima (RVSM)		
~~AMC OPS.SPA.001.RVSM(b)(2)(ix) Operations in RVSM~~		Text content included in the IR.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~airspace~~ ~~OPERATIONAL PROCEDURES – INCIDENT REPORTING~~ ~~1. In-flight defect reporting procedures should be defined to aid identification of altimetry system error sources. Such procedures could cover acceptable differences between primary and alternate static sources, and others as appropriate. This reporting shall be in addition to the reporting referred to in Part-OR, and these reports of occurrences involving poor height keeping should be submitted to the responsible authority within 72 hours. The incidence of height keeping errors that can be tolerated in an RVSM environment is small. Height keeping errors fall into two broad categories:~~ ~~a. errors caused by malfunction of aircraft equipment; and~~ ~~b. operational errors.~~ ~~2. Each operator should take immediate action to rectify the conditions that cause an error. A report of such actions should be submitted to the competent authority, including an initial analysis of causal factors and measures taken to prevent repeat occurrences. Where necessary the need for follow up reports should be determined together with the competent authority. Occurrences that should be reported and investigated are errors of:~~ ~~a. TVE equal to or greater than ±90 m (±300 ft),~~ ~~b. ASE equal to or greater than ±75 m (±245 ft), and~~ ~~c. Assigned altitude deviation equal to or greater than ±90 m (±300 ft).~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
AMC1-SPA.RVSM.105 RVSM operational approval		Text moved from AMC2 to AR.OPS.200.
CONTENT OF OPERATOR RVSM APPLICATION The following material should be made available to the competent authority, in sufficient time to permit evaluation, before the intended start of RVSM operations: ~~a~~**1**. Airworthiness **d**~~D~~ocuments~~:~~ Documentation that shows that the aircraft has RVSM airworthiness approval. This should include an ~~Approved Flight Manual~~ **AFM** amendment or supplement.		
~~b~~**2**. Description of **a**~~A~~ircraft **e**~~E~~quipment~~:~~ A description of the aircraft appropriate to operations in an RVSM environment. Further standards are provided in AMC1-SPA.RVSM.110.		
~~c~~**3**. Training **p**~~P~~rogrammes and **o**~~O~~perating **p**~~P~~ractices and **p**~~P~~rocedures~~:~~ The operator ~~shall~~ **should** submit training syllabi for initial and recurrent training programmes together with other relevant material to the competent authority. The material should show that the operating practices, procedures and training items,		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
related to RVSM operations in airspace that requires State operational approval, are incorporated. Further standards are provided in AMC2-SPA.RVSM.105.		
~~d~~**4.** Operations **m**~~M~~anuals and **c**~~C~~hecklists~~:~~ The appropriate manuals and checklists should be revised to include information/guidance on standard operating procedures. Manuals should contain a statement of the airspeeds, altitudes and weights considered in RVSM aircraft approval, including identification of any operating limitations or conditions established for that aircraft group. Manuals and checklists may need to be submitted for review by the competent authority as part of the application process. Further standards are provided in AMC2-SPA.RVSM.105.		
~~e~~**5.** Past **p**~~P~~erformance~~:~~ Relevant operating history, where available, should be included in the application. The applicant should show that **any required** changes have been made ~~required~~ in training, operating or maintenance practices to improve poor ~~height keeping~~ **height-keeping** performance.		
~~f~~**6.** Minimum **e**~~E~~quipment **l**~~L~~ist~~:~~ Where applicable, a minimum equipment list (MEL), adapted from the master minimum equipment list (MMEL) and relevant operational regulations, should include items pertinent to		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
operating in RVSM airspace.		
~~h~~**7.** Plan for **p**~~P~~articipation in **v**~~V~~erification/**m**~~M~~onitoring **p**~~P~~rogrammes~~:~~ The operator should establish a plan for participation in any applicable verification/monitoring programme acceptable to the competent authority. This plan should include, as a minimum, a check on a sample of the operator's fleet by an independent height monitoring system. ***SPA.RVSM.105 RVSM operational approval***		
~~**GM OPS.SPA.001.RVSM(b)(2) Operations in RVSM airspace**~~ **AMC2-SPA.RVSM.105 RVSM operational approval**		
~~Operations in RVSM airspace~~ OPERATI**NG** ~~ONAL~~ PROCEDURES 1. Flight planning ~~1.1~~**a.** During flight planning the flight crew should pay particular attention to conditions that may affect operation in RVSM airspace. These include, but may not be limited to: ~~a~~**i.** verifying that the airframe is approved for RVSM operations;		3.1(d) Operating transponder. Text deleted because TGL 6 paragraph 8.1.1 required a transponder in all RVSM airspace.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~b~~**ii.** reported and forecast weather on the route of flight; ~~c~~**iii.** minimum equipment requirements pertaining to ~~height keeping~~ **height-keeping** and alerting systems; and ~~d~~**iv.** any airframe or operating restriction related to RVSM approval.		
2. Pre-flight procedures ~~2.1~~**a.** The following actions should be accomplished during the pre-flight procedure: **i**~~a~~. Review technical logs and forms to determine the condition of equipment required for flight in the RVSM airspace. Ensure that maintenance action has been taken to correct defects to required equipment**.**~~;~~ ~~b~~**ii.** During the external inspection of aircraft, particular attention should be paid to the condition of static sources and the condition of the fuselage skin near each static source and any other component that affects altimetry system accuracy. This check may be accomplished by a qualified and authorised person other than the pilot (e.g. a flight engineer or ground engineer)**.**~~;~~ ~~c~~**iii.** Before take**-**off, the aircraft altimeters should be set to the QNH **(atmospheric pressure at nautical height)** of the airfield and should display a known		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
altitude, within the limits specified in the aircraft operating manuals. The two primary altimeters should also agree within limits specified by the aircraft operating manual. An alternative procedure using QFE **(atmospheric pressure at aerodrome elevation/runway threshold)** may also be used. **The maximum value of acceptable altimeter differences for these checks should not exceed 23 m (75 ft).** Any required functioning checks of altitude indicating systems should be performed. ~~The maximum value for these checks should not exceed 23 m (75 ft).~~ ~~d~~**iv**. ~~b~~**B**efore take-off, equipment required for flight in RVSM airspace should be operative, and any indications of malfunction should be resolved.		
3. Prior to RVSM airspace entry ~~3.1~~**a.** The following equipment should be operating normally at entry into RVSM airspace: **i**~~a~~. **two primary altitude measurement systems. A cross-check between the primary altimeters should be made. A minimum of two will need to agree within ±60 m (±200 ft). Failure to meet this condition will require that the altimetry system be reported as defective and air traffic control (ATC) notified;**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
ii~~b~~. **o**~~O~~ne automatic altitude-control system**;**~~.~~ **iii**~~c~~. **o**~~O~~ne altitude-alerting device**; and**~~.~~ **iv**~~d~~. **o**~~O~~perating **t**~~T~~ransponder. ~~An operating transponder may not be required for entry into all designated RVSM airspace. The operator should determine the requirement for an operational transponder in each RVSM area where operations are intended. The operator should also determine the transponder requirements for transition areas next to RVSM airspace.~~ ~~3.2~~**b.** Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot should request a new clearance to avoid entering this airspace.		
4. In-flight procedures ~~4.1~~**a.** The following practices should be incorporated into flight crew training and procedures: **i**~~a~~. Flight crew~~s~~ will need to comply with any aircraft operating restrictions, if required for the specific aircraft **type,**~~group,~~ e.g. limits on indicated Mach number, given in the RVSM airworthiness approval. **ii**~~b~~. Emphasis should be placed on promptly setting the sub-scale on all primary and standby altimeters to 1013.2 (hPa) /29.92 in~~.~~ Hg when passing the transition altitude, and rechecking for proper		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
altimeter setting when reaching the initial cleared flight level.~~;~~ **iii**~~c~~. In level cruise it is essential that the aircraft is flown at the cleared flight level. This requires that particular care is taken to ensure that ~~Air Traffic Control clearances (~~ATC~~)~~**clearances** are fully understood and followed. The aircraft should not intentionally depart from cleared flight level without a positive clearance from ATC unless the crew are conducting contingency or emergency manoeuvres.~~;~~		
iv~~d~~. When changing levels, the aircraft should not be allowed to overshoot or undershoot the cleared flight level by more than 45 m (150 ft). If installed, the level off should be accomplished using the altitude capture feature of the automatic altitude-control system. **v**~~e~~. An automatic altitude-control system should be operative and engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement. In any event, adherence to cruise altitude should be done by reference to one of the two primary altimeters. Following loss of the automatic ~~height keeping~~ **height-keeping** function, any consequential restrictions will need to be observed.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
vi~~f~~. Ensure that the altitude-alerting system is operative**.**~~;~~		
vii~~g~~. At intervals of approximately one hour, cross-checks between the primary altimeters should be made. A minimum of two will need to agree within ±60 m (±200 ft). Failure to meet this condition will require that the altimetry system be reported as defective and ~~notified to~~ ATC **notified:**~~;~~ **A**~~i~~. **t**~~T~~he usual scan of flight deck instruments should suffice for altimeter crosschecking on most flights**;**~~.~~ **and** ~~ii~~**B**. **b**~~B~~efore entering RVSM airspace, the initial altimeter cross check of primary and standby altimeters should be recorded.		
viii~~h~~. In normal operations, the altimetry system being used to control the aircraft should be selected for the input to the altitude reporting transponder transmitting information to ATC. ~~i. If the pilot is advised in real time that the aircraft has been identified by a height monitoring system as exhibiting a TVE greater than ±90 m (±300 ft) and/or an ASE greater than ±75 m (±245 ft) then the pilot should follow established regional procedures to protect the safe operation of the aircraft. This assumes that the monitoring system will~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~identify the TVE or ASE within the set limits for accuracy.~~ ~~j~~**ix.** If the pilot is notified by ATC of **a deviation from** an assigned altitude ~~deviation which~~ exceed**ing**~~s~~ ±90 m (±300 ft) then the pilot should take action to return to cleared flight level as quickly as possible.		
~~4.2~~**b.** Contingency procedures after entering RVSM airspace are **as follows**: ~~a~~**i.** the pilot should notify ATC of contingencies (equipment failures, weather) which affect the ability to maintain the cleared flight level, and co-ordinate a plan of action appropriate to the airspace concerned. Detailed guidance on contingency procedures is contained in the relevant publications dealing with the airspace. Refer to specific regional procedures. ~~b~~**ii.** Examples of equipment failures which should be notified to ATC are: ~~i~~**A.** failure of all automatic altitude-control systems aboard the aircraft; ~~ii~~**B.** loss of redundancy of altimetry systems; ~~iii~~**C.** loss of thrust on an engine necessitating descent; or ~~iv~~**D.** any other equipment failure affecting the ability to maintain cleared flight level.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~c~~**iii.** The pilot should notify ATC when encountering greater than moderate turbulence. ~~d~~**iv.** if unable to notify ATC and obtain an ATC clearance prior to deviating from the cleared flight level, the pilot should follow any established contingency procedures **for the region of operation** and obtain ATC clearance as soon as possible.		
5. Post**-**flight procedures ~~5.1~~**a.** In making technical log entries against malfunctions in ~~height keeping~~ **height-keeping** systems, the pilot should provide sufficient detail to enable maintenance to effectively troubleshoot and repair the system. The pilot should detail the actual defect and the crew action taken to try to isolate and rectify the fault.		
~~5.2~~**b.** The following information should be recorded when appropriate: ~~a~~**i.** **p**~~P~~rimary and standby altimeter readings**;**~~.~~ ~~b~~**ii.** **a**~~A~~ltitude selector setting**;**~~.~~ ~~c~~**iii.** **s**~~S~~ubscale setting on altimeter**;**~~.~~ ~~d~~**iv.** **a**~~A~~utopilot used to control the aircraft and any differences when an alternative autopilot system was selected**;**~~.~~ ~~e~~**v.** **d**~~D~~ifferences in altimeter readings, if alternate static		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
ports selected**;**~~.~~ **vi**~~f~~. **u**~~U~~se of air data computer selector for fault diagnosis procedure**;**~~.~~ **and** **vii**~~g~~. **t**~~T~~he transponder selected to provide altitude information to ATC and any difference noted when an alternative transponder was selected.		
6. Crew training ~~6.1~~**a.** The following items should also be included in flight crew training programmes: ~~a~~**i.** knowledge and understanding of standard ATC phraseology used in each area of operations; ~~b~~**ii.** importance of crew members cross-checking to ensure that ATC clearances are promptly and correctly complied with; ~~c~~**iii.** use and limitations in terms of accuracy of standby altimeters in contingencies. Where applicable, the pilot should review the application of static source error correction/position error correction through the use of correction cards; such correction data should be available on the flight deck**;**~~.~~ ~~d~~**iv.** problems of visual perception of other aircraft at 300 m (1 000 ft) planned separation during darkness, when encountering local phenomena such as northern lights, for opposite and same direction		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
traffic, and during turns; ~~e~~**v**. characteristics of aircraft altitude capture systems which may lead to overshoots; ~~f~~**vi**. relationship between the aircraft's altimetry, automatic altitude control and transponder systems in normal and abnormal conditions; and ~~g~~**vii**. any airframe operating restrictions, if required for the specific aircraft group, related to RVSM airworthiness approval. ***SPA.RVSM.105 RVSM operational approval***		
GM1-SPA.RVSM.105 RVSM operational approval		
~~7.~~ SPECIFIC REGIONAL PROCEDURES **1.**~~7.1~~ The areas of applicability (by Flight Information Region) of RVSM airspace in identified ICAO regions is contained in the relevant sections of ICAO Document 7030/4. In addition these sections contain operati**ng** ~~onal~~ and contingency procedures unique to the regional airspace concerned, specific flight planning requirements, and the approval requirements for aircraft in the designated region.		
2~~7.2~~**.** For the North Atlantic ~~M~~**m**inimum ~~N~~**n**avigation **p**~~P~~erformance **s**~~S~~pecification (MNPS) airspace, where RVSM have been in operation since 1997, further guidance (principally for ~~State~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Approval Agencies~~**competent authorities**) is contained in ICAO Document NAT 001 T13/5NB.5 with comprehensive operational guidance (aimed specifically at ~~aircraft~~ operators) in the North Atlantic MNPS Airspace Operational Manual.		
3~~7.3~~**.** Comprehensive guidance on operational matters for European RVSM ~~A~~**a**irspace is contained in EUROCONTROL Document ASM ET1.ST.5000 entitled "The ATC Manual for a Reduced Vertical Separation (RVSM) in Europe" with further material included in the relevant State **a**~~A~~eronautical **p**~~P~~ublications. ***SPA.RVSM.105 RVSM operational approval***		
AMC1-SPA.RVSM.110 RVSM equipment requirements **TWO INDEPENDENT ALTITUDE MEASUREMENT SYSTEMS** **Each system should be composed of the following components:** **1. cross-coupled static source/system, with ice protection if located in areas subject to ice accretion;** **2. equipment for measuring static pressure sensed by the static source, converting it to pressure altitude and displaying the pressure altitude to the flight crew:** **3. equipment for providing a digitally encoded signal corresponding to the displayed pressure altitude, for automatic altitude reporting purposes;**		Text added from TGL 6.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
4. static source error correction (SSEC), if needed to meet the performance criteria for RVSM flight envelopes; and **5. signals referenced to a flight crew selected altitude for automatic control and alerting. These signals will need to be derived from an altitude measurement system meeting the performance criteria for RVSM flight envelopes.** ***SPA.RVSM.110*** *RVSM equipment requirements*		
Subpart E – Low visibility operations (LVO)		The revised text is displayed in Subpart E – revised rule text.
~~**Section IV – Low visibility operations**~~	1/ Keep the Implementing Rules as close as possible to EU-OPS (as tasked), and refrain from detailed and/or extended procedure descriptions in AMC and GM.	1/ Revised rule text aligns with the content of EU-OPS and JAR-OPS 3 and raised several AMC standards to IR level. The revised rule text, however, as the NPA version, also aims to provide sufficient flexibility for operators to adapt standards to specific operations where required.
GM1 OPS.SPA.001.LVO Low visibility operations (LVO)		This GM is part of AMC1-SPA.LVO.125.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
GENERAL – TERMINOLOGY		
1. Low Visibility Operations include, as applicable:	1/ LVP and LVTO should be included in terminology as in EU-OPS 1.435	1/ Revised rule text includes these terms which are included in Annex I.
a. Manual take-off (with or without electronic guidance systems or Head-Up Guidance Landing System (HUDLS)/Hybrid Head-up display (HUD)/HUDLS);		
b. Auto-coupled approach to below Decision Height (DH), with manual flare, hover, landing and roll-out;	1/ change sequence of b. and c. to provide a logical order.	1/ text revised accordingly.
c. Approach flown with the use of a HUDLS/Hybrid HUD/HUDLS and/or Enhanced Vision system (EVS);		
d. Auto-coupled approach followed by auto-flare, hover, auto landing and manual roll-out; and		
e. Auto-coupled approach followed by auto-flare, hover, auto landing and auto-roll-out, when the applicable Runway Visual Range (RVR) is less than 400 m.	1/ Various stakeholders pointed out that this terminology is not in line with EU-OPS 1.440 and request an alignment with EU-OPS.	1/ Text is aligned with the wording of Appendix 1 to OPS 1.455.
Note 1: A hybrid system may be used with any of these modes of operations.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Note 2: Other forms of guidance systems or displays may be certificated and approved.		
2. Terms used have the following meaning:		These terms are moved to the Annex I and AMC to Annex I respectively.
a. Flight control system. A system which includes an automatic landing system and/or a hybrid landing system;		
b. Fail-Passive flight control system. A flight control system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude but the landing is not completed automatically. For a fail-passive automatic flight control system the pilot assumes control of the aeroplane after a failure;		
c. Fail-Operational flight control system. A flight control system is fail-operational if, in the event of a failure below alert height, the approach, flare and landing, can be completed automatically. In the event of a failure, the automatic landing system will operate as a fail passive system;		
d. Fail-operational hybrid landing system. A system which consists of a primary fail-passive automatic landing system and a secondary independent guidance system enabling the pilot to complete a landing manually after		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
failure of the primary system;		
e. Head-Up Display (HUD). A display system which presents flight information into the pilot's forward external field of view and which does not significantly restrict the external view;		
f. Head-Up Guidance Landing System (HUDLS). The total airborne system which provides head-up guidance to the pilot during the approach and landing and/or go-around. It includes all sensors, computers, power supplies, indications and controls. A HUDLS is typically used for primary approach guidance to decision heights of 50 ft;		
g. Hybrid Head-Up Display Landing System (Hybrid HUDLS). A system which consists of a primary fail-passive automatic landing system and a secondary independent HUD/HUDLS enabling the pilot to complete a landing manually after failure of the primary system;		
Note: Typically, the secondary independent HUD/HUDLS provides guidance which normally takes the form of command information, but it may alternatively be situation (or deviation) information.		
h. Lower than Standard Category I Operation. A Category I Instrument Approach and Landing Operation using Category I DH, with an RVR lower than would normally be		Replaced by a more detailed definition and moved to Annex I.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
associated with the applicable DH;		
i. Other than Standard Category II Operation. A Category II Instrument Approach and Landing Operation to a runway where some or all of the elements of the ICAO Annex 14 Precision Approach Category II lighting system are not available.		Replaced by a more detailed definition and moved to Annex I.
GM2 OPS.SPA.001.LVO Low visibility operations (LVO)		GM1-SPA.LVO.100.
DOCUMENTS CONTAINING INFORMATION RELATED TO LOW VISIBILITY OPERATIONS		
The following documents provide information related to LVO.	1/ it is recommended to add the ICAO EUR Doc 013: EUROPEAN GUIDANCE MATERIAL ON AERODROME OPERATIONS UNDER LIMITED VISIBILITY CONDITIONS which provides detailed information about low visibility procedures	1/ Reference added to GM1-SPA.LVO.100.
1. ICAO Annex 2 / Rules of the Air;		
2. ICAO Annex 6 / Operation of Aircraft;		
3. ICAO Annex 10 / Telecommunications Vol 1;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
4. ICAO Annex 14 / Aerodromes Vol 1;		
5. ICAO Doc 8186 / PANS - OPS Aircraft Operations;		
6. ICAO Doc 9365 / AWO Manual;		
7. ICAO Doc 9476 / SMGCS Manual (Surface Movement Guidance and Control Systems);		
8. ICAO Doc 9157 / Aerodrome Design Manual;		
9. ICAO Doc 9328 / Manual for RVR Assessment;		
10. ECAC Doc 17, Issue 3 (partly incorporated in this Part OPS); and		
11. CS-AWO (Airworthiness Certification).		
AMC OPS.SPA.001.LVO(b)(1) Low visibility operations (LVO)		AMC1-SPA.LVO.120.
FLIGHT CREW TRAINING	1/ Several comments claimed that this text has nothing to do with an AMC; It's only procedures description. It doesn't need to be so detailed.	1/ This text derives from Appendix 1 to 1.440 and is currently EU-OPS IR text. The text therefore cannot be deleted. To provide flexibility, however, it has been maintained

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		as AMC.
1. General. An operator should ensure that flight crew member training programmes for Low Visibility Operations include structured courses of ground, flight simulator and/or flight training. The operator may abbreviate the course content as prescribed by 1.2 and 1.3 below.		
1.1 Flight crew members with no Category II or Category III experience should complete the full training programme prescribed in 2, 3 and 4 below.		
1.2 Flight crew members with Category II or Category III experience with a similar type of operation (auto-coupled/auto-land, HUDLS/Hybrid HUDLS or EVS) or Category II with manual land if appropriate with another community operator may undertake an:		
a. Abbreviated ground-training course if operating a different type/class from that on which the previous Category II or Category III experience was gained;		
b. Abbreviated ground, Flight Simulator and/or flight training course if operating the same type/class and variant of the same type or class on which the previous Category II or Category III experience was gained. The abbreviated course is to include at least the provisions of 4.1, 4.2 a. or		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
4.2 b. as appropriate and 4.3 a. The operator may reduce the number of approaches/landings stated in 4.2 a. if the type/class or the variant of the type or class has the same or similar:		
i. Level of technology - Flight control/guidance system (FGS);		
ii. Operational Procedures;		
iii. Handling characteristics (see 4. below);		
iv. Use of HUDLS/Hybrid HUDLS;		
v. Use of EVS;		
as the previously operated type or class, otherwise 4.2 a. should be met in full.		
1.3 Flight crew members with Category II or Category III experience with the operator may undertake an abbreviated ground, Flight Simulator and/or flight training course. The abbreviated course when changing:		
a. aircraft type/class is to include at least the provisions of 4.1, 4.2 a. or 4.2 b. as appropriate and 4.3 a.;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
b. to a different variant of aircraft within the same type or class rating that has the same or similar:		
i. level of technology - flight control/guidance system (FGS); and		
ii. operational procedures- integrity;		
iii. handling characteristics (see 1.4 below);		
iv. use of HUDLS/Hybrid HUDLS;		
v. use of EVS;		
as the previously operated type or class, then a difference course or familiarisation appropriate to the change of variant fulfils the abbreviated course provisions.		
c. to a different variant of aircraft within the same type or class rating that has a significantly different:		
i. level of technology - flight control/guidance system (FGS);		
ii. operational procedures- integrity;		
iii. handling characteristics (see 1.4 below);		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
iv. use of HUDLS/Hybrid HUDLS;		
v use of EVS;		
then the provisions of 4.1, 4.2 a. or 4.2 b. as appropriate and 4.3 a. should be fulfilled. The operator may reduce the number of approaches/landings stated in 4.2 a.		
1.4 An operator should ensure when undertaking Category II or Category III operations with different variant(s) of aircraft within the same type or class rating that the differences and/or similarities of the aircraft concerned justify such operations, taking account at least the following:		
a. The level of technology, including the:		
i. FGS and associated displays and controls;		
ii. the Flight Management System and its integration or not with the FGS;		
iii. use of HUD/HUDLS with hybrid systems and/or EVS.		
b. Operational procedures, including:		
i. fail passive/fail operational, alert height;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
ii. manual landing/automatic landing;		
iii. no decision height operations;		
iv. use of HUD/HUDLS with hybrid systems.		
c. Handling characteristics, including:		
i. manual landing from automatic HUDLS and/or EVS guided approach;		
ii. manual go-around from automatic approach;		
iii. automatic/manual roll out.		
2. Ground Training. The initial ground training course for LVO should cover at least:		
a. the characteristics and limitations of the ILS and/or MLS;	1/ Low visibility operations (LVO) should contain XLS/GLS, notably in sections: 2.a and3.7.b.	1/ XLS would be too vague; XLS cannot be used for all LVO. Therefore all applicable facilities are mentioned.
b. the characteristics of the visual aids;		
c. the characteristics of fog;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
d. the operational capabilities and limitations of the particular airborne system to include HUD symbology and EVS characteristics if appropriate;		
e. the effects of precipitation, ice accretion, low level wind shear and turbulence;		
f. the effect of specific aircraft/system malfunctions;		
g. the use and limitations of RVR assessment systems;		
h. the principles of obstacle clearance requirements;		
i. recognition of and action to be taken in the event of failure of ground equipment;		
j. the procedures and precautions to be followed with regard to surface movement during operations when the RVR is 400 m or less and any additional procedures required for take-off in conditions below 150 m (200 m for Category D aeroplanes);		
k. the significance of decision heights based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on the automatic approach/landing systems;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
l. the importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height;		
m. the qualification requirements for pilots to obtain and retain approval to conduct Low Visibility Take-offs and Category II or III operations; and		
n. the importance of correct seating and eye position.		
3. Flight Simulator training and/or flight training		
3.1 Flight Simulator and/or flight training for LVO should include:		
a. checks of satisfactory functioning of equipment, both on the ground and in flight;		
b. effect on minima caused by changes in the status of ground installations;		
c. monitoring of:		
i. automatic flight control systems and autoland status annunciators with emphasis on the action to be taken in the event of failures of such systems; and		
ii. HUD/HUDLS/EVS guidance status and annunciators		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
as appropriate, to include Head Down Displays.		
d. actions to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control systems;		
e. the effect of known unserviceabilities and use of minimum equipment lists;		
f. operating limitations resulting from airworthiness certification;		
g. guidance on the visual cues required at decision height together with information on maximum deviation allowed from glide path or localiser; and		
h. the importance and significance of Alert Height, if applicable, and the action in the event of any failure above and below the Alert Height.		
3.2 An operator should ensure that each flight crew member is trained to carry out his duties and instructed on the coordination required with other crew members. Maximum use should be made of suitably equipped Flight Simulators for this purpose.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3.3 Training should be divided into phases covering normal operation with no aircraft or equipment failures but including all weather conditions which may be encountered and detailed scenarios of aircraft and equipment failure which could affect Category II or III operations. If the aircraft system involves the use of hybrid or other special systems (such as HUD/HUDLS or enhanced vision equipment) then flight crew members should practise the use of these systems in normal and abnormal modes during the Flight Simulator phase of training.		
3.4 Incapacitation procedures appropriate to Low Visibility Take-offs and Category II and III operations should be practised.		
3.5 For aircraft with no Flight Simulator available to represent that specific aircraft operators should ensure that the flight training phase specific to the visual scenarios of Category II operations is conducted in a Flight Simulator approved for that purpose by the competent authority. Such training should include a minimum of 4 approaches. The training and procedures that are type specific should be practised in the aircraft.		
3.6 Initial Category II and III training should include at least the following exercises:		
a. Approach using the appropriate flight guidance, autopilots and control systems installed in the aircraft, to the appropriate decision height and to include transition to		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
visual flight and landing;		
b. Approach with all engines operating using the appropriate flight guidance systems, autopilots, HUDLS and/or EVS and control systems installed in the aircraft down to the appropriate decision height followed by missed approach; all without external visual reference;		
c. Where appropriate, approaches utilising automatic flight systems to provide automatic flare, hover, landing and roll-out; and		
d. Normal operation of the applicable system both with and without acquisition of visual cues at decision height.		
3.7 Subsequent phases of training should include at least:		
a. approaches with engine failure at various stages on the approach;		
b. approaches with critical equipment failures (e.g. electrical systems, auto flight systems, ground and/or airborne XLS/GLS systems and status monitors);	1/ Low visibility operations (LVO) should contain XLS/GLS, notably in sections: 2.a and 3.7.b.	1/ XLS would be too vague; XLS cannot be used for all LVO. Therefore all applicable facilities are mentioned.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
c. approaches where failures of auto flight equipment and/or HUD/HUDLS/EVS at low level require either:		
i. reversion to manual flight to control flare, hover, landing and roll out or missed approach; or		
ii. reversion to manual flight or a downgraded automatic mode to control missed approaches from, at or below decision height including those which may result in a touchdown on the runway;		
d. failures of the systems which will result in excessive localiser and/or glide slope deviation, both above and below decision height, in the minimum visual conditions authorised for the operation. In addition, a continuation to a manual landing should be practised if a head-up display forms a downgraded mode of the automatic system or the head-up display forms the only flare mode; and		
e. failures and procedures specific to aircraft type or variant.		
3.8 The training programme should provide practice in handling faults which require a reversion to higher minima.		
3.9 The training programme should include the handling of the aircraft when, during a fail passive Category III approach, the fault causes the autopilot to disconnect at or below decision		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
height when the last reported RVR is 300 m or less.		
3.10 Where take-offs are conducted in RVRs of 400 m and below, training should be established to cover systems failures and engine failure resulting in continued as well as rejected take-offs.		
3.11 The training programme should include, where appropriate, approaches where failures of the HUDLS and/or EVS equipment at low level require either:		
a. Reversion to head down displays to control missed approach; or		
b. Reversion to flight with no, or downgraded, HUDLS Guidance to control missed approaches from decision height or below, including those which may result in a touchdown on the runway.		
3.12 An operator should ensure that when undertaking Low Visibility Take-off, Lower than Standard Category I, Other than Standard Category II, and Category II and III Operations utilising a HUD/HUDLS or Hybrid HUD/HUDLS or an EVS, that the training and checking programme includes, where appropriate, the use of the HUD/HUDLS in normal operations during all phases of flight.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
4. Conversion Training provisions to conduct Low Visibility Take-off, Lower than Standard Category I, Other than Standard Category II, Approach utilising EVS and Category II and III Operations. Each flight crew member should complete the following Low Visibility Procedures training if converting to a new type/class or variant of aircraft in which Low Visibility Take-off, Lower than Standard Category I, Other than Standard Category II Approaches utilising EVS with an RVR of 800 m or less and Category II and III Operations will be conducted. The necessary flight crew member experience to undertake an abbreviated course is prescribed in 1.2, 1.3 and 1.4 above.		
4.1 Ground Training. The appropriate provisions prescribed in 2. above, taking into account the flight crew member's Category II and Category III training and experience.		
4.2 Flight Simulator Training and/or Flight training:		
a. A minimum of 6 (8 for HUDLS with or without EVS) approaches and/or landings in a Flight Simulator approved for the purpose. The 8 HUDLS approaches may be reduced to 6 when conducting Hybrid HUDLS operations. See 4.4a. below;		
b. Where no Flight Simulator is available to represent that specific aircraft, a minimum of 3 (5 for HUDLS and/or		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
EVS) approaches including at least 1 go-around should be flown on the aircraft. For Hybrid HUDLS operations a minimum of 3 approaches should be flown, including at least 1 go-around;		
c. Appropriate additional training if any special equipment is required such as head-up displays or enhanced vision equipment. When approach operations utilising EVS are conducted with an RVR of less than 800 m, a minimum of 5 approaches, including at least one go-around should be flown on the aircraft.		
4.3 Flight Crew Qualification is specific to the operator and the type of aircraft operated.		
a. The operator should ensure that each flight crew member completes a check before conducting Category II or III operations.		
b. The check prescribed in 4.3 a. above may be replaced by successful completion of the Flight Simulator and/or flight training prescribed in 4.2 above.	1/ The option to substitute the check with training even if it is successfully is not acceptable.	1/ This is the rule applied today in EU-OPS. The revised rule text does not alter this provision.
4.4 Line Flying under Supervision. An operator should ensure that each flight crew member undergoes the following line flying under supervision (LIFUS):		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. For Category II when a manual landing or a HUDLS approach to touchdown is required, a minimum of:		
i. 3 landings from autopilot disconnect;		
ii. 4 landings with HUDLS used to touchdown;		
except that only 1 manual landing (2 using HUDLS to touchdown) is required when the training in 4.2 above has been carried out in a Flight Simulator qualified for zero flight time conversion.		
b. For Category III, a minimum of 2 auto lands except that:		
i. only 1 auto land is required when the training in 4.2 above has been carried out in a Flight Simulator qualified useable for zero flight time conversion;		
ii. no auto land is required during LIFUS when the training in 4.2 above has been carried out in a Flight Simulator qualified for Zero Flight Time (ZFT) conversion and the flight crew member successfully completed the ZFT type rating conversion course;		
iii. the flight crew member, trained and qualified in accordance with 4.4b.ii. above, is qualified to operate		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
during the conduct of LIFUS to the lowest approved DA(H) and RVR as stipulated in the Operations Manual.		
c. For Category III approaches using HUDLS to touchdown a minimum of 4 approaches.		
5. Type and command experience.		
5.1 Before commencing Category II operations, the following additional provisions are applicable to the pilot-in-command, or pilots to whom conduct of the flight may be delegated, who are new to the aircraft type/class:		
a. 50 hours or 20 sectors on the type, including line flying under supervision; and		
b. 100 m should be added to the applicable Category II RVR minima when the operation requires a Category II manual landing or use of HUDLS to touchdown until:		
i. a total of 100 hours or 40 sectors, including LIFUS has been achieved on the type; or		
ii. a total of 50 hours or 20 sectors, including LIFUS has been achieved on the type where the flight crew member has been previously qualified for Category II manual landing operations with a Community		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
operator.		
iii. For HUDLS operations the sector requirements in 5.1 and 5.2 a. should always be applicable, the hours on type/class does not fulfil the requirement.		
5.2 Before commencing Category III operations, the following additional provisions are applicable to the pilot-in-command, or pilots to whom conduct of the flight may be delegated, who are new to the aircraft type:		
a. 50 hours or 20 sectors on the type, including line flying under supervision; and		
b. 100 m should be added to the applicable Category II or Category III RVR minima unless he has previously qualified for Category II or III operations with a Community operator, until a total of 100 hours or 40 sectors, including line flying under supervision, has been achieved on the type.	1/ Several commentators pointed out that this AMC derives from EU-OPS 1 Appendix 1 to OPS 1.450. The paragraph (e) 3 of the Appendix has been deleted. This paragraph reads: "The Authority may authorize a reduction in the above command experience requirements for flight crew members who have Category II or Category III command experience." The Agency should explain why this paragraph has	1/ This paragraph has been deleted because it would be subject to the AltAMC procedure, which, for AOC holders, would require an authorisation of the competent authority. The text would be redundant.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	been deleted or add this paragraph as a paragraph 5.3 of the AMC.	
6. Low Visibility Take-Off with RVR less than 150/200 m.		
6.1 Prior to authorisation to conduct take-offs in RVRs below 150 m (below 200 m for Category D aeroplanes) the following training should be carried out:		
a. Normal take-off in minimum authorised RVR conditions;		
b. Take-off in minimum authorised RVR conditions with an engine failure:		
i. for aeroplanes between V_1 and V_2, or as soon as safety considerations permit;		
ii. For helicopters at or after Take-off decision point (TDP); and		
c. Take-off in minimum authorised RVR conditions with an engine failure:		
i. for aeroplanes before V_1 resulting in a rejected take-off;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
ii. for helicopters before the TDP.		
6.2 The training described in 6.1 above should be carried out in an approved Flight Simulator. This training should include the use of any special procedures and equipment. Where no approved Flight Simulator is available to represent that specific aircraft, such training may be conducted in an aircraft without the requirement for minimum RVR conditions.		
6.3 A flight crew member should have completed a check before conducting low visibility take-offs in RVRs of less than 150 m (less than 200 m for Category D aeroplanes), if applicable. The check may only be replaced by successful completion of the Flight Simulator and/or flight training prescribed in 6.1 on initial conversion to an aircraft type.		
7. Recurrent Training and Checking – Low Visibility Operations		
7.1 An operator should ensure that, in conjunction with the normal recurrent training and operator proficiency checks, a pilot's knowledge and ability to perform the tasks associated with the particular category of operation, including Low Visibility Take-Off (LVTO), for which he/she is authorised is checked. The number of approaches to be undertaken in the Flight Simulator within the validity period of the operator proficiency check is to be a minimum of 2 (4 when HUDLS and/or EVS is utilized to	1/ This paragraph is built on requirements for commercial operators, which have to do OPC's. This is not required for non-commercial operators. An additional simulator training event is very demanding for smaller operators and not really necessary,	1/ Revised text uses "operator's proficiency check" taking into account that this standard also applies to non-commercial operators.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
touchdown) one of which should be a landing at the lowest approved RVR; in addition 1 (2 for HUDLS and/or operations utilising EVS) of these approaches may be substituted by an approach and landing in the aircraft using approved Category II or III procedures. One missed approach should be flown during the conduct of the operator proficiency check. If the operator is authorised to conduct take-off with RVR less than 150/200 m, at least one LVTO to the lowest applicable minima should be flown during the conduct of the operator proficiency check. (See GM OPS.SPA.001.LVO (b)(1).)	taking in account the small number of training approaches required. This simulator training could be compensated by an adequate recency requirement. Suggestion: Change wording of Operator Proficiency Check into Proficiency Check, thus also including the LPC. Alternatively: Add at the end of No. 7.1: Non-commercial operators operating CAT II approaches and LVTO's: The above mentioned requirements have to be fulfilled during the validity period of the LPC and when conducting the LPC. For non-commercial operators, not conducting flight simulator training every 6 months, there is an additional recency requirement for 2 approaches and landings in the aircraft using approved CAT II procedures during the last 90 days.	
The number of approaches to be conducted during such recurrent training is to be a minimum of two, one of which is to be a missed approach and at least one low visibility take-off to the lowest applicable minima. The period of validity for this check should be 6 months including the remainder of the month	1/ Several commentators pointed out that this paragraph which has been added to the EU-OPS text is redundant and should be deleted.	1/ Text deleted in the revised text.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
of issue.		
7.2 For Category III operations an operator should use a Flight Simulator approved for that purpose.		
7.3 For Category III operations on aircraft with a fail passive flight control system, including HUDLS, a missed approach should be completed at least once over the period of three consecutive operator proficiency checks as the result of an autopilot failure at or below decision height when the last reported RVR was 300 m or less.		
7.4 The competent authority may authorise recurrent training and checking for Category II and LVTO operations in an aircraft type where no approved Flight Simulator to represent that specific aircraft or an acceptable alternate is available.		
Recency for LVTO and Category II/III based upon automatic approaches and/or auto-lands is maintained by the recurrent training and checking as prescribed in this paragraph.		
8. Additional training provisions for operators conducting Lower than Standard Category I, Approaches utilising EVS and Other than Standard Category II Operations	1/ Proposed Action: add any specific training requirement for Lower than standard CAT I with autoland.	1/ to be within the scope of a new rule making task.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
8.1 Operators conducting Lower than Standard Category I operations should comply with this Acceptable Means of Compliance (AMC) applicable to Category II operations to include the provisions applicable to HUDLS (if appropriate). The operator may combine these additional provisions, where appropriate, provided that the operational procedures are compatible. During conversion training the total number of approaches should not be additional to the requirements of Part-OR, provided the training is conducted utilising the lowest applicable RVR. During recurrent training and checking the operator may also combine the separate provisions provided the above operational procedure provision is met, provided that at least one approach using Lower than Standard Category I minima is conducted at least once every 18 months.		
8.2 Operators conducting Other than Standard Category II operations should comply with this AMC applicable to Category II operations to include the provisions applicable to HUDLS (if appropriate). The operator may combine these additional provisions, where appropriate, provided that the operational procedures are compatible. During conversion training the total number of approaches should not be less than those to complete Category II training utilising a HUD/HUDLS. During recurrent training and checking the operator may also combine the separate provisions provided the above operational procedure provision is met, provided that at least one approach using Other than Standard Category II minima is conducted at		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
least once every 18 months.		
8.3 Operators conducting Approach Operations utilising EVS with RVR of 800 m or less should comply with this AMC applicable to Category II operations to include the requirements applicable to HUD (if appropriate). The operator may combine these additional provisions, where appropriate, provided that the operational procedures are compatible. During conversion training the total number of approaches should not be less than those to complete Category II training utilising a HUD. During recurrent training and checking the operator may also combine the separate provisions provided the above operational procedure provision is met, provided that at least one approach utilising EVS is conducted at least once every 12 months.		
GM- OPS.SPA.001.LVO(b)(1) Low visibility operations (LVO)		GM1-SPA.LVO.120.
FLIGHT CREW TRAINING		
The number of approaches referred to in AMC OPS.SPA.001.LVO (b)(1) 7.1 includes one approach and landing that may be conducted in the aircraft using approved Category II/III procedures. This approach and landing may be conducted in normal line operation or as a training flight.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
AMC OPS.SPA.001.LVO(b)(2) Low visibility operations (LVO)		AMC1-SPA.LVO.110.
USE OF ENHANCED VISION SYSTEMS (EVS)		
1. A pilot using a certificated enhanced vision system in accordance with the procedures and limitations of the approved flight manual may:		
a. continue an approach below DH or MDH to 100 feet above the threshold elevation of the runway provided that at least one of the following visual references is displayed and identifiable on the enhanced vision system:		
i. Elements of the approach lighting; or		
ii. The runway threshold, identified by at least one of the following: the beginning of the runway landing surface, the threshold lights, the threshold identification lights; and the touchdown zone, identified by at least one of the following: the runway touchdown zone landing surface, the touchdown zone lights, the touchdown zone markings or the runway lights.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
b. reduce the calculated RVR/CMV for the approach from the value in column 1 of Table 1 below to the value in column 2:		
Table 1 –Approach utilising EVS RVR/CMV Reduction vs Normal RVR/CMV		

RVR/CMV Normally required	RVR/CMV for approach utilising EVS
550	350
600	400
650	450
700	450
750	500
800	550
900	600
1000	650
1100	750
1200	800

A: Rule		B: Summary of comments	C: Reasons for change, remarks
1300	900		
1400	900		
1500	1000		
1600	1100		
1700	1100		
1800	1200		
1900	1300		
2000	1300		
2100	1400		
2200	1500		
2300	1500		
2400	1600		
2500	1700		
2600	1700		
2700	1800		

A: Rule		B: Summary of comments	C: Reasons for change, remarks
2800	1900		
2900	1900		
3000	2000		
3100	2000		
3200	2100		
3300	2200		
3400	2200		
3500	2300		
3600	2400		
3700	2400		
3800	2500		
3900	2600		
4000	2600		
4100	2700		
4200	2800		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
4300 — 2800 4400 — 2900 4500 — 3000 4600 — 3000 4700 — 3100 4800 — 3200 4900 — 3200 5000 — 3300 2. Paragraph 1 above may only be used for Instrument Landing System (ILS), Microwave Landing System (MLS), Precision Approach Radar (PAR), GNSS Landing System (GLS) and Approaches with Vertical Guidance (APV) Operations with a DH no lower than 200 feet or an approach flown using approved vertical flight path guidance to a MDH or DH no lower than 250 feet.		
3. A pilot may not continue an approach below 100 feet above runway threshold elevation for the intended runway, unless at least one of the visual references specified below is distinctly visible and identifiable to the pilot without reliance on the		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
enhanced vision system:		
a. The lights or markings of the threshold; or		
b. The lights or markings of the touchdown zone.		
GM- OPS.SPA.001.LVO(b)(2) Low visibility operations (LVO)		GM1-SPA.LVO.110.
USE OF ENHANCED VISION SYSTEMS (EVS)		
1. Introduction		
1.1 Enhanced vision systems use sensing technology to improve a pilot's ability to detect objects, such as runway lights or terrain, which may otherwise not be visible. The image produced from the sensor and/or image processor can be displayed to the pilot in a number of ways including use of a head up display. The systems can be used in all phases of flight and can improve situational awareness. In particular, infrared systems can display terrain during operations at night, improve situational awareness during night and low-visibility taxiing, and may allow earlier acquisition of visual references during instrument approaches.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2. Background to EVS provisions		
2.1 The provisions for EVS were developed after an operational evaluation of two different EVS systems, along with data and support kindly provided by the FAA. Approaches using EVS were flown in a variety of conditions including fog, rain and snow showers, as well as at night to aerodromes located in mountainous terrain. The infrared EVS performance can vary depending on the weather conditions encountered. Therefore, the provisions take a conservative approach to cater for the wide variety of conditions which may be encountered. It may be necessary to amend the provisions in the future to take account of greater operational experience.		
2.2 Provisions for the use of EVS during take-off have not been developed. The systems evaluated did not perform well when the RVR was below 300 metres. There may be some benefit for use of EVS during take-off with greater visibility and reduced lighting; however, such operations would need to be evaluated.		
2.3 Provisions have been developed to cover use of infrared systems only. Other sensing technologies are not intended to be excluded; however, their use will need to be evaluated to determine the appropriateness of this, or any other provision. During the development, it was envisaged what minimum equipment should be fitted to the aircraft. Given the present state of technological development, it is considered that a HUD		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
is an essential element of the EVS equipment.		
2.4 In order to avoid the need for tailored charts for approaches utilising EVS, it is envisaged that an operator will use AMC OPS.SPA.001.LVO(b)(2) Table 1 – Approach utilising EVS RVR/CMV Reduction vs. Normal RVR/CMV to determine the applicable RVR at the commencement of the approach.		
3. Additional operational considerations		
3.1 Enhanced vision system equipment should have:		
a. a head-up display system (capable of displaying, airspeed, vertical speed, aircraft attitude, heading, altitude, command guidance as appropriate for the approach to be flown, path deviation indications, flight path vector, and flight path angle reference cue and the EVS imagery);		
b. for two-pilot operation, a head-down view of the EVS image, or other means of displaying the EVS-derived information easily to the pilot monitoring the progress of the approach.	1/ A commentator took the view that having two pilots monitoring the aircraft trajectory using information - EVS image - coming from the same sensor - EVS infrared camera - is not "safety-oriented". The commentator proposes to remove this paragraph.	1-2/ After a safety assessment of the original ACJ text, there was common agreement that there is no need to modify the text for the time being.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	2/ Another commentator suggested that the specific requirements levied in this paragraph are too restrictive. A monitoring pilot could be effective through the use of other tools than just "a head-down view of the EVS image, or other means of displaying the EVS-derived information ...."Recommendation: For a two-pilot operation, the monitoring pilot should have a means of readily identifying the vertical and horizontal accuracy of the aircraft position in relation to the runway."	
If the aircraft is equipped with a radio altimeter, it should be used only as enhanced terrain awareness during approach using EVS and should not be taken into account for the operational procedures development.	1/ This is in contradiction with OPS.SPA.010.LVO which specifies that an LVO needs a radio altimeter to define the DH.	1/ Text deleted because it would be in contradiction with SPA.LVO.100.
4. Two-pilot operations		
4.1 For operations in RVRs below 550 m, two-pilot operation is required.	1/ The FAA pointed out that in the US, there are operators who are approved to perform operations as low as CAT II with a single pilot. The requirement to have two pilots	1/ Noted. Text is maintained as it transposes the content of EU-OPS.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	below 550 m would stand in conflict with this and not allow operators to take advantage of the safety benefits afforded by the use of EVS. An additional inconsistency with the delineation of a 550 m restriction is that it would cut into the realm of the lower-than-standard CAT I operations. Recommendation: Recommend removing paragraph 4 in its entirety.	
4.2 The provision for a head-down view of the EVS image is intended to cover for multi-pilot philosophy. The pilot not-flying (PNF) is kept in the 'loop' and Crew Resource Management (CRM) does not break down. The PNF can be very isolated from the information necessary for monitoring flight progress and decision making if the PF is the only one to have the EVS image.	1/ A commentator took the view that having two pilots monitoring the aircraft trajectory using information - EVS image - coming from the same sensor - EVS infrared camera - is not "safety-oriented". The commentator proposes to remove this paragraph.	1/ After a safety assessment of the original ACJ text, there was common agreement that there is no need to modify the text for the time being.
AMC OPS.SPA.001.LVO(b)(2)(iii) Low visibility operations (LVO)		AMC1-SPA.LVO.125

A: Rule	B: Summary of comments	C: Reasons for change, remarks
NORMAL PROCEDURES		
1. An operator should establish procedures and instructions to be used for Low Visibility Take-Off, approaches utilising EVS, Lower than Standard Category I, Other than Standard Category II and Category II and III operations. These procedures should be included in the operations manual and contain the duties of flight crew members during taxiing, take-off, approach, flare, the hover, landing, roll-out and missed approach, as appropriate.		
2. An operator should specify the detailed operating procedures and instructions in the operations manual. The instructions should be compatible with the limitations and mandatory procedures contained in the Flight Manual and cover the following items in particular:		
a. Checks for the satisfactory functioning of the aircraft equipment, both before departure and in flight;		
b. Effect on minima caused by changes in the status of the ground installations and airborne equipment;		
c. Procedures for the take-off, approach, flare, hover, landing, roll-out and missed approach;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
d. Procedures to be followed in the event of failures, warnings to include HUD/HUDLS/EVS and other non-normal situations;		
e. The minimum visual reference required;		
f. The importance of correct seating and eye position;		
g. Action which may be necessary arising from a deterioration of the visual reference;		
h. Allocation of crew duties in the carrying out of the procedures according to 2.a to 2.d and 2.f above, to allow the pilot-in-command to devote himself mainly to supervision and decision making;		
i. The requirement for all height calls below 200 ft to be based on the radio altimeter and for one pilot to continue to monitor the aircraft instruments until the landing is completed;		
j. The requirement for the ILS Sensitive Area to be protected;	1/ The requirement for the ILS sensitive area to be protected in case of Lower than CAT I operations - is this requirement applicable down to 200ft, or to the threshold? In other terms do we have to protect for the signal on	1/ needs to be addressed in a multi-disciplinary RM task.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	the visual segment? This is quite important to know as a CAT I airport does not have CAT II holding positions for example. At several other places this requirement has been extended to have LVP to be in force. LVPs cover more than ILS signal protection. Finally ILS is not the only system that can support LVO. The same requirement should apply to the other eligible systems. There is no section that identifies the requirements when low visibility procedures are in force. There is no clarification regarding ATM procedures for low visibility take-off and the ones for approach and landing. Proposed action: Clarify the exact operation requirement vis-a-vis the protection needed on the ground. Take into consideration other landing system protection criteria (e.g. MLS). Add a section for when LVP are in force. Add a section clarifying LVP applicability: for take-off or for approach and landing.	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
k. The use of information relating to wind velocity, wind shear, turbulence, runway contamination and use of multiple RVR assessments;		
l. Procedures to be used for:		
i. Lower than Standard Category I;		
ii. Other than Standard Category II;		
iii. Approaches utilising EVS; and		
iv. Practice approaches and landing on runways at which the full Category II or Category III aerodrome procedures are not in force;		
m. Operating limitations resulting from airworthiness certification; and		
n. Information on the maximum deviation allowed from the ILS glide path and/or localiser.		
GM1 OPS.SPA.001.LVO(b)(2)(iii) Low visibility operations (LVO)		AMC1-SPA.LVO.125
NORMAL PROCEDURES		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
The precise nature and scope of procedures and instructions given depend upon the airborne equipment used and the cockpit procedures followed. An operator should clearly define flight crew member duties during take-off, approach, flare, hover, roll-out and missed approach in the Operations Manual. Particular emphasis should be placed on flight crew responsibilities during transition from non-visual conditions to visual conditions, and on the procedures to be used in deteriorating visibility or when failures occur. Special attention should be paid to the distribution of flight deck duties so as to ensure that the workload of the pilot making the decision to land or execute a missed approach enables him to devote himself to supervision and the decision making process.		
GM2 OPS.SPA.001.LVO(b)(2)(iii) Low visibility operations (LVO)		GM1-SPA.LVO.125
NORMAL PROCEDURES – USE OF AUTOLAND SYSTEMS WHEN LOW VISIBILITY PROCEDURES ARE NOT IN FORCE		
1. Introduction		
a. Most Instrument Landing System (ILS) installations are subject to signal interference by either surface vehicles or aircraft. To prevent this interference ILS critical areas are established near each localizer and glide slope antenna. For Category II and III ILS installations, additionally an	1/ The acronym LLZ is not used in the US or ICAO. LOC is the correct acronym for localizer. Recommendation: Recommend	1/ LLZ has been changed into LOC. 2/ Text revised accordingly.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
ILS sensitive area is established. The critical areas are restricted from all vehicle or aircraft operation when the ILS is being used, or at least when an aircraft is inside the Outer Marker (OM) or equivalent position. At US airports the Localisor (LLZ) and GP critical areas will be protected when weather at the airport is reported less than 800 feet ceiling and/or visibility is less than 2 miles with an aircraft inside the OM or equivalent position.	changing LLZ to LOC. 2/ Text revision proposed: At US airports the localisor (LOC) and GP critical area protection will begin when weather at the airport is reported less than 800 feet ceiling and/or visibility is less than 2 miles and will be fully protected when the ceiling is less than 200 feet and/or the visibility is RVR 2 000 or less, when an arriving aircraft is inside the ILS MM.	
b. The ILS sensitive area is protected from all surface vehicles and aircraft when ILS Category II or III operations are conducted or anticipated. This typically takes place when landing operations are conducted with Runway Visual Range (RVR) less than 600 m or with a ceiling of less than 200 feet. At US airports the sensitive area is called the "ILS critical area" (not to be confused with the LLZ or GP critical areas which are smaller). The US ILS critical area is protected during the corresponding conditions. The operators need to inform their pilots about the differences in terminology which are summarised in the following Table:		
EU / EASA | US / FAA		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
<table><tr><td>ILS Critical Area(s)</td><td>LLZ & GP Critical Areas</td></tr><tr><td>ILS Sensitive Area</td><td>ILS Critical Area</td></tr></table> c. LVPs on an aerodrome basically have two main objectives: to prevent collisions involving an aircraft on the aerodrome and to ensure that the ILS sensitive area is protected. To find out if LVPs are in force, the pilots need to contact Air Traffic Control (ATC) or listen to the Air Traffic Information System (ATIS).		
d. When the LVPs are not in force, ILS beam bends may occur because of vehicle or aircraft interference. Sudden and unexpected flight control movements may occur at a very low altitude or during the landing and roll-out when the autopilot attempts to follow the beam bends. A Category I ILS is not required to support autoland operations although it is recognised that some Category I ILS facilities can support autoland operations. Unless specifically mentioned in the Aeronautical Information Publication (AIP), it must be assumed that ILS signals to Category I runways are not flight inspected below 100 feet Above Ground Level (AGL), and therefore guidance signal anomalies may be encountered below this altitude without advance warnings.		
2. Auto land operational considerations		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. Auto land operations are performed as follows:		
i. For actual Category III operations;		
ii. For actual Category II operations with Category D aircrafts when using an RVR less than 350 metres;		
iii. For crew qualification and recency;		
iv. For operational demonstration and in-service proving; or		
v. For system verification (scheduled maintenance and corrective maintenance).		
b. Additionally, operators recommend their pilots to perform auto land operations in order to reduce crew work load, in particular during marginal weather conditions.		
c. Cases 2.a.i. and 2.a.ii. above require the full protection of the ILS, whereas in the other cases, Category I standard is acceptable, provided that the pilot-in-command is informed. In the latter cases the crew will be expected to have sufficient visual references to detect and correct any deviations from the expected flight path.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
d. For case 2.a.iii. Flight Simulators may be used instead.		
e. For case 2.a.iv., a proportion of the number of automatic landings required by the operators when introducing a new aircraft type may be done on Cat I facilities for practical reasons. This reduces the number of auto lands significantly. As a compensation, this work includes a requirement to verify the auto land capability for all combinations of airframe/onboard equipment and runways and ground equipment. These automatic landings will need to be done in Category I or II conditions. In order to reduce the burden on operators and aerodromes, it would be beneficial if operators using the same type of airframe/equipment/procedures could take credit for each other experiences.		
3. The problems and potential risks of performing auto-land operations on ILS facilities or runways not meeting CAT II/III standards:		
a. Where the ILS Auto land system is to be used on an ILS facility not meeting the CAT II/III standards, it should be realised that a number of factors may influence the accuracy of the localiser signal:		
i. Since the ILS sensitive area protection is not assured, other aircraft and vehicles may cause disturbance to		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
the localiser signal;		
ii. Switch-over time of the ground aids may not be in accordance with the requirements for Cat III;		
iii. The pre-threshold terrain may contain irregularities which may cause abnormal autopilot behaviour.		
b. The quality of the ILS signal may not support an automatic coupling since this is not a requirement for a CAT I ILS. In some cases where known inadequacies of the ILS are present, this will be mentioned in the AIP.		
c. Sudden and unexpected flight control movements may occur at a very low altitude or during the landing and rollout when the autopilot attempts to follow the beam bends.		
4. Operational procedures to ensure the safety of auto land:		
a. when auto land operations are conducted, the operational procedures should be used fully regardless of the weather conditions;		
b. Flight crews should be alert to the possibility of abnormal autopilot behaviour and guard the flight controls (control wheel, rudder pedals, and thrust levers) throughout all		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
automatic approaches and landings. They should be prepared to disconnect the autopilot and manually land or go-around. Attempts to override the autopilot in lieu of a disconnect is not recommended due to the forces required to overpower the autopilot servos;		
c. The ATC should be informed about the intention to conduct an auto land. Such information should not be taken as a request for or expectation of the protection of the ILS but is merely given to enhance the possibility for ATC to inform the flight crew of any known or anticipated disturbance;		
Note: In some States, the hours where practice auto land operations can expect full protection of the ILS sensitive area, are published in the AIP.		
d. The operator should include the appropriate instructions in the Operations Manual.		
AMC1 OPS.SPA.001.LVO(b)(3) Low visibility operations (LVO)		AMC1-SPA.LVO.105-
OPERATIONAL DEMONSTRATION AND DATA COLLECTION/ANALYSIS	1/ Commentators reminded that at the Air Safety Committee, the European Commission, at the request of several Member States, has asked EASA to review this requirement and its practical	1/ Noted.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	implications.	
1. Operational Demonstration for aeroplanes		
1.1 The purpose of the operational demonstration is to determine or validate the use and effectiveness of the applicable aircraft flight guidance systems, including HUDLS if appropriate, training, flight crew procedures, maintenance programme, and manuals applicable to the Category II/III programme being approved.		
a. At least 30 approaches and landings should be accomplished in operations using the Category II/III systems installed in each aircraft type if the requested Decision Height (DH) is 50 ft or higher. If the DH is less than 50 ft, at least 100 approaches and landings should be accomplished.	1/ A manufacturer recommended the following text proposal: The number of approaches or landings where decision height (DH) is 50 ft or higher, or where the DH is less than 50 ft, is approved through Part-21. 2/ EU-OPS allowed for authorities' discretion about the amount of approaches and landings. Proposal: Add: "unless otherwise approved by the competent authority"	1/ This operational rule needs for the time being to be addressed in the OPS rules. This does not exclude that, with the introduction of the OSD, this provision may be revised. 2/ This has been deleted because it would be subject to an AltAMC procedure which would require an approval of the competent authority for AOC holders.
b. If an operator has different variants of the same type of aircraft utilising the same basic flight control and display		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
systems, or different basic flight control and display systems on the same type of aircraft, the operator should show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant. The number of approach and landings may be reduced based on the experience gained by another Community operator using the same aeroplane type or variant and procedures.		
c. If the number of unsuccessful approaches exceeds 5 % of the total (e.g. unsatisfactory landings, system disconnects) the evaluation programme should be extended in steps of at least 10 approaches and landings until the overall failure rate does not exceed 5 %.		
1.2 Data collection for operational demonstrations. Each applicant should develop a data collection method (e.g. a form to be used by the flight crew) to record approach and landing performance. The resulting data and a summary of the demonstration data should be made available to the competent authority for evaluation.		
1.3 Data analysis. Unsatisfactory approaches and/or automatic landings should be documented and analysed.		
2. Operational demonstration for helicopters		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2.1 The operator should comply with the provisions prescribed in 2.2 below when introducing a helicopter type which is new to the Community into Category II or III service.		
For helicopter types already used for Category II or III operations in another Member State, the in-service proving programme in 2.4 should be used instead.		
a. Operational reliability. The Category II and III success rate should not be less than that required by CS-AWO or its equivalent.		
b. Criteria for a successful approach. An approach is regarded as successful if:		
i. The criteria are as specified in CS-AWO or its equivalent;		
ii. No relevant helicopter system failure occurs.		
2.2 Data Collection during Airborne System Demonstration - General		
a. An operator should establish a reporting system to enable checks and periodic reviews to be made during the operational evaluation period before the operator is approved to conduct Category II or III operations. The		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
reporting system should cover all successful and unsuccessful approaches, with reasons for the latter, and include a record of system component failures. This reporting system should be based upon flight crew reports and automatic recordings as prescribed in 2.3 and 2.4 below.		
b. The recordings of approaches may be made during normal line flights or during other flights performed by the operator.		
2.3 Data Collection during Airborne System Demonstration – Operations with DH not less than 50 ft		
a. For operations with DH not less than 50 ft, data should be recorded and evaluated by the operator and evaluated by the competent authority when necessary.		
b. It is sufficient for the following data to be recorded by the flight crew:		
i. FATO and runway used;		
ii. Weather conditions;		
iii. Time;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
iv. Reason for failure leading to an aborted approach;		
v. Adequacy of speed control;		
vi. Trim at time of automatic flight control system disengagement;		
vii. Compatibility of automatic flight control system, flight director and raw data;		
viii. An indication of the position of the helicopter relative to the ILS centreline when descending through 30 m (100 ft); and		
ix. Touchdown position.		
c. The number of approaches made during the initial evaluation should be sufficient to demonstrate that the performance of the system in actual airline service is such that a 90 % confidence and a 95 % approach success will result.		
2.4 Data Collection during Airborne System Demonstration – Operations with DH less than 50 ft or no DH:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. For operations with DH less than 50 ft or no DH, a flight data recorder, or other equipment giving the appropriate information, should be used in addition to the flight crew reports to confirm that the system performs as designed in actual airline service. The following data should be recorded:		
i. Distribution of ILS deviations at 30 m (100 ft), at touchdown and, if appropriate, at disconnection of the roll-out control system and the maximum values of the deviations between those points; and		
ii. Sink rate at touchdown.		
b. Any landing irregularity should be fully investigated using all available data to determine its cause.		
2.5 In-service proving		
An operator fulfilling the provisions of 2.2 above will be deemed to have met the in-service proving contained in this paragraph.		
a. The system should demonstrate reliability and performance in line operations consistent with the operational concepts. A sufficient number of successful landings should be accomplished in line operations, including training flights, using the auto land and roll-out		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
system installed in each helicopter type.		
b. The demonstration should be accomplished using a Category II or Category III ILS. Demonstrations may be made on other ILS facilities if sufficient data is recorded to determine the cause of unsatisfactory performance.		
c. If an operator has different variants of the same type of helicopter utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of helicopter, the operator should show that the variants comply with the basic system performance criteria, but the operator need not conduct a full operational demonstration for each variant.		
d. Where an operator introduces a helicopter type which has already been approved by the competent authority of any Member State for Category II and/or III operations a reduced proving programme may be approved.		
3. All aircraft		
3.1 Continuous Monitoring		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. After obtaining the initial authorisation, the operations should be continuously monitored by the operator to detect any undesirable trends before they become hazardous. Flight crew reports may be used to achieve this.		
b. The following information should be retained for a period of 12 months:		
i. The total number of approaches, by aircraft type, where the airborne Category II or III equipment was utilised to make satisfactory, actual or practice, approaches to the applicable Category II or III minima; and		
ii. Reports of unsatisfactory approaches and/or automatic landings, by aerodrome and aircraft registration, in the following categories:		
A. Airborne equipment faults;		
B. Ground facility difficulties;		
C. Missed approaches because of ATC instructions; or		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
D. Other reasons.		
c. An operator should establish a procedure to monitor the performance of the automatic landing system or HUDLS to touchdown performance, as appropriate, of each aircraft.		
3.2 Transitional periods		
a. Operators with no previous Category II or III experience:		
i. An operator without previous Category II or III operational experience may be approved for Category II or IIIA operations, having gained a minimum experience of 6 months of Category I operations on the aircraft type.		
ii. On completing 6 months of Category II or IIIA operations on the aircraft type the operator may be approved for Category IIIB operations. When granting such an approval, the competent authority may impose higher minima than the lowest applicable for an additional period. The increase in minima will normally only refer to RVR and/or a restriction against operations with no decision height and shall be selected such that they will not require any		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
change of the operational procedures.		
b. Operators with previous Category II or III experience:		
i. An operator with previous Category II or III experience may obtain a reduced transition period.		
ii. An operator authorised for Category II or III operations using auto-coupled approach procedures, with or without auto-land, and subsequently introducing manually flown Category II or III operations using a HUDLS should be considered to be a "New Category II/III operator" for the purposes of the demonstration period provisions.		
3.3 Maintenance of Category II, Category III and LVTO equipment. Maintenance instructions for the on-board guidance systems shall be established by the operator, in liaison with the manufacturer, and included in the operator's aircraft maintenance programme in accordance with Part-M.		
3.4 Eligible Aerodromes and Runways	1/ Several commentators strongly requested to delete these provisions, which they consider an administrative burden without safety benefits.	1/ After an in-depth assessment of all comments received it was decided to keep the provision in the AMC. This would provide operators the possibility to

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	2/ Other commentators took a contrary position and requested to clearly state that compliance with requirement 3.4 is required continuously throughout the operation and not only at the time of the initial application of the Cat II and Cat III special approval.	propose AltAMC if a safe operations with other means can be demonstrated.
a. Each aircraft type/runway combination should be verified by the successful completion of at least one approach and landing in Category II or better conditions, prior to commencing Category III operations.		
b. For runways with irregular pre-threshold terrain or other foreseeable or known deficiencies, each aircraft type/runway combination should be verified by operations in standard Category I or better conditions, prior to commencing Lower than Standard Category I, Category II, or Other than Standard Category II.	1/ One commentator requested to add Category III.	1/ CAT III is already addressed in a.
c. If an operator has different variants of the same type of aircraft in accordance with 3.4 d. below, utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of aircraft in accordance with 3.4 d. below, the operator should show that the variants have satisfactory operational performance, but the operator need not		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
conduct a full operational demonstration for each variant/runway combination.		
d. For the purpose of paragraph 3.4, an aircraft type or variant of an aircraft type is deemed to be the same type/variant of aircraft if that type/variant has the same or similar:		
i. level of technology, including the:		
A. FGS and associated displays and controls;		
B. the FMS and level of integration with the FGS;		
C. use of HUDLS.		
ii. operational procedures, including:		
A. alert height;		
B. manual landing /automatic landing;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
C. no decision height operations;		
D. use of HUD/HUDLS in hybrid operations.		
iii. handling characteristics, including:		
A. manual landing from automatic or HUDLS guided approach;		
B. manual go-around from automatic approach;		
C. automatic/manual roll out.		
e. Operators using the same aircraft type/class or variant of a type in accordance with 3.4 d. above may take credit from each other's experience and records in complying with this paragraph.		
f. Operators conducting Other than Standard Category II operations should comply with the requirements of this section applicable to Category II operations.		
AMC2 OPS.SPA.001.LVO(b)(3) Low visibility operations (LVO)		AMC2-SPA.LVO.105.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
OPERATIONAL DEMONSTRATION AND DATA COLLECTION/ANALYSIS		
1. General		
1.1 Demonstrations may be conducted in line operations or any other flight where the Operator's procedures are being used.		
1.2 In unique situations where the completion of 100 successful landings could take an unreasonably long period of time due to factors such as a small number of aircraft in the fleet, limited opportunity to use runways having Category II/III procedures, or inability to obtain Air Traffic Services (ATS) sensitive area protection during good weather conditions, and equivalent reliability assurance can be achieved, a reduction in the required number of landings may be considered on a case-by-case basis. Reduction of the number of landings to be demonstrated requires a justification for the reduction. However, at the operator's option, demonstrations may be made on other runways and facilities. Sufficient information should be collected to determine the cause of any unsatisfactory performance (e.g. sensitive area was not protected).		
1.3 If an operator has different variants of the same type of aircraft utilising the same basic flight control and display systems, or different basic flight control and display systems on the same		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
type/classes of aircraft, the operator should show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant.		
1.4 Not more than 30 % of the demonstration flights should be made on the same runway.	1/ Several commentators stated that this is not practical at busy airports and to delete the provision.	1/ There are no safety related justifications available to delete this provision.
2. Data collection for operational demonstrations		
2.1 Data should be collected whenever an approach and landing is attempted utilising the Category II/III system, regardless of whether the approach is abandoned, unsatisfactory, or is concluded successfully.		
2.2 The data should, as a minimum, include the following information:		
a. Inability to initiate an approach. Identify deficiencies related to airborne equipment which preclude initiation of a Category II/III approach.		
b. Abandoned approaches. Give the reasons and altitude above the runway at which approach was discontinued or the automatic landing system was disengaged.		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
c. Touchdown or touchdown and roll-out performance. Describe whether or not the aircraft landed satisfactorily (within the desired touchdown area) with lateral velocity or cross track error which could be corrected by the pilot or automatic system so as to remain within the lateral confines of the runway without unusual pilot skill or technique. The approximate lateral and longitudinal position of the actual touchdown point in relation to the runway centreline and the runway threshold, respectively, should be indicated in the report. This report should also include any Category II/III system abnormalities which required manual intervention by the pilot to ensure a safe touchdown or touchdown and roll-out, as appropriate.		
3. Data Analysis		
3.1 Unsuccessful approaches due to the following factors may be excluded from the analysis:		
a. ATS Factors. Examples include situations in which a flight is vectored too close to the final approach fix/point for adequate localiser and glide slope capture, lack of protection of ILS sensitive areas, or ATS requests the flight to discontinue the approach.		
b. Faulty Navaid Signals. Navaid (e.g. ILS localiser) irregularities, such as those caused by other aircraft		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
taxiing, over-flying the navaid (antenna).		
c. Other Factors. Any other specific factors that could affect the success of Category II/ III operations that are clearly discernible to the flight crew should be reported.		
GM- OPS.SPA.001.LVO(b)(3) Low visibility operations (LVO)		GM1-SPA.LVO.105.
CRITERIA FOR A SUCCESFUL CAT II/III APPROACH AND AUTOMATIC LANDING		
1. The purpose of this guidance material is to provide operators with supplemental information regarding the criteria for a successful approach and landing to facilitate fulfilling the requirements prescribed in OPS.SPA.001.LVO(b)(3).		
2. An approach may be considered to be successful if:		
2.1 From 500 feet to start of flare:		
a. Speed is maintained as specified in AMC-AWO 231, paragraph 2 'Speed Control'; and		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
b. No relevant system failure occurs; and		
2.2 From 300 feet to DH:		
a. no excess deviation occurs; and		
b. no centralised warning gives a go-around command (if installed).		
3. An automatic landing may be considered to be successful if:		
a. no relevant system failure occurs;		
b. no flare failure occurs;		
c. no de-crab failure occurs (if installed);		
d. longitudinal touchdown is beyond a point on the runway 60 metres after the threshold and before the end of the touchdown zone lighting (900 metres from the threshold);		
e. lateral touchdown with the outboard landing gear is not outside the touchdown zone lighting edge;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
f. sink rate is not excessive;		
g. bank angle does not exceed a bank angle limit; and		
h. no roll-out failure or deviation (if installed) occurs.		
4. More details can be found in CS-AWO 131, CS-AWO 231 and AMC-AWO 231.		
AMC1 OPS.SPA.020.LVO LVO operating minima	1/ There is a lack of consistency between the approach taken for 'OPS.GEN.150' and that for 'AMC1 OPS.SPA.020.LVO'. The calculating methods for 'Aerodrome minima' have been split between Subpart GEN and Subpart SPA (with the exception of LVTO) but the objective requirements that are contained in IR OPS.GEN.150 are only a method of compliance in AMC1 OPS.SPA.020.LVO. There are potential issues that arise from this: Apart from the title, there is no objective in OPS.SPA.020.LVO for which this is a method of compliance (in fact the objective is	CAT.OP.110(a). 1/ This EU-OPS requirement of 1.430 is not limited to SPA operations and has therefore been moved to the OP rules. Moreover, it contains approval items and has therefore been moved back as IR. For NCC/NCO/SPO this AMC is therefore proposed to be an AMC to XXX.OP.150.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	itself contained in the AMC). (The AMC could be promoted to an IR with the title 'Aerodrome Operating Minima - General') The text of the AMC (apart from the substitution of the word 'shall' with 'should') contains the rule objective. This can be seen from the wording (my underlining) "An operator should establish, for each aerodrome planned to be used, aerodrome operating minima that are not lower than the values given in...". Apart from the 'should', this sentence contains an imperative. The second paragraph of the AMC also contains an imperative "Such minima should not be lower than the minima that may be established for such aerodromes by the State in which the aerodrome is located, except where specifically approved by that State". (This is a Standard in ICAO Annex 6 Part 2, Chapter 2.2.2.2, and Part 1, Chapter 4.2.8.1 and might therefore be a rule and not a method of compliance.	

A: Rule	B: Summary of comments	C: Reasons for change, remarks
GENERAL		
1. An operator should establish, for each aerodrome planned to be used, aerodrome operating minima that are not lower than the values given in Appendix 1, 2, 3 and 4 to this AMC. The method of determination of such minima should be included in the operations manual.		
2. Such minima should not be lower than minima that may be established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State.		
3. The use of HUD, HUDLS or EVS may allow operations with lower visibilities than normally associated with the aerodrome operating minima. States which promulgate aerodrome operating minima may also promulgate regulations for reduced visibility minima associated with the use of HUD or EVS.		
4. In establishing the aerodrome operating minima which will apply to any particular operation, an operator should take full account of:		
a. the type, performance and handling characteristics of the aircraft;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
b. the composition of the flight crew, their competence and experience;		
c. the dimensions and characteristics of the FATO's/runways which may be selected for use;		
d. the adequacy and performance of the available visual and non-visual ground aids (see AMC 4 OPS.SPA.020.LVO);		
e. the equipment available on the aircraft for the purpose of navigation and/or control of the flight path, as appropriate, during the take-off, the approach, the flare, the hover, the landing, roll-out and the missed approach;		
f. the obstacles in the approach, missed approach and the climb-out areas required for the execution of contingency procedures and necessary clearance;		
g. the obstacle clearance altitude/height for the instrument approach procedures;		
h. the means to determine and report meteorological conditions; and		
i. the flight technique to be used during the final approach.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Appendix 1 to AMC1 OPS.SPA.020.LVO LVO operating minima	1/ This appendix should be an IR, not an AMC. Justification: All requirements of DH/RVR should be published as Implementing Rules. 2/ LTS allows DH 200 ft with RVR 400 m whereas OTS allows DH 199 ft with RVR 450 m. This looks inconsistent. Rationale needs to be checked. 3/ There is no requirement for ILS type to be published in AIP. How does an operator find out that the ILS provided at a specific airport fully meets the requirement for lower than Standard CAT I, in particular the fact that the system has been flight checked to the threshold?	AMC1-SPA.LVO.110 1/ It is proposed that the lowest minima are in IR; the tables, however, would remain AMC. 2/ Values in the table have been rectified. 3/ Noted. This will be taken up when drafting the ATM/ANS requirements.
LOWER THAN STANDARD CAT I OPERATIONS		
1. The decision height should not be lower than the highest of:		
a. the minimum decision height specified in the AFM, if stated; or		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
b. the minimum height to which the precision approach aid can be used without the required visual reference; or		
c. the OCH for the category of aircraft; or		
d. the decision height to which the flight crew is authorised to operate; or		
e. 200 ft.		
2. An ILS/MLS which supports a Lower than Standard Category I operation should be an unrestricted facility with a straight-in course (≤ 3º offset) and the ILS should be certificated to:		
a. class I/T/1 for operations to a minimum of 450 m RVR; or,	1/ The performance requirement for the ILS to support CAT I operations appears to be excessive. Class I/T/1 requires Category III localizer performance to threshold. This will result in an increased burden on the aerodrome and facilities organisations.	1/ Noted. This will be reassessed in a separate rulemaking task.
b. class II/D/2 for operations to less than 450 m RVR.		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td>Single ILS facilities are only acceptable if Level 2 performance is provided.</td><td></td><td></td></tr>
<tr><td>3. Required RVR/CMV.</td><td></td><td></td></tr>
<tr><td>The lowest minima to be used by an operator for Lower than Standard Category I operations are stipulated in Table 1 below:</td><td>1/ The commentator pointed out that there are no studies that would support authorising lower than standard operations with no lights (NALS) or basic lights (BALS). It is recommended that the columns for BALS and NALS be removed.</td><td>1/ The table is identical with existing rules. The proposal can be followed up within a new Rulemaking task.</td></tr>
<tr><td>Table 1 - Lower than Standard Category I Minimum RVR/CMV vs. Approach Light System</td><td></td><td></td></tr>
<tr><td><table>
<tr><td colspan="5">Lower than Standard Category I Minima</td></tr>
<tr><td rowspan="2">DH (ft)</td><td colspan="4">Class of Lighting Facility</td></tr>
<tr><td>FALS</td><td>IALS</td><td>BALS</td><td>NALS</td></tr>
<tr><td></td><td colspan="4">RVR/CMV (Metres)</td></tr>
<tr><td>200 - 210</td><td>400</td><td>500</td><td>600</td><td>750</td></tr>
</table></td><td></td><td></td></tr>
</table>

A: Rule	B: Summary of comments	C: Reasons for change, remarks
<table><tr><td>211 – 220</td><td>450</td><td>550</td><td>650</td><td>800</td></tr><tr><td>221 – 230</td><td>500</td><td>600</td><td>700</td><td>900</td></tr><tr><td>231 – 240</td><td>500</td><td>650</td><td>750</td><td>1 000</td></tr><tr><td>241 – 249</td><td>550</td><td>700</td><td>800</td><td>1 100</td></tr></table> The visual aids comprise standard runway day markings, approach lighting, runway edge lights, threshold lights, runway end lights and, for operations below 450 m, should include touch-down zone and/or runway centre line lights.		
4. Visual reference. A pilot should not continue an approach below decision height unless visual reference containing a segment of at least 3 consecutive lights being the centre line of the approach lights, or touchdown zone lights, or runway centre line lights, or runway edge lights, or a combination of these is attained and can be maintained. This visual reference should include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting unless the operation is conducted utilising an approved HUDLS useable to at least 150 ft.		
5. To conduct Lower than Standard Category I operations:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. The approach should be flown auto-coupled to an auto-land; or an approved HUDLS should be used to at least 150ft above the threshold.	1/ Lower than standard CAT I operations require autoland or HUDLS to 150 ft. This makes the use of a localizer over the runway mandatory if the operator elects to autoland. The localizer SARPS for Facility Performance Category III might not be met in the touch down zone of the runway. You are only requiring that the ILS has to be certified to class I/T/1 which does not support autoland operations. Many antenna types that support CAT I operations are susceptible to disruptions and it can be difficult to protect an autoland (CAT III) sensitive area. Recommendation: Either do not require autoland for CAT I operations; or require that the ILS be certified and protected to at least class I/D/1.	1/ Noted. This will be reassessed in a separate rulemaking task.
b. The aircraft should be certificated in accordance to CS-AWO to conduct Category II operations;		
c. The auto-land system should be approved for Category		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
IIIA operations;		
d. In service proving requirements should be completed in accordance with AMC1 OPS.SPA.001.LVO(b)(3) 3.4;		
e. Training specified in AMC OPS.LVO.001(b)(1)8. should be completed, this should include training and checking in a Flight Simulator using the appropriate ground and visual aids at the lowest applicable RVR; and		
f. The Operator should ensure that Low Visibility procedures are established and in operation at the intended aerodrome of landing.		
Appendix 2 to AMC1 OPS.SPA.020.LVO LVO operating minima	1/ The commentator pointed out that there are no studies that would support authorising lower than standard operations with no lights (NALS) or basic lights (BALS). It is recommended that the columns for BALS and NALS be removed.	AMC1-SPA.LVO.110 1/ The table is identical with existing rules. The proposal can be followed up within a new Rulemaking task.
CAT II AND OTHER THAN STANDARD CAT II OPERATIONS		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
1. General		
a. A Category II operation is a precision instrument approach and landing using ILS or MLS with:		
i. A decision height below 200 ft but not lower than 100 ft; and		
ii. A runway visual range of not less than 300 m.		
b. An other than Standard Category II operation is a precision instrument approach and landing using ILS or MLS which meets facility requirements as established in c. below with:		
i. A decision height below 200 ft but not lower than 100 ft (see Table 2 below); and		
ii. A runway visual range of not less than 350/400 m (see Table 2 below).	1/ Inconsistency with the lowest minima in the table which are 300/350.	1/ Table 1 refers to CAT II and not OTS CAT II.
c. The ILS/MLS that supports other than a Standard Category II operation should be an unrestricted facility with a straight in course (≤ 3º offset) and the ILS should be certificated to:	1/ Several commentators pointed out that Cat II operations refer to a DH of 200 ft or less. Therefore stating an ILS requirement for CAT II operations with a DH of 200 ft or	1-2/ Rectified, only Class II/D/2 is mentioned.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	more does not make sense. Class II/D/2 implies a requirement for level 2 performance. Proposed Text (if applicable): c. The ILS/MLS that supports other than a Standard Category II operation should be an unrestricted facility with a straight in course (≤ 3º offset) and the ILS should be certificated to Class II/D/2. 2/ The AMC indicates that a straight in course ≤ 3° offset is acceptable. This would be unacceptable for low RVR operations and autoland. The localizer course could be outside of the limits of the runway. Recommendation: Recommend rewording as follows: The ILS/MLS that supports other than a Standard Category II operation should be an unrestricted facility with a straight in course aligned with runway centreline, etc.	
i. Class I/T/1 for operations down to 450 m RVR and to a DH of 200 ft or more; or		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
ii. Class II/D/2 for operations in RVRs of less than 450 m or to a DH of less than 200 ft.		
Single ILS facilities are only acceptable if Level 2 performance is provided.		
2. The decision height should not be lower than the highest of:		
a. The minimum decision height specified in the Aircraft Flight Manual, if stated; or		
b. The minimum height to which the precision approach aid can be used without the required visual reference; or		
c. The OCH for the category of aircraft; or		
d. The OCH/OCL for the category of helicopter; or		
e. The decision height to which the flight crew is authorised to operate; or		
f. 100 ft.		
3. Visual reference. A pilot may not continue an approach below either the Category II or the other than Standard Category II		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td>decision height determined in accordance with 2. above unless visual reference containing a segment of at least 3 consecutive lights being the centre line of the approach lights, or touchdown zone lights, or FATO/runway centre line lights, or FATO/runway edge lights, or a combination of these is attained and can be maintained. This visual reference should include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting unless the operation is conducted utilising an approved HUDLS to touchdown.</td><td></td><td></td></tr>
<tr><td>4. The lowest minima to be used by an operator for</td><td></td><td></td></tr>
<tr><td>a. Category II operations are:</td><td></td><td></td></tr>
<tr><td>Table 1 – RVR for Cat II Operations vs DH</td><td></td><td></td></tr>
<tr><td><table>
<tr><td colspan="4">Category II Minima</td></tr>
<tr><td rowspan="2">DH (ft)</td><td colspan="3">RVR
Auto-coupled/Approved HUDLS to below DH*</td></tr>
<tr><td>Aeroplane Category A, B & C</td><td>Aeroplane Category D</td><td>Helicopters operated in Performance</td></tr>
</table></td><td>1/ Inconsistencies with the table for LTS CAT I which would allow lower RVR minima than OTS CAT II.

2/ The first column of the bottom row lists “141 and above.” It is inconsistent with the text. Recommendation: Recommend changing it to “141 to 199” to be</td><td>1/ Table values corrected for OTS CAT II.

2/ Text changed accordingly.</td></tr>
</table>

A: Rule	B: Summary of comments	C: Reasons for change, remarks
<table><tr><td></td><td></td><td></td><td>Class 1</td></tr><tr><td>100 – 120</td><td>300 m</td><td>300 / 350 m**</td><td>300 m</td></tr><tr><td>121 – 140</td><td>400 m</td><td>400 m</td><td>400 m</td></tr><tr><td>141 and above</td><td>450 m</td><td>450 m</td><td>450 m</td></tr></table> * The reference to 'auto-coupled to below DH/Approved HUDLS' in this table means continued use of the automatic flight control system or the HUDLS down to a height of 80 % of the applicable DH. Thus airworthiness requirements may, through minimum engagement height for the automatic flight control system, affect the DH to be applied.	consistent with paragraph 1. b. i., above.	
** 300 m may be used for a Category D aeroplane conducting an auto-land. (See GM2 to Appendix 3 to AMC 1 OPS.SPA.020.LVO).		
b. other than Standard Category II operations are:		
Table 2 - Other than Standard Category II Minimum RVR vs. Approach Light System		
<table><tr><td colspan="2">Other than Standard Category II Minima</td></tr><tr><td>DH (ft)</td><td>Auto land or Approved HUDLS utilised to touchdown</td></tr></table>	1/ The commentator pointed out that there are no studies that would support authorising lower	1/ NALS does not mean that there are no lights. The table values have been maintained.

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td>
<table>
<tr><td rowspan="5"></td><td colspan="5">Class of Lighting Facility</td></tr>
<tr><td colspan="2">FALS</td><td>IALS</td><td>BALS</td><td>NALS</td></tr>
<tr><td colspan="5">See AMC6 A OPS.GEN.150 5., 6. and 10. about RVR < 750 m</td></tr>
<tr><td>CAT A - C</td><td>CAT D</td><td>CAT A - D</td><td>CAT A - D</td><td>CAT A – D</td></tr>
<tr><td colspan="5">RVR (m)</td></tr>
<tr><td>100 – 120</td><td>350</td><td>400</td><td>450</td><td>600</td><td>700</td></tr>
<tr><td>121 – 140</td><td>400</td><td>450</td><td>500</td><td>600</td><td>700</td></tr>
<tr><td>141 – 160</td><td>450</td><td>500</td><td>500</td><td>600</td><td>750</td></tr>
<tr><td>161 – 199</td><td>450</td><td>500</td><td>550</td><td>650</td><td>750</td></tr>
</table>
The visual aids required to conduct Other than Standard Category II Operations comprise standard runway day markings and approach and runway lighting (runway edge lights, threshold lights, runway end lights). For operations in RVR of 400 m or less, centre line lights should be available. The approach light configurations are classified and listed in Table 1
</td><td>than standard operations with no lights (NALS) or basic lights (BALS). It is recommended that the columns for BALS and NALS be removed.</td><td></td></tr>
</table>

A: Rule	B: Summary of comments	C: Reasons for change, remarks
of AMC6 A OPS.GEN.150.		
5. To conduct other than Standard Category II operations the operator should ensure that appropriate Low Visibility procedures are established and in operation at the intended aerodrome of landing.		
Appendix 3 to AMC1 OPS.SPA.020.LVO LVO operating minima		AMC1-SPA.LVO.110.
PRECISION APPROACH - CAT III OPERATIONS		
1. General		
Category III operations are subdivided as follows:		
a. Category III A operations. A precision instrument approach and landing using ILS or MLS with:		
i. A decision height lower than 100 ft; and		
ii. A runway visual range not less than 200 m.		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
b. Category III B operations. A precision instrument approach and landing using ILS or MLS with:		
i. A decision height lower than 100 ft, or no decision height; and		
ii. A runway visual range lower than 200 m but not less than 75 m.		
Where the decision height (DH) and runway visual range (RVR) do not fall within the same Category, the RVR will determine in which Category the operation is to be considered.		
2. Decision Height		
For operations in which a decision height is used, an operator should ensure that the decision height is not lower than:		
a. The minimum decision height specified in the AFM, if stated; or		
b. The minimum height to which the precision approach aid can be used without the required visual reference; or		
c. The decision height to which the flight crew is authorised to operate.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3. No Decision Height Operations		
Operations with no decision height may only be conducted if:		
a. the operation with no decision height is authorised in the AFM;		
b. the approach aid and the aerodrome facilities can support operations with no decision height; and		
c. the operator has an approval for CAT III operations with no decision height.		
In the case of a CAT III runway it may be assumed that operations with no decision height can be supported unless specifically restricted as published in the AIP or NOTAM.		
4. Visual reference		
4.1 For Category IIIA operations, and for Category IIIB operations conducted either with fail-passive flight control systems, or with the use of an approved HUDLS, a pilot may not continue an approach below the decision height determined in accordance with 2. above unless a visual reference containing a segment of at least 3 consecutive lights being the centreline of the approach lights, or touchdown zone lights, or runway centreline		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
lights, or runway edge lights, or a combination of these is attained and can be maintained.		
4.2 For Category IIIB operations conducted either with fail-operational flight control systems or with a fail operational hybrid landing system (comprising e.g. a HUDLS) using a decision height a pilot may not continue an approach below the Decision Height, determined in accordance with Appendix 1 to AMC1 OPS.SPA.020.LVO 2., unless a visual reference containing at least one centreline light is attained and can be maintained.	1/ For CAT IIIB operations with no decision height there is no requirement for visual contact with the runway prior to touchdown.	1/ Text revised accordingly.
5. The lowest required RVR minima to be used by an operator should be:		
Table 1 – RVR for Cat III Operations vs. DH and roll-out control/guidance system		
(see table below)	1/ The first line of CAT IIIA is set to 200 m. According to ICAO, through, amdt 33 to Annex 6 part I, amdt 28 to Annex 6 part II and amdt 14 to Annex 6 part III, changing this value to 175 m should be considered.	1/ The respective amendments of Annex 6 will be followed up in a new Rulemaking task.

Category III Minima			
Category	Decision Height (ft)***	Roll-Out Control / Guidance System	RVR (m)
IIIA	< 100	Not required	200*
IIIB	< 100	Fail-passive	150*,**
IIIB	< 50	Fail-passive	125

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
IIIB | < 50 or no DH | Fail-operational**** | 75 * For fail-passive operations see GM1 Appendix 3 to AMC1 OPS.SPA.020.LVO.		
** For aircraft certificated in accordance with CS-AWO 321(b)(3) or equivalent.		
*** Flight control system redundancy is determined under CS-AWO by the minimum certificated decision height.		
**** The fail operational system referred to may consist of a fail operational hybrid system. (GM2 Appendix 3 to AMC1 OPS.SPA.020.LVO)		
Appendix 4 to AMC1 OPS.SPA.020.LVO LVO operating minima		
AERODROME MINIMA – TAKE-OFF MINIMA		
Refer to AMC3 OPS.GEN.150 paragraph 3		
GM1 Appendix 3 to AMC1 OPS.SPA.020.LVO LVO operating minima		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
CREW ACTIONS IN CASE OF AUTOPILOT FAILURE AT OR BELOW DECISION HEIGHT IN FAIL-PASSIVE CATEGORY III OPERATIONS		
For operations to actual RVR values less than 300 m, a go-around is assumed in the event of an autopilot failure at or below DH. This means that a go-around is the normal action. However, the wording recognises that there may be circumstances where the safest action is to continue the landing. Such circumstances include the height at which the failure occurs, the actual visual references, and other malfunctions. This would typically apply to the late stages of the flare. In conclusion, it is not forbidden to continue the approach and complete the landing when the pilot-in-command or the pilot to whom the conduct of the flight has been delegated, determines that this is the safest course of action. The operator's policy and the operational instructions should reflect this information.		
GM2 Appendix 3 to AMC1 OPS.SPA.020.LVO LVO operating minima		
ESTABLISHMENT OF MINIMUM RVR FOR CATEGORY II AND III OPERATIONS		
1. General		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
1.1 When establishing minimum RVR for Category II and III Operations, operators should pay attention to the following information which originates in ECAC Doc 17 3rd Edition, Subpart A. It is retained as background information and, to some extent, for historical purposes although there may be some conflict with current practices.		
1.2 Since the inception of precision approach and landing operations various methods have been devised for the calculation of aerodrome operating minima in terms of decision height and runway visual range. It is a comparatively straightforward matter to establish the decision height for an operation but establishing the minimum RVR to be associated with that decision height so as to provide a high probability that the required visual reference will be available at that decision height has been more of a problem.		
1.3 The methods adopted by various States to resolve the DH/RVR relationship in respect of Category II and Category III operations have varied considerably. In one instance there has been a simple approach which entailed the application of empirical data based on actual operating experience in a particular environment. This has given satisfactory results for application within the environment for which it was developed. In another instance a more sophisticated method was employed which utilised a fairly complex computer programme to take account of a wide range of variables. However, in the latter case, it has been found that with the improvement in the		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
performance of visual aids, and the increased use of automatic equipment in the many different types of new aircraft, most of the variables cancel each other out and a simple tabulation can be constructed which is applicable to a wide range of aircraft. The basic principles which are observed in establishing the values in such a table are that the scale of visual reference required by a pilot at and below decision height depends on the task that he has to carry out, and that the degree to which his vision is obscured depends on the obscuring medium, the general rule in fog being that it becomes more dense with increase in height. Research using flight simulators coupled with flight trials has shown the following:		
a. Most pilots require visual contact to be established about 3 seconds above decision height though it has been observed that this reduces to about 1 second when a fail-operational automatic landing system is being used;		
b. To establish lateral position and cross-track velocity most pilots need to see not less than a 3 light segment of the centre line of the approach lights, or runway centre line, or runway edge lights;		
c. For roll guidance most pilots need to see a lateral element of the ground pattern, i.e. an approach lighting cross bar, the landing threshold, or a barrette of the touchdown zone lighting; and		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
d. To make an accurate adjustment to the flight path in the vertical plane, such as a flare, using purely visual cues, most pilots need to see a point on the ground which has a low or zero rate of apparent movement relative to the aircraft.		
e. With regard to fog structure, data gathered in the United Kingdom over a twenty-year period have shown that in deep stable fog there is a 90 % probability that the slant visual range from eye heights higher than 15 ft above the ground will be less that the horizontal visibility at ground level, i.e. RVR. There are at present no data available to show what the relationship is between the Slant Visual Range and RVR in other low visibility conditions such as blowing snow, dust or heavy rain, but there is some evidence in pilot reports that the lack of contrast between visual aids and the background in such conditions can produce a relationship similar to that observed in fog.		
2. Category II Operations		
2.1 The selection of the dimensions of the required visual segments which are used for Category II operations is based on the following visual requirements:		
a. A visual segment of not less than 90 metres will need to be in view at and below decision height for pilot to be able		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
to monitor an automatic system;		
b. A visual segment of not less than 120 metres will need to be in view for a pilot to be able to maintain the roll attitude manually at and below decision height; and		
c. For a manual landing using only external visual cues, a visual segment of 225 metres will be required at the height at which flare initiation starts in order to provide the pilot with sight of a point of low relative movement on the ground.		
Before using a Category II ILS for landing, the quality of the localiser between 50 ft and touchdown should be verified.		
3. Category III fail passive operations		
3.1 Category III operations utilising fail-passive automatic landing equipment were introduced in the late 1960's and it is desirable that the principles governing the establishment of the minimum RVR for such operations be dealt with in some detail.		
3.2 During an automatic landing the pilot needs to monitor the performance of the aircraft system, not in order to detect a failure which is better done by the monitoring devices built into the system, but so as to know precisely the flight situation. In the final stages he/she should establish visual contact and, by		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
the time he/she reaches decision height, he/she should have checked the aircraft position relative to the approach or runway centre-line lights. For this he/she will need sight of horizontal elements (for roll reference) and part of the touchdown area. He/she should check for lateral position and cross-track velocity and, if not within the pre-stated lateral limits, he/she should carry out a go-around. He/she should also check longitudinal progress and sight of the landing threshold is useful for this purpose, as is sight of the touchdown zone lights.		
3.3 In the event of a failure of the automatic flight guidance system below decision height, there are two possible courses of action; the first is a procedure which allows the pilot to complete the landing manually if there is adequate visual reference for him/her to do so, or to initiate a go-around if there is not; the second is to make a go-around mandatory if there is a system disconnect regardless of the pilot's assessment of the visual reference available:		
a. if the first option is selected then the overriding requirement in the determination of a minimum RVR is for sufficient visual cues to be available at and below decision height for the pilot to be able to carry out a manual landing. Data presented in Doc 17 showed that a minimum value of 300 metres would give a high probability that the cues needed by the pilot to assess the aircraft in pitch and roll will be available and this should be the minimum RVR for this procedure.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
b. the second option, to require a go-around to be carried out should the automatic flight-guidance system fail below decision height, will permit a lower minimum RVR because the visual reference requirement will be less if there is no need to provide for the possibility of a manual landing. However, this option is only acceptable if it can be shown that the probability of a system failure below decision height is acceptably low. It should be recognised that the inclination of a pilot who experiences such a failure would be to continue the landing manually but the results of flight trials in actual conditions and of simulator experiments show that pilots do not always recognise that the visual cues are inadequate in such situations and present recorded data reveal that pilots' landing performance reduces progressively as the RVR is reduced below 300 metres. It should further be recognised that there is some risk in carrying out a manual go-around from below 50 ft in very low visibility and it should therefore be accepted that if an RVR lower than 300 metres is to be authorised, the flight deck procedure should not normally allow the pilot to continue the landing manually in such conditions and the aircraft system should be sufficiently reliable for the go-around rate to be low.		
3.4 These criteria may be relaxed in the case of an aircraft with a fail-passive automatic landing system which is supplemented by a head-up display which does not qualify as a fail-operational system but which gives guidance which will enable the pilot to		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
complete a landing in the event of a failure of the automatic landing system. In this case it is not necessary to make a go-around mandatory in the event of a failure of the automatic landing system when the RVR is less than 300 metres.		
4. Category III fail operational operations - with a Decision Height		
4.1 For Category III operations utilising a fail-operational landing system with a Decision Height, a pilot should be able to see at least 1 centre line light.		
4.2 For Category III operations utilising a fail-operational hybrid landing system with a Decision Height, a pilot should have a visual reference containing a segment of at least 3 consecutive lights of the runway centre line lights.		
5. Category III fail operational operations - with No Decision Height		
5.1 For Category III operations with No Decision Height the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of aircraft equipment.		
5.2 A CAT III runway may be assumed to support operations with no Decision Height unless specifically restricted as published in the AIP or NOTAM.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
AMC2 OPS.SPA.020.LVO LVO operating minima		
EFFECT ON LANDING MINIMA OF TEMPORARILY FAILED OR DOWNGRADED GROUND EQUIPMENT		
1. Operations with no Decision Height (DH)		
1.1 An operator should ensure that, for aircraft authorised to conduct no DH operations with the lowest RVR limitations, the following applies in addition to the content of Tables 1, below:		
a. RVR. At least one RVR value should be available at the aerodrome;		
b. FATO/Runway lights		
i. No FATO/runway edge lights, or no centre lights – Day – RVR 200 m; Night – Not allowed;		
ii. No TDZ lights – No restrictions;		
iii. No standby power to FATO/runway lights – Day – RVR 200 m; Night – not allowed.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2. Conditions applicable to Table 1:		
a. Multiple failures of runway/final approach and take-off area (FATO) lights other than indicated in Table 1 are not acceptable.		
b. Deficiencies of approach and runway/FATO lights are treated separately.		
c. Category II or III operations. A combination of deficiencies in FATO/runway lights and RVR assessment equipment is not allowed.		
d. Failures other than Instrument Landing System (ILS) affect runway visual range (RVR) only and not decision height (DH).		
TABLE 1 - Failed or downgraded equipment - effect on landing minima	1/ Which rules should be applied for LTS CAT I and OTS CAT II? 2/ Use table as published in EU-OPS and add info about CAT 1 and non-precision approaches. 3/ The tables which describe the affect of failed or downgraded equipment on landing minima only apply to operational requirements.	1/ Needs to be addressed in a new RM task. 2/ Tables for CAT I and NPA are in CAT.OP. Tables have been split between LVO and OP to keep consistency with other SPA rules. 3/ This needs to be followed up in a new Rulemaking task.

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td></td><td>A similar strategy should be applied to navaid facility, aerodromes, and air traffic control requirements.</td><td></td></tr>
<tr><td>
<table>
<tr><td rowspan="2">FAILED OR DOWNGRADED EQUIPMENT (note 1)</td><td colspan="4">EFFECT ON LANDING MINIMA</td></tr>
<tr><td>CAT III B (No DH)</td><td>CAT III B</td><td>CAT III A</td><td>CAT II</td></tr>
<tr><td>ILS Standby Transmitter</td><td>Not Allowed</td><td>RVR 200m</td><td colspan="2">No Effect</td></tr>
<tr><td>Outer Marker</td><td colspan="4">No effect if replaced by equivalent position</td></tr>
<tr><td>Middle Marker</td><td colspan="4">No effect</td></tr>
<tr><td>RVR Assessment Systems</td><td>At least one RVR value must be available on the aerodrome</td><td colspan="3">On runways equipped with 2 or more RVR Assessment Units, one may be inoperative</td></tr>
<tr><td>Approach lights</td><td>No effect</td><td colspan="2">Not allowed for operations with DH > 50 ft.</td><td>Not allowed</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

A: Rule					**B: Summary of comments**	**C: Reasons for change, remarks**
Approach lights except the last 210 m	No effect			Not allowed		
Approach lights except the last 420 m	No effect					
Standby power for approach lights	No effect					
Edge lights, threshold lights and runway end lights	No effect		Day - No effect Night - Min RVR 550 m	Day - no effect Night – Not allowed		
Centreline lights	Day - RVR 200m Night - not allowed	Not allowed	Day - RVR 300m Night – RVR 400m	Day - RVR 350m Night – RVR 550m (400m with HUDLS or Auto-land)		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
<table><tr><td>Centreline lights spacing increased to 30 m</td><td colspan="2">RVR 150 m</td><td>No effect</td></tr><tr><td>Touch Down Zone lights</td><td>No effect</td><td>Day - RVR 200m Night – RVR 300m</td><td>Day - RVR 300m Night – RVR 550m; 350mwith HUDLS or auto-land</td></tr><tr><td>Taxiway light system</td><td colspan="3">No effect</td></tr></table>		
~~Section V~~Subpart G - Transport of dangerous goods		
AMC1-~~-OPS.~~SPA.~~001.~~DG.100(b)(1) Approval to transport dangerous goods TRAINING PROGRAMME		
1. The operator should indicate for the approval of the training programme how the training will be carried out. For formal training courses, the course objectives, the training programme syllabus/curricula and examples of the written examination to be undertaken should be included.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2. Instructors should have knowledge of training techniques as well as in the field of transport of dangerous goods by air so that the subject is covered fully and questions can be adequately answered.		
3. Training intended to give general information and guidance may be by any means including hand**-**outs, leaflets, circulars, slide presentations, videos, **computer based training,** etc., and may take place on-the-job or off-the-job. The person being trained should receive an overall awareness of the subject. This training should include a written**,** ~~or~~ oral **or computer based** examination covering all areas of the training programme, showing that a required minimum level of knowledge has been acquired.	1 comment (IND): The text does not specifically mention computer-based training or computer-based exam as a possibility and these should be included to avoid doubt.	Text amended to refer to computer-based training and computer-based examinations.
4. Training intended to give an in-depth and detailed appreciation of the whole subject or particular aspects of it should be by formal training courses, which should include a written examination, the successful passing of which will result in the issue of the proof of qualification. The course may be by means of tuition or as a self-study program or a mixture of both. The person being trained should gain knowledge so as to be able to apply the detailed requirements of the Technical Instructions.		
5. Training in emergency procedures should include as a minimum:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. **f**~~F~~or personnel other than crew members:		
i. ~~D~~**d**ealing with damaged or leaking packages; and		
ii. **o**~~O~~ther actions in the event of ground emergencies arising from dangerous goods;		
b. ~~F~~**f**or flight crew members:		
i. **a**~~A~~ctions in the event of emergencies in flight occurring in the passenger cabin or in the cargo compartments; and		
ii. **t**~~T~~he notification to ~~Air Traffic Services~~**ATS** should an in-flight emergency occur.		
c. **f**~~F~~or crew members other than flight crew members:		
i. **d**~~D~~ealing with incidents arising from dangerous goods carried by passengers; or		
ii. **d**~~D~~ealing with damaged or leaking packages in flight.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
6. Training should be conducted at intervals of not longer than ~~2~~ **two** years.	This paragraph received 25 comments (IND): It was proposed to extend this requirement to 5 year**s.**	Not accepted. This proposed amendment would not be in compliance with Part 1; Chapter 4.2.3 of the T~~.~~I~~.~~ which has been a requirement for many years.
AMC1-~~OPS.~~SPA.~~001.~~DG.100(b)(2)(ii) Approval to transport dangerous goods ACCEPTANCE OF DANGEROUS GOODS		
1. ~~An~~ **The** operator should not accept dangerous goods unless:		
a. the package, overpack or freight container has been inspected in accordance with the acceptance procedures in the Technical Instructions;		
b. except when otherwise specified in the Technical Instructions, they are accompanied by two copies of a dangerous goods transport document **or the information applicable to the consignment is provided in electronic form**; and	Provision needs to be included for electronic transfer of data.	Amended to reflect amendments to the Technical Instructions to specifically permit the use of electronic transfer of data.
c. the English language is used for:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
i. package marking and labelling; and		
ii. the dangerous goods transport document in addition to any other language requirements.		
2. ~~An~~ **The** operator or his**/her** handling agent should use an acceptance check-list which allows for:		
a. all relevant details to be checked; and		
b. the recording of the results of the acceptance check by manual, mechanical or computerised means.		
AMC1-~~OPS.~~SPA.~~001.~~DG.100(b)(2)(iv) Approval to transport dangerous goods PROVISION OF INFORMATION IN THE EVENT OF AN IN-FLIGHT EMERGENCY		
If an in-flight emergency occurs the pilot-in-command**/commander** should, as soon as the situation permits, inform the appropriate ~~air traffic services~~**ATS** unit of any dangerous goods carried as cargo on board the aircraft as specified in the Technical Instructions.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~**AMC OPS.SPA.001.DG(b)(2)(v) Approval to transport dangerous goods**~~ ~~REMOVAL OF CONTAMINATION~~		Text deleted as generally, text from the TI has been repeated if it contains obligations for the operator. Where there is general text that is also contained in the Technical Instructions, this has not been repeated.
~~1. An operator should ensure that:~~		
~~a. Any contamination found as a result of resulting from the leakage from or damage to articles or packages containing dangerous goods is removed without delay and steps are taken to nullify any hazard as specified in the Technical Instructions; and~~		
~~b. An aircraft which has been contaminated by radioactive materials is immediately taken out of service and not returned until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.~~		
~~2. In the event of a non-compliance with any limit in the Technical Instructions applicable to radiation level or contamination,~~		
~~a. the operator should:~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~i. ensure the shipper is informed if the non-compliance is identified during transport;~~		
~~ii. take immediate steps to mitigate the consequences of the non-compliance;~~		
~~iii. communicate the non-compliance to the shipper and relevant competent authority(ies), respectively, as soon as practicable and immediately whenever an emergency situation has developed or is developing;~~		
~~b. the operator should also, within the scope of his responsibilities:~~		
~~i. investigate, the non-compliance and its causes, circumstances and consequences;~~		
~~ii. take appropriate action, to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance;~~		
~~iii. communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventative actions taken or to be taken.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~AMC OPS.SPA.001.DG(b)(2)(vii) Approval to transport dangerous goods~~ ~~Inspection for Damage, Leakage or Contamination~~	The text from EU/JAR-OPS 1/3.1200(a)(2) seems to have been omitted.	Text deleted as unnecessary repetition of text contained in the Technical Instructions. The TI contains this requirement in 7.3.1.2.
~~An operator should ensure that:~~		
~~1. Packages, overpacks and freight containers are inspected for evidence of leakage or damage immediately prior to loading on an aircraft, as specified in the Technical Instructions;~~		
~~2. Leaking or damaged packages, overpacks or freight containers are not loaded on an aircraft;~~		
~~3. Any package of dangerous goods found on an aircraft and which appears to be damaged or leaking is removed or arrangements made for its removal by an appropriate authority or organisation. In this case the remainder of the consignment shall be inspected to ensure it is in a proper condition for transport and that no damage or contamination has occurred to the aircraft or its load; and~~		
~~4. Packages, overpacks and freight containers are inspected for signs of damage or leakage upon unloading from a aircraft and, if there is evidence of damage or leakage, the area where the dangerous goods were stowed is inspected for damage or~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~contamination.~~		
GM1-~~OPS.~~SPA.~~001.~~DG.100(b)(1) Approval to transport dangerous goods PERSONNEL		
Personnel include all persons involved in the transport of dangerous goods, whether they are employees of the operator or not.		
~~AMC OPS.SPA.040.DG(b) Dangerous goods information and documentation~~ **~~Information to Passengers and Other Persons~~**	The provision of information to passengers and at cargo acceptance points applies to all operators and should be in the relevant GEN Subparts.	Section moved to become GM to the relevant GEN Subparts.
~~1. An operator should ensure that information is promulgated as required by the Technical Instructions so that passengers are warned as to the types of goods which they are forbidden from transporting aboard an aircraft; and~~		
~~2. An operator and, where applicable, his handling agent should ensure that notices are provided at acceptance points for cargo giving information about the transport of dangerous goods.~~	Delete 'and, where applicable, his handling agent' since handling agents are not subject to this document.	The text 'and, where applicable, his handling agent' will be deleted from the re-positioned text.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
AMC1-~~OPS.~~SPA.~~040.~~DG.105(~~c~~a) Dangerous goods information and documentation INFORMATION TO THE PILOT-IN-COMMAND**/COMMANDER**		
If the volume of information provided to the pilot-in-command**/commander** is such that it would be impracticable to transmit it in the event of an in-flight emergency, a summary of the information should be provided to the pilot-in-command**/commander** by the operator, containing at least the quantities and class or division of the dangerous goods in each cargo compartment.		
~~**Subpart D – Section VI – Helicopter operations without an assured safe forced landing capability**~~		
	(MS=3; IND=1; INDIV=58 – these comments include multiple repeated comments from a number of individuals and cannot therefore be considered as representative) A number of comments relate SFL to:	Noted. In order to address a large number of comments, the following four responses have been gathered together in one general response and the commentators are enumerated by numbers in the adjacent cell.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	1. AW, 2. the inclusion of helicopter with reciprocal engines, 3. the applicability of Appendix 3.005(e), 4. mountain operations and mountain rescue. This is mainly because it is in Subpart SPA and therefore within the scope of all of the operational areas.	Each of the four subjects are dealt with immediately below:
		1. SFL is restricted to CAT except that it should be applied to AW when carrying passengers (i.e. neither crew members nor aerial task specialists). For that reason, it has been withdrawn from Subpart SPA and put back into the performance Subparts of CAT. The exception is a special case of AW with passengers and represents an operational limitation unless the UMS is fitted – this will put the AW with passengers on the

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		same footing as those aircraft operating in a hostile environment in accordance with the requirements of Appendix 1 to JAR-OPS 3.005(f). AW operations without the carriage of passengers will not be required to have a safe-forced-landing capability.
		2. The exclusion of reciprocal engine helicopter from the hostile environment appendix is being addressed as the subject of a future regulatory task.
		3. The SFL concept of CAT is dependent upon engine reliability of 1:100 000 per flight hour and an exposure to an accident in limited phases of flight that reduce the overall exposure to 5 x 10-8; such exceptions that are permitted are related to operational areas where it is impractical to apply (mountain areas) or where legacy operations should be

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		maintained (remote Arctic areas) because the expense of twins could not be tolerated and alternative surface transport introduces greater risk. JAR-OPS 3.005(e) has been transposed into CAT.POL.H.420.
		4. The issue with mountain rescue is well understood and is examined and discussed in TGL 43; the recommendations in TGL will be considered by EASA and a solution sought in a future regulatory task.
~~• **GM OPS.SPA.001.SFL(b) Operations without an assured safe forced landing capability**~~		
~~**HELICOPTER FLIGHT MANUAL LIMITATIONS**~~		
~~The approved performance data contained in the Helicopter Flight Manual should be used to determine compliance with the requirements of the appropriate performance class, supplemented as necessary with other data acceptable to the competent authority as may be prescribed in the relevant requirements. When applying the~~	The text of GM OPS.SPA.001.SFL(b) belongs to OPS.CAT.360.H; it has nothing to do with operations without SFL. It would better if it were (b) of the IR	Accepted The JAR-OPS 3 text will be reinstated.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~factors prescribed for the appropriate performance class, account should be taken of any operational factors already incorporated in the Helicopter Flight Manual performance data to avoid double application of these factors.~~	above.~~:~~	
~~• **AMC OPS.SPA.001.SFL(b)(1) and (b)(2) Operations without an assured safe forced landing capability**~~		
~~**POWERPLANT RELIABILITY STATISTICS**~~		
~~1. Except in the case of new engines, power plant reliability should show sudden power loss from the set of in flight shutdown (IFSD) events not exceeding 1 per 100,000 engine hours in a 5 year moving window. A rate in excess of this value, but not exceeding 3 per 100,000 engine hours, may be accepted by the competent authority after an assessment showing an improving trend.~~	One commentator suggested that the text for the improving rate should be removed and that alternative wording (less liberal) be used in the assessment.	Noted. This system (which was accepted by all manufacturers) is being used at this time and has resulted in the production of these data for the first time. Before this AMC, there was no provision for, and sharing of, data. The methodology has been transposed from JAR-OPS 3; any change should be the subject of a new Rulemaking proposal.
~~2. New engines should be assessed on a case-by-case basis.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~3. After the initial assessment, updated statistics should be periodically reassessed; any adverse sustained trend will require an immediate evaluation to be accomplished by the operator in consultation with the competent authority and the manufacturers concerned. The evaluation may result in corrective action or operational restrictions being applied.~~		
~~• **GM OPS.SPA.001.SFL(b)(1) and (b)(2) Operations without an assured safe forced landing capability**~~		
~~**DETERMINATION OF SUDDEN POWER LOSS RATE**~~	This a requirement for the manufacturer and should be deleted here.	Not accepted This system (which was accepted by all manufacturers) is being used at this time and has resulted in the production of these data for the first time. Before this AMC, there was no provision for, and sharing of, data.
	Applicability factor' and the 'assumptions made on the efficiency of corrective actions' are subjective items and should not be used in the primary statistical analysis. Consequently, the text	Noted This system (which was accepted by all manufacturers) is being used at this time and has resulted in the production of these data for the first time.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	should be amended as shown below, with deleted text struck through and additional text in bold.	Before this AMC, there was no provision for, and sharing of, data. The methodology has been transposed from JAR-OPS 3; any change should be the subject of a new proposal.
~~1. The purpose of this paragraph is to provide guidance on how the in-service power plant sudden power loss rate is determined.~~		
~~a. Share of roles between the helicopter and engine Type Certificate Holders (TCH).~~		
~~i. The provision of documents establishing the in-service sudden power loss rate for the helicopter/engine installation; the interface with the operational authority of the State of Design should be the Engine TCH or the Helicopter TCH depending on the way they share the corresponding analysis work.~~		
~~ii. The Engine TCH should provide the Helicopter TCH with a document including: the list of in-service power loss events, the applicability factor for each event (if used), and the assumptions made on the efficiency of any corrective actions implemented (if~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~used);~~		
~~iii. The Engine or Helicopter TCH should provide the operational authority of the State of Design or, where this authority does not take responsibility, the competent authority, with a document that details the calculation results – taking into account:~~	1 MS comments that there is no reason for having "where this authority does not take responsibility". EASA has to take the responsibility for that because EASA is responsible for the airworthiness and to ensure that the eligibility of helicopters will be the same throughout Europe.	Not accepted The TCH (for engine or helicopter) may not be within the jurisdiction of EASA (in fact most are not). This text makes provisions for this fact and provides a method of provisioning ~~of~~ the document so that reliability may be assessed.
~~A. the events caused by the engine and the events caused by the engine installation;~~		
~~B. the applicability factor for each event (if used), the assumptions made on the efficiency of any corrective actions implemented on the engine and on the helicopter (if used); and~~		
~~C. the calculation of the power plant power loss rate.~~		
~~b. Documentation.~~		
~~The following documentation should be updated every year:~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~i. The document with detailed methodology and calculation as distributed to the authority of the State of Design;~~		
~~ii. A summary document with results of computation as made available on request to any competent authority;~~		
~~iii. A Service Letter establishing the eligibility for such operation and defining the corresponding required configuration as provided to the operators.~~		
~~c. Definition of the "sudden in-service power loss".~~		
~~The sudden in-service power loss is an engine power loss:~~		
~~i. larger than 30 % of the take-off power;~~		
~~ii. occurring during operation; and~~		
~~iii. without the occurrence of an early intelligible warning to inform and give sufficient time for the pilot to take any appropriate action.~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~d. Data base documentation.~~		
~~Each power loss event should be documented, by the engine and/or helicopter TCH's, as follows:~~		
~~i. incident report number;~~		
~~ii. engine type;~~		
~~iii. engine serial number;~~		
~~iv. helicopter serial number;~~		
~~v. date;~~		
~~vi. event type (demanded IFSD, un-demanded IFSD);~~		
~~vii. presumed cause;~~		
~~viii. applicability factor when used; and~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~ix. reference and assumed efficiency of the corrective actions that will have to be applied (if any).~~		
~~e. Counting methodology.~~		
~~Various methodologies for counting engine power loss rate have been accepted by authorities. The following is an example of one of these methodologies:~~		
~~i. The events resulting from:~~		
~~A. unknown causes (wreckage not found or totally destroyed, undocumented or unproven statements); or~~		
~~B. where the engine or the elements of the engine installation have not been investigated (for example when the engine has not been returned by the customer); or~~		
~~C. an unsuitable or non representative use (operation or maintenance) of the helicopter or the engine;~~		
~~are not counted as engine in-service sudden power loss and the applicability factor is 0 %.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~ii. The events caused by:~~		
~~A. the engine or the engine installation; or~~		
~~B. the engine or helicopter maintenance, when the applied maintenance was compliant with the Maintenance Manuals;~~		
~~are counted as engine in-service sudden power loss and the applicability factor is 100 %.~~		
~~iii. For the events where the engine or an element of the engine installation has been submitted to investigation which did not allow defining a presumed cause, the applicability factor is 50 %.~~		
~~f. Efficiency of corrective actions.~~		
~~The corrective actions made by the engine and helicopter manufacturers on the definition or maintenance of the engine or its installation could be defined as mandatory for specific commercial air transport (CAT) operations. In this case, the associated reliability improvement could be considered as mitigating factor for the event.~~		
~~A factor defining the efficiency of the corrective action could be applied to the applicability factor of the concerned event.~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~g. Method of calculation of the power plant power loss rate.~~		
~~The detailed method of calculation of the power plant power loss rate should be documented by engine or helicopter TCH and accepted by the relevant authority.~~		
~~• **AMC OPS.SPA.001.SFL(b)(3)(ii) Operations without an assured safe forced landing capability**~~		
~~**SITE SPECIFIC PROCEDURES**~~		
~~1. Site specific procedures should be established and included in the Operations Manual to minimise the period during which there would be danger to helicopter occupants and persons on the surface in the event of a power unit failure during take-off and landing at a public interest site.~~	1 IND comments that it would not be possible to capture the data for all of its landing sites.	Not accepted. This text comes originally from JAR-OPS 3.005(i) and is specifically related to public interest sites. These are sites within cities that do not meet the criteria for operations in PC1 and are therefore alleviated. To ensure that all appropriate precautions are taken, it becomes an obligation upon the operator to capture the main dangers and the mitigated procedures. This is not an

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		arduous task and merely reflects conditions of the SMS to reduce risk.
~~2. Part C of the Operations Manual should therefore contain for each public interest site a diagram or annotated photograph showing the main aspects, the dimensions, the non-conformance with performance class 1 requirements, the main risks and the contingency plan should an incident occur.~~	Should state: 2. Part C of the operations manual should therefore contain for each public interest site a diagram or annotated photograph showing the main aspects, the dimensions, the non-conformance with performance class 1 requirements, the main risks and the contingency plan should an incident occur or a reference where such information can be found. It is acceptable that such information are published in an electronic format.	Not accepted. It is not necessary for the OM to be in one volume, it may be in several. The main consideration is that it is available in flight. A reference would not be sufficient because it does not specify that it has to be carried in flight.
~~• **AMC OPS.SPA.001.SFL(b)(4) and (b)(5) Operations without an assured safe forced landing capability**~~	(	
~~**SET OF CONDITIONS TO BE IMPLEMENTED TO OBTAIN AND MAINTAIN THE APPROVAL**~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~To obtain an approval under this section, an operator conducting operations without an assured safe forced landing capability should implement the following:~~		
~~1. Attain and then maintain the helicopter/engine modification standard defined by the manufacturer that has been designated to enhance reliability during the take-off and landing phases.~~		
~~2. Conduct the preventive maintenance actions recommended by the helicopter or engine manufacturer as follows:~~		
~~a. Engine oil spectrometric and debris analysis – as appropriate;~~		
~~b. Engine trend monitoring, based on available power assurance checks;~~		
~~c. Engine vibration analysis (plus any other vibration monitoring systems where fitted).~~		
~~d. Oil consumption monitoring.~~		
~~3. The Usage Monitoring System should fulfil at least the following:~~		
~~a. Recording of the following data:~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~i. Date and time of recording, or a reliable means of establishing these parameters;~~		
~~ii. Amount of flight hours recorded during the day plus total flight time;~~		
~~iii. N_1 (gas producer RPM) cycle count;~~		
~~iv. N_2 (power turbine RPM) cycle count (if the engine features a free turbine);~~		
~~v. Turbine temperature exceedance: value, duration;~~		
~~vi. Power-shaft torque exceedance: value, duration (if a torque sensor is fitted); and~~		
~~vii. Engine shafts speed exceedance: value, duration.~~		
~~b. Data storage of the above parameters, if applicable, covering the maximum flight time in a day, and not less than 5 flight hours, with an appropriate sampling interval for each parameter.~~		
~~c. The system should include a comprehensive self-test function with a malfunction indicator and a detection of~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~power-off or sensor input disconnection.~~		
~~d. A means should be available for downloading and analysis of the recorded parameters. Frequency of downloading should be sufficient to ensure data is not lost through over-writing.~~		
~~e. The analysis of parameters gathered by the usage monitoring system, the frequency of such analysis and subsequent maintenance actions should be described in the maintenance documentation.~~		
~~f. The data should be stored in an acceptable form and accessible to the authority, for at least 24 months.~~		
~~4. Include take-off and landing procedures in the operations manual, where they do not already exist in the Helicopter Flight Manual.~~		
~~5. Establish training for flight crew which should include the discussion, demonstration, use and practice of the techniques necessary to minimise the risks;~~	1 manufacturer comments that: the requirement is already covered by OPS.SPA.001.SFL (b)(6). So this requirement should not be listed as one of the set of conditions requested by OPS.SPA.001.SFL (5).	Noted. All such anomalies are addressed by aligning the text with JAR-OPS.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~6. Report to the manufacturer any loss of power control, engine shutdown (precautionary or otherwise) or power unit failure for any cause (excluding simulation of power unit failure during training). The content of each report should provide:~~		
~~a. Date and time;~~		
~~b. Operator (and Maintenance organisations where relevant);~~		
~~c. Type of helicopter and description of operations;~~		
~~d. Registration and serial number of airframe;~~		
~~e. Engine type and serial number;~~		
~~f. Power unit modification standard where relevant to failure;~~		
~~g. Engine position;~~		
~~h. Symptoms leading up to the event.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~i. Circumstances of power unit failure including phase of flight or ground operation;~~		
~~j. Consequences of the event;~~		
~~k. Weather/environmental conditions;~~		
~~l. Reason for power unit failure – if known;~~		
~~m. In case of an In Flight Shut Down (IFSD), nature of the IFSD (Demanded/Un-demanded);~~		
~~n. Procedure applied and any comment regarding engine restart potential;~~		
~~o. Engine hours and cycles (from new and last overhaul);~~		
~~p. Airframe flight hours;~~		
~~q. Rectification actions applied including, if any, component changes with part number and serial number of the removed equipments; and~~		

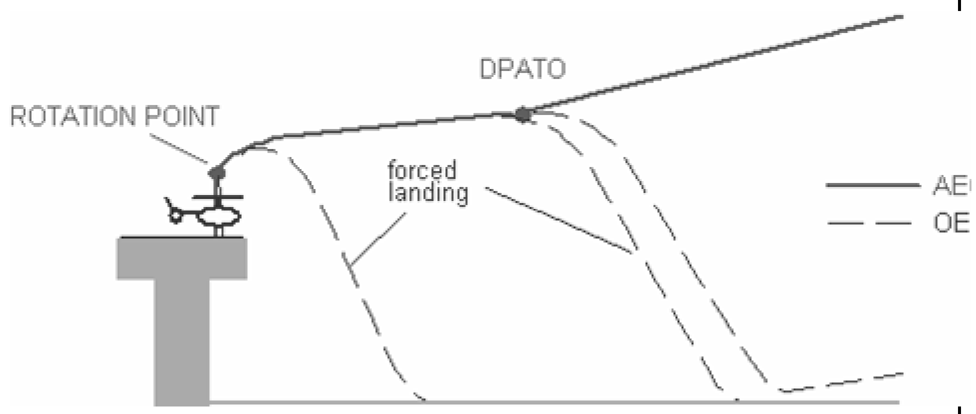
A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~r. Any other relevant information.~~		
~~• **AMC OPS.SPA.005.SFL(b) and (c) Applicability**~~		
~~**ADDITIONAL TAKE-OFF AND LANDING CONDITIONS**~~	1 MS comments: we have reservations regarding the use of “Enhanced Performance Class 2” as we are not sure that the data will be made available to the operator by the manufacturer.	Noted.
~~1. In addition to AMC3 OPS.CAT.355.H 1.a.:~~		
~~a. the take-off mass should not exceed the maximum mass specified in the Helicopter Flight Manual for an all engine operative (AEO) outside ground effect (OGE) hover in still air with all power units operating at an appropriate power setting.~~		
~~b. for operations to/from a helideck in a hostile environment and, for a helicopter with a maximum passenger seating configuration (MPSC) of more than 19, a non-hostile environment, the take-off mass, with the critical power unit(s) inoperative and the remaining power unit(s) operating at an appropriate power setting, should take~~	These conditions apply only to the take-off phase; the wording should be: "b. for operations from a helideck..."	Accepted. This is amended by aligning the text with JAR-OPS 3.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~into account:~~		
	Proposal: In order to restore the original JAR-OPS 3 text (JAR-OPS 3.520 (a)(3)(ii) for take-off; JAR-OPS 3.535(a)(3)(ii) for landing), Eurocopter propose wording modifications. [modifications not repeated] In JAR-OPS 3.520 (a)(3)(ii) and JAR-OPS 3.535(a)(3)(ii), the additional requirements (so-called 'Enhanced PC2') are applicable either to helicopters located in a hostile environment whatever the MPSC is (condition B) or to helicopters with an MPSC of more than 19 (condition A).	Accepted. This is rectified by aligning the text with JAR-OPS 3.
~~i. the procedure used;~~		
~~ii. deck-edge miss; and~~		
~~iii. drop down appropriate to the height of the helideck.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~2. In addition to AMC3 OPS.CAT.355.H 4.a.:~~		
~~a. the landing mass should not exceed the maximum mass specified in the Helicopter Flight Manual for an all engine operative (AEO) outside ground effect (OGE) hover in still air with all power units operating at an appropriate power setting.~~		
~~b. for operations to/from a helideck in a hostile environment and, for a helicopter with a MPSC of more than 19, a non-hostile environment, the landing mass, with the critical power unit(s) inoperative and the remaining power unit(s) operating at an appropriate power setting, should take into account:~~	These conditions apply only to the landing phase; the wording should be: "b. for operations to a helideck..."	Accepted. This is amended by aligning the text with JAR-OPS 3.
~~i. the procedure used; and~~		
~~ii. drop down appropriate to the height of the helideck.~~		
• ~~**GM1 OPS.SPA.005.SFL(b) Applicability**~~		
~~**PROCEDURE FOR CONTINUED OPERATIONS TO HELIDECKS**~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~1. Factors to be considered when taking off from or landing on a helideck~~		
~~In order to take account of the considerable number of variables associated with the helideck environment, each take-off and landing may require a slightly different profile. Factors such as helicopter mass and centre of gravity, wind velocity, turbulence, deck size, deck elevation and orientation, obstructions, power margins, platform gas turbine exhaust plumes etc., will influence both the take-off and landing. In particular, for the landing, additional considerations such as the need for a clear go-around flight path, visibility and cloud base etc., will affect the pilot-in command's decision on the choice of landing profile. Profiles may be modified, taking account of the relevant factors noted above and the characteristics of individual helicopter types.~~		
~~2. Performance~~		
~~To perform the following take-off and landing profiles, adequate all engines operating (AEO) hover performance at the helideck is required. In order to provide a minimum level of performance, data (derived from the Flight Manual AEO out of ground effect (OGE), with wind accountability) should be used to provide the maximum take-off or landing mass. Where a helideck is affected by downdrafts or turbulence or hot gases, or where the take-off or landing profile is obstructed, or the approach or take-off cannot be made into wind, it may be necessary to decrease this take-off or landing mass by using~~		

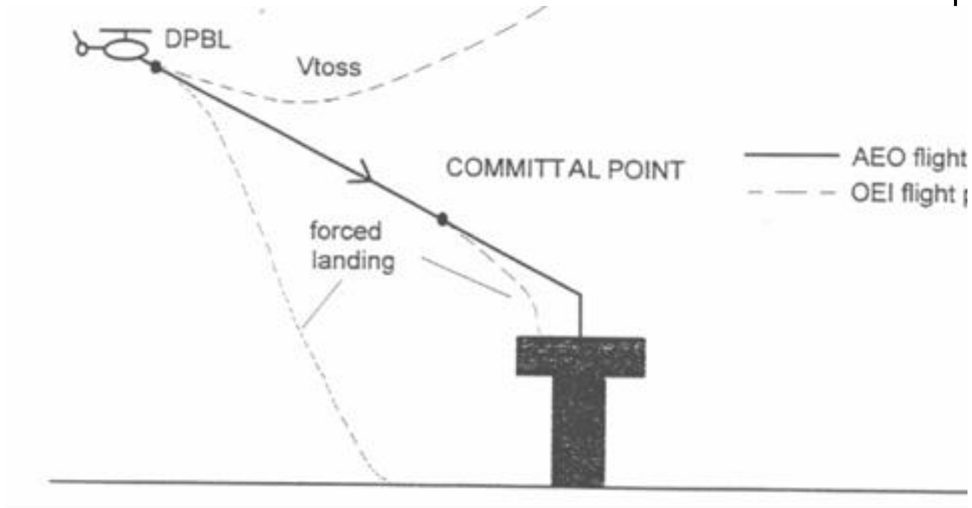
A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~a suitable calculation method recommended by the manufacturer or established by the operator. The helicopter mass should not exceed that stated in AMC3 OPS.CAT.355.H 1.a. and 4.a.~~		
~~3. Take-off profile~~		
~~a. The take-off should be performed in a dynamic manner ensuring that the helicopter continuously moves vertically from the hover to the Rotation Point (RP) and thence into forward flight. If the manoeuvre is too dynamic then there is an increased risk of losing spatial awareness (through loss of visual cues) in the event of a rejected take-off, particularly at night.~~		
~~b. If the transition to forward flight is too slow, the helicopter is exposed to an increased risk of contacting the deck edge in the event of an engine failure at or just after the point of cyclic input (RP).~~		
~~c. It has been found that the climb to RP is best made between 110 % and 120 % of the power required in the hover. This power offers a rate of climb which assists with deck-edge clearance following power unit failure at RP, whilst minimising ballooning following a failure before RP. Individual types will require selection of different values within this range.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		
~~4. Selection of a lateral visual cue~~		
~~In order to obtain the maximum performance in the event of an engine failure being recognised at or just after RP, the RP must be at its optimum value, consistent with maintaining the necessary visual cues. If an engine failure is recognised just before RP, the helicopter, if operating at a low mass, may 'balloon' a significant height before the reject action has any effect. It is, therefore, important that the Pilot Flying selects a lateral visual marker and maintains it until the RP is achieved, particularly on decks with few visual cues. In the event of a rejected take-off, the lateral marker will be a vital visual cue in assisting the pilot to carry out a successful landing.~~		
~~5. Selection of the rotation point~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~a. The optimum RP should be selected to ensure that the take-off path will continue upwards and away from the deck with All Engines Operating (AEO), but minimising the possibility of hitting the deck edge due to the height loss in the event of an engine failure at or just after RP.~~		
~~b. The optimum RP may vary from type to type. Lowering the RP will result in a reduced deck edge clearance in the event of an engine failure being recognised at or just after RP. Raising the RP will result in possible loss of visual cues, or a hard landing in the event of an engine failure just prior to RP.~~		
~~6. Pilot reaction times~~		
~~Pilot reaction time is an important factor affecting deck edge clearance in the event of an engine failure prior to or at RP. Simulation has shown that a delay of one second can result in a loss of up to 15 ft in deck edge clearance.~~		
~~7. Variation of wind speed~~		
~~Relative wind is an important parameter in the achieved take-off path following an engine failure; wherever practicable, take-off should be made into wind. Simulation has shown that a 10 knot wind can give an extra 5 ft deck edge clearance compared to a zero wind~~	It is not correct to write that 10 kt wind increases by 5 ft the deck edge clearance. This result is depending on the helicopter type.	Not accepted . It is correctly stated that simulation has shown this effect. With wind of less than 10 kt, the

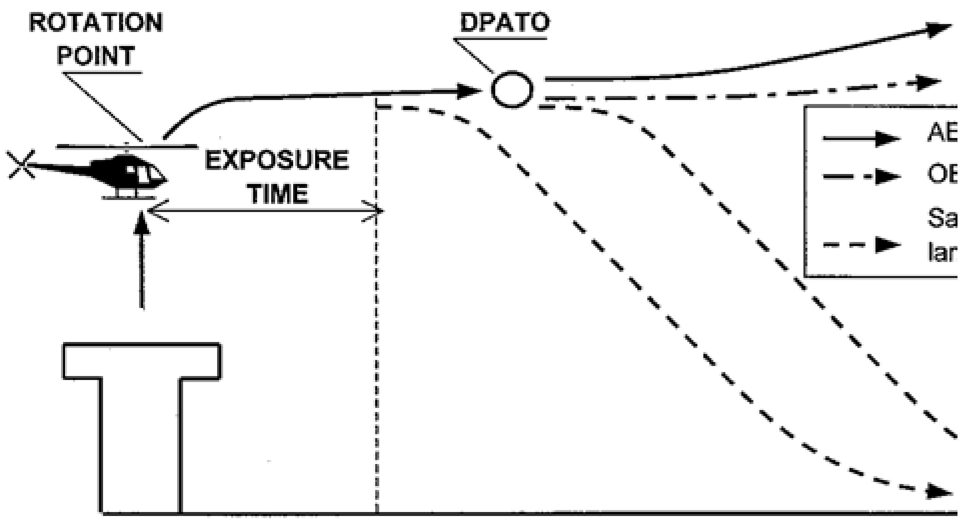
A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~condition.~~	There are even cases where the wind will reduce the deck-edge margin.	wind does not have the same predictability. However, it is expected that manufacturers will produce their own data to establish deck-edge clearance.
~~8. Position of the helicopter relative to the deck edge~~		
~~a. It is important to position the helicopter as close to the deck edge (including safety nets) as possible whilst maintaining sufficient visual cues, particularly a lateral marker.~~		
~~b. The ideal position is normally achieved when the rotor tips are positioned at the forward deck edge. This position minimises the risk of striking the deck edge following recognition of an engine failure at or just after RP. Any take-off heading which causes the helicopter to fly over obstructions below and beyond the deck edge should be avoided if possible. Therefore, the final take-off heading and position will be a compromise between the take-off path for least obstructions, relative wind, turbulence and lateral marker cue considerations.~~		
~~9. Actions in the event of an engine failure at or just after RP~~		

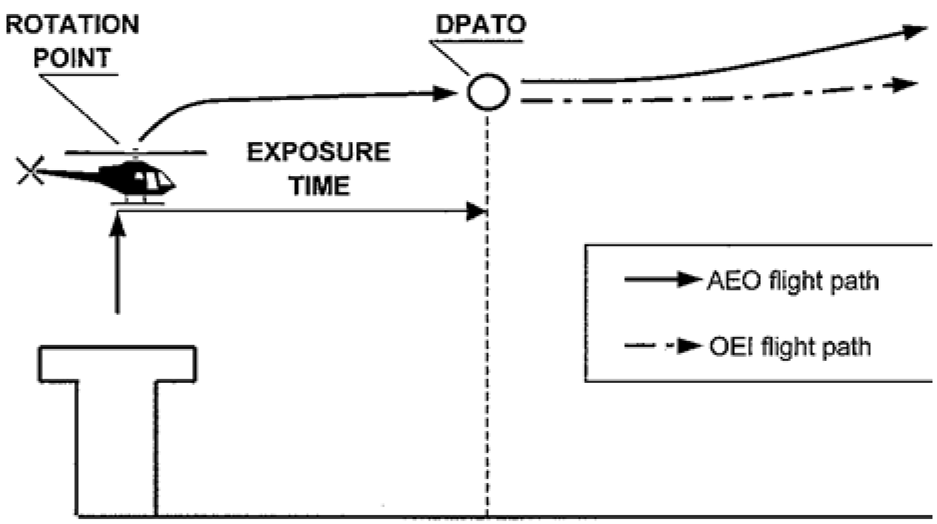
A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Once committed to the continued take-off, it is important, in the event of an engine failure, to rotate the aircraft to the optimum attitude in order to give the best chance of missing the deck edge. The optimum pitch rates and absolute pitch attitudes should be detailed in the profile for the specific type.~~		
~~10. Take-off from helidecks which have significant movement~~		
~~a. This technique should be used when the helideck movement and any other factors, e.g. insufficient visual cues, makes a successful rejected take-off unlikely. Weight should be reduced to permit an improved one engine inoperative capability, as necessary.~~		
~~b. The optimum take-off moment is when the helideck is level and at its highest point, e.g. horizontal on top of the swell. Collective pitch should be applied positively and sufficiently to make an immediate transition to climbing forward flight. Because of the lack of a hover, the take-off profile should be planned and briefed prior to lift off from the deck.~~		
~~11. Standard landing profile~~		
~~The approach should be commenced into wind to a point outboard of the helideck. Rotor tip clearance from the helideck edge should be~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~maintained until the aircraft approaches this position at the requisite height (type dependent) with approximately 10 knots ground speed and a minimal rate of descent. The aircraft is then flown on a flight path to pass over the deck edge and into a hover over the safe landing area.~~		
		
~~12. Offset landing profile~~		
~~If the normal landing profile is impracticable due to obstructions and the prevailing wind velocity, the offset procedure may be used. This should involve flying to a hover position, approximately 90° offset from the landing point, at the appropriate height and maintaining rotor tip clearance from the deck edge. The helicopter should then be~~		

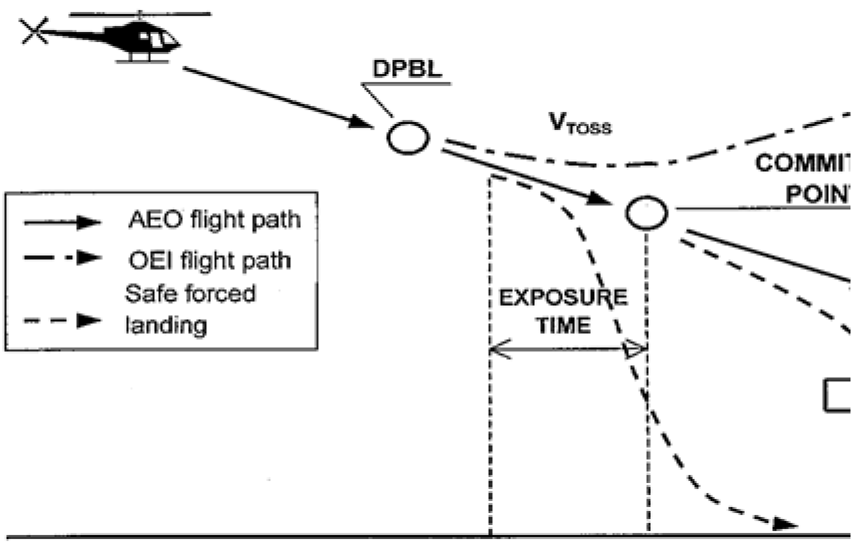
A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~flown slowly but positively sideways and down to position in a low hover over the landing point. Normally, CP will be the point at which helicopter begins to transition over the helideck edge.~~		
~~13. Training~~		
~~These techniques should be covered in the training required by Part-OR.~~		
~~• **GM2 OPS.SPA.005.SFL(b) Applicability**~~		
~~**OPERATIONS TO/FROM ELEVATED FATO'S OR HELIDECKS**~~		
~~1. This GM describes types of operation to/from helidecks and elevated FATO's by helicopters operating in performance class 2, without an assured safe forced landing capability in the case of take-off and landing. Exposure time is used, where the probability of a power unit failure is regarded as extremely remote, but if a power unit failure (engine failure) occurs during the exposure time a safe force landing may not be possible.~~		
~~2. Take Off - Non-Hostile Environment~~		
~~a. Figure 1 shows a typical take-off profile for performance class 2 operations from a helideck or an elevated FATO in~~		

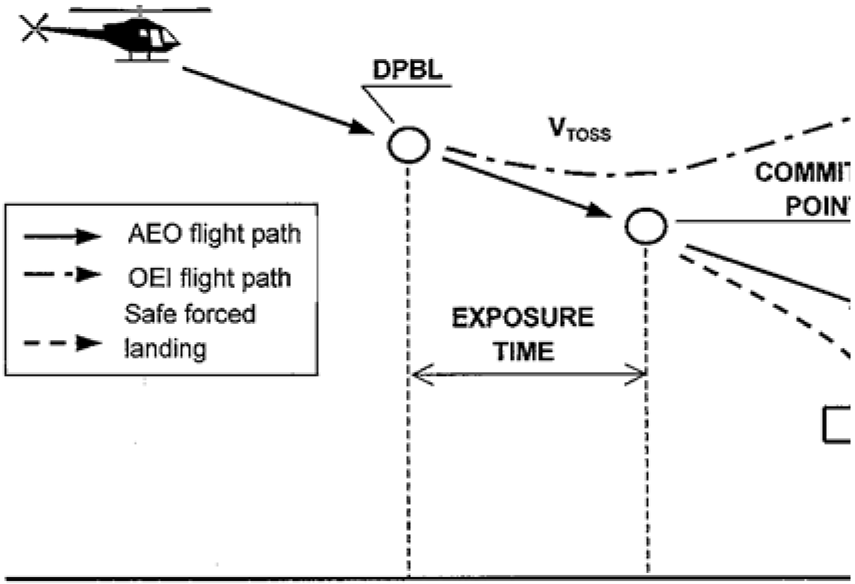
A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~a non-hostile environment (with exposure time).~~		
~~b. If an engine failure occurs after the exposure time and before DPATO, compliance with AMC OPS.SPA.005.SFL(b) and (c) 1. will enable a safe force landing on the surface.~~		
~~c. At or after the DPATO, the OEI flight path should clear all obstacles by the margins specified in AMC3 OPS.CAT.H.355 2.~~		
~~Note: An engine failure outside of exposure time should result in a safe forced landing or safe continuation of the flight.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
 **Figure 1**		
~~3. Take Off - Non-Congested Hostile Environment~~		
~~a. Figure 2 shows a typical take off profile for performance class 2 operations from a helideck or an elevated FATO in a non-congested hostile environment (with exposure time).~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~b. If an engine failure occurs after the exposure time the helicopter is capable of continuing the flight.~~		
~~c. At or after the defined point after take-off (DPATO), the OEI flight path should clear all obstacles by the margins specified in AMC3 OPS.CAT.H.355 2.~~		
~~Note: an engine failure outside of exposure time should result in a safe forced landing or safe continuation of the flight.~~		
 **Figure 2**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~4. Landing – Non-Hostile Environment~~		
~~a. Figure 3 shows a typical landing profile for performance class 2 operations to a helideck or an elevated FATO in a non-hostile environment (with exposure time).~~		
~~b. The DPBL is defined as a "window" in terms of airspeed, rate of descent, and height above the landing surface. If an engine failure occurs before the DPBL, the pilot may elect to land or to execute a balked landing.~~		
~~c. In the event of an engine failure being recognised before the exposure time compliance with AMC OPS.SPA.005.SFL(b) and (c) 2. will enable a safe force landing on the surface.~~		
~~d. In the event of an engine failure after the exposure time, compliance with AMC AMC OPS.SPA.005.SFL(b) and (c) 2. will enable a safe force landing on the deck.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
 **Figure 3**		
~~5. Landing - Non-Congested Hostile~~		
~~a. Figure 4 shows a typical landing profile for Performance Class 2 operations to a helideck or an elevated FATO in a non-congested hostile environment (with exposure time).~~		
~~b. In the event of an engine failure at any point during the approach and landing phase up to the start of exposure~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~time, compliance with AMC OPS.SPA.005.SFL (b) and (c) 2. will enable the helicopter, after clearing all obstacles under the flight path, to continue the flight.~~		
~~c. In the event of an engine failure after the exposure time, compliance with AMC OPS.SPA.005.SFL (b) and (c) 2. will enable a safe force landing on the deck.~~		
 **Figure 4**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
• ~~**GM OPS.SPA.005.SFL(c) Applicability**~~		
~~**PERFORMANCE CLASS 2 – THE TAKE-OFF AND LANDING PHASE**~~		
~~1. BENEFITS OF PERFORMANCE CLASS 2 WITH EXPOSURE~~		
~~Following a Risk Assessment when the use of exposure is approved the benefits are:~~		
~~a. ability to operate when a safe forced landing is not assured in the take-off phase;~~		
~~b. ability to penetrate the HV curve for short periods during take-off or landing.~~		
~~Risk Assessment used for fulfilment of this proposed standard should be consistent with principles described in 'AS/NZS 4360:1999'.~~	1 MS comments: amend text to include relevant text from the quoted reference document.	Noted. This is a large international tract; as with ICAO references it is best provided as a reference rather than to include extracts.
~~Note: Terms used in this text and defined in the AS/NZS Standard are shown in Sentence Case e.g. Risk Assessment or Risk Reduction.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~2. OPERATIONS IN PERFORMANCE CLASS 2 WITH EXPOSURE~~		
~~OPS.SPA.005.SFL (c) offers an opportunity to discount the requirement for an assured safe forced landing area in the take-off or landing phase - subject to an approval.~~		
~~2.1 Limit of Exposure~~		
~~As stated in GM3 OPS.CAT.H.355, performance class 2 has to ensure AEO obstacle clearance to DPATO and OEI obstacle clearance from that point. This does not change with the application of exposure.~~		
~~It can therefore be stated that operations with exposure are concerned only with alleviation from the requirement for the provision of a safe-forced-landing.~~		
~~The absolute limit of exposure is 200 ft – from which point OEI obstacle clearance should be shown.~~	1 IND comments that it can never be certain that exposure will end at 200 ft. They indicate that it is not possible to 'patch' into a CAT A procedure after taking off with exposure.	Noted. Whilst it is correct that 200 ft was an arbitrary line, it was chosen because this represented the start of the second segment climb; for that reason, the conversion from PC2 with exposure to PC1 was only a matter of being in a condition of V_Y and clear of obstacles. If as

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		suspected, the take-off is taken up a valley into wind, then the aircraft should be manoeuvred to an into wind position before 200 ft above the landing site. How is left to the pilot. The text is copied from section 7 of ACJ to Subpart H and was therefore already contained in JAR-OPS 3.
~~2.2 The principle of Risk Assessment~~		
~~ICAO Annex 6 Part III Chapter 3.1.2 (Sixth Edition July 2007) states:~~		
~~"3.1.2 In conditions where the safe continuation of flight is not ensured in the event of a critical power unit failure, helicopter operations shall be conducted in a manner that gives appropriate consideration for achieving a safe forced landing."~~		
~~Although a safe forced landing may no longer be the (absolute) Standard, it is considered that Risk Assessment is obligatory to satisfy the requirement for 'appropriate consideration'.~~		
~~2.3 The application of Risk Assessment to Performance Class 2~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~Under circumstances where no risk attributable to engine failure (beyond that inherent in the safe-forced-landing) is present, operations in performance class 2 may be conducted in accordance with GM3 OPS.CAT.H.355 - and a safe-forced-landing will be possible.~~		
~~Under circumstances where such risk would be present i.e.: operations to an elevated FATO (deck edge strike); or, when permitted, operations from a site where a safe-forced-landing cannot be accomplished because the surface is inadequate; or where there is penetration into the Height Velocity (HV) curve for a short period during take-off or landing (a limitation in CS 29 HFM's), operations have to be conducted under a specific approval.~~		
~~Provided such operations are Risk Assessed and can be conducted to an established safety target - they may be approved.~~		
~~2.3.1The elements of the Risk Management~~		
~~The approval process consists of an operational Risk Assessment and the application of four principles:~~		
~~a. a safety target;~~		
~~b. a helicopter reliability assessment;~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~c. continuing airworthiness; and~~		
~~d. mitigating procedures.~~		
~~2.3.2The safety target~~		
~~The main element of the Risk Assessment when exposure was initially introduced into JAR-OPS 3 (NPA OPS-8), was the assumption that turbine engines in helicopters would have failure rates of about 1:100 000 per flying hour; which would permit (against the agreed safety target of 5 x 10-8 per event) an exposure of about 9 seconds for twins during the take-off or landing event. (When choosing this target it was assumed that the majority of current well maintained turbine powered helicopters would be capable of meeting the event target - it therefore represents the Residual Risk.)~~		
~~Note: Residual Risk is considered to be the risk that remains when all mitigating procedures - airworthiness and operational - are applied (see sections 2.3.4 and 2.3.5 below).~~		
~~2.3.3The reliability assessment~~		
~~The reliability assessment was initiated to test the hypothesis (stated in 2.3.2 above) that the majority of turbine powered types would be able to meet the safety target. This hypothesis could only be~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~confirmed by an examination of the manufacturers' power loss data.~~		
~~2.3.4 Mitigating procedures (airworthiness)~~		
~~Mitigating procedures consist of a number of elements:~~		
~~a. the fulfilment of all manufacturers' safety modifications;~~		
~~b. a comprehensive reporting system (both failures and usage data); and~~		
~~c. the implementation of a Usage Monitoring System (UMS).~~		
~~Each of these elements is to ensure that engines, once shown to be sufficiently reliable to meet the safety target, will sustain such reliability (or improve upon it).~~		
~~The monitoring system is felt to be particularly important as it had already been demonstrated that when such systems are in place it inculcates a more considered approach to operations. In addition the elimination of 'hot starts', prevented by the UMS, itself minimises the incidents of turbine burst failures.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~2.3.5Mitigating procedures (operations)~~		
~~Operational and training procedures, to mitigate the risk – or minimise the consequences – are required of the operator. Such procedures are intended to minimise risk by ensuring that: the helicopter is operated within the exposed region for the minimum time; and simple but effective procedures are followed to minimise the consequence should an engine failure occur.~~		
~~2.4 Operation with Exposure - the alleviation and the requirement~~		
~~When operating with exposure, there is alleviation from the requirement to establish a safe forced landing area (which extends to landing as well as take-off); however, the requirement for obstacle clearance - AEO in the take-off and from DPATO OEI in the climb and en-route phases - remains (both for take-off and landing).~~		
~~The take-off mass is obtained from the more limiting of the following:~~		
~~a. the climb performance of 150 ft/min at 1000 ft above the take-off point; or~~		
~~b. obstacle clearance (in accordance with GM3 OPS.CAT.H.355 6.5); or~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~c. AEO hover out of ground effect (HOGE) performance at the appropriate power setting. (AEO HOGE is required to ensure acceleration when (near) vertical dynamic take-off techniques are being used. Additionally for elevated FATO's/helidecks, it ensures a power reserve to offset ground cushion dissipation; and ensures that, during the landing manoeuvre, a stabilised HOGE is available – should it be required.)~~		
~~2.4.1 Operations to elevated FATO or helideck~~		
~~Performance class 2 operations to elevated FATO or helideck are a specific case of operations with exposure. In these operations, the alleviation covers the possibility of:~~		
~~a. a deck-edge strike if the engine fails early in the take-off or late in the landing; and~~		
~~b. penetration into the HV Curve during take-off and landing; and~~		
~~c. forced landing with obstacles on the surface (hostile water conditions) below the elevated FATO (helideck). The take-of mass is as stated above and relevant techniques are as described in AMC OPS.SPA.005.SFL(b).~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Note: It is unlikely that the DPATO will have to be calculated with operations to helidecks (due to the absence of obstacles in the take-off path).~~		
~~2.4.2 Additional requirements for operations to Helidecks in a Hostile Environment~~		
~~For a number of reasons (e.g. the deck size, and the helideck environment – including obstacles and wind vectors), it is not anticipated that operations in performance class 1 would be technically feasible or economically justifiable (OEI HOGE could have provided a method of compliance but this would have resulted in a severe and unwarranted restriction on payload/range).~~		
~~However, due to the severe consequences of an engine failure to helicopters involved in take-off and landings to helidecks located in hostile sea areas (such as the North Sea or the North Atlantic), a policy of Risk Reduction is called for. As a result, enhanced performance class 2 take-off and landing masses together with techniques that provide a high confidence of safety due to: deck-edge avoidance; and, drop-down that provides continued flight clear of the sea, are seen as practical measures.~~		
~~For helicopters which have a Category A elevated helideck procedure, certification is satisfied by demonstrating a procedure and adjusted masses (adjusted for wind as well as temperature and pressure) which assure a 15 ft deck edge clearance on take-off and landing. It is therefore recommended that manufacturers, when~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~providing enhanced performance class 2 procedures, use the provision of this deck-edge clearance as their benchmark.~~		
~~As the height of the helideck above the sea is a variable, drop down has to be calculated; once clear of the helideck, a helicopter operating in performance class 1 would be expected to meet the 35 ft obstacle clearance. Under circumstances other than open sea areas and with less complex environmental conditions, this would not present difficulties. As the provision of drop down takes no account of operational circumstances, standard drop down graphs for enhanced performance class 2 – similar to those in existence for Category A procedures – are anticipated.~~		
~~Under conditions of offshore operations, calculation of drop down is not a trivial matter – the following examples indicate some of the problems which might be encountered in hostile environments:~~		
~~a. Occasions when tide is not taken into account and the sea is running irregularly – the level of the obstacle (i.e. – the sea) is indefinable making a true calculation of drop down impossible.~~		
~~b. Occasions when it would not be possible – for operational reasons – for the approach and departure paths to be clear of obstacles – the 'standard' calculation of drop down could not be applied.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Under these circumstances, practicality indicates that drop down should be based upon the height of the deck AMSL and the 35 ft clearance should be applied.~~		
~~There are however, other and more complex issues which will also affect the deck-edge clearance and drop down calculations:~~		
~~c. When operating to moving decks on vessels, a recommended landing or take-off profile might not be possible because the helicopter might have to hover alongside in order that the rise and fall of the ship is mentally mapped; or, on take-off re-landing in the case of an engine failure might not be an option.~~		
~~Under these circumstances, the pilot-in-command might adjust the profiles to address a hazard more serious or more likely than that presented by an engine failure.~~		
~~It is because of these and other (unforeseen) circumstances that a prescriptive requirement is not used. However, the target remains a 15 ft deck-edge clearance and a 35ft obstacle clearance and data should be provided such that, where practically possible, these clearances can be planned.~~		
~~As accident/incident history indicates that the main hazard is collision with obstacles on the helideck due to human error, simple and reproducible take-off and landing procedures are recommended.~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~In view of the reasons stated above, the future requirement for performance class 1 was replaced by the new requirement that the take-off mass takes into account: the procedure; deck-edge miss; and drop down appropriate to the height of the helideck. This will require calculation of take-off mass from information produced by manufacturers reflecting these elements. It is expected that such information will be produced by performance modelling/simulation using a model validated through limited flight testing.~~		
~~2.4.3 Operations to helidecks for helicopters with a MPSC of more than 19~~		
~~The original requirement for operations of helicopters with a MPSC of more than 19 was performance class 1 (as set out in OPS.CAT.355.H (a)(2)).~~		
~~However, when operating to helidecks, the problems enumerated in 2.4.2 above are equally applicable to these helicopters. In view of this, but taking into account that increased numbers are (potentially) being carried, such operations may be permitted in enhanced performance class 2 (OPS.CAT.355.H (a)(3)) but, in all helideck environments (both hostile and non-hostile), have to satisfy, the additional requirements, set out in 2.4.2 above.~~		
• ~~**GM OPS.SPA.005.SFL(d) Applicability**~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~**PERFORMANCE CLASS 3 – THE TAKE-OFF AND LANDING PHASE**~~	1 MS comments: There are several places in the text where the original text of “V_Y or 200 ft” has been replaced with “200 ft”.	Accepted. Restoration of the original text rectifies the problem.
~~1. To understand the use of ground level exposure in performance class 3, it is important first to be aware of the logic behind the use of ‘take-off and landing phases’; once this is clear, it is easier to appreciate the aspects and limits of the use of ground level exposure. This GM shows the derivation of the term from the ICAO definition of the ‘en-route phase’ and then gives practical examples of the use, and limitations on the use, of ground level exposure in OPS.SPA.005.SFL (d).~~		
~~2. The take-off phase in performance class 1 and 2 may be considered to be bounded by ‘the specified point in the take-off’ from which the take-off flight path begins.~~		
~~a. In performance class 1 this specified point is defined as “the end of the take-off distance required”.~~		
~~b. In performance class 2 this specified point is defined as “DPATO or, as an alternative, no later than 200 ft above the take-off surface”.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~c. There is no simple equivalent point for bounding of the landing in performance class 1 and 2.~~		
~~3. Take-off flight path is not used in performance class 3 and, consequently, the term 'take-off and landing phases' is used to bound the limit of exposure. For the purpose of performance class 3, the take-off and landing phases are considered to be bounded by:~~		
~~a. for the take-off no later than 200 ft above the take-off surface; and~~		
~~b. for the landing 200 ft above the landing surface.~~		
~~Note: in ICAO Annex 6 Part III, En-route phase is defined as being "That part of the flight from the end of the take-off and initial climb phase to the commencement of the approach and landing phase." The use of take-off and landing phase in this text is used to distinguish the take-off from the initial climb, and the landing from the approach: they are considered to be complimentary and not contradictory.~~		
~~4. Ground level exposure – and exposure for elevated FATO's or helidecks in a non-hostile environment – is permitted for operations under an approval in accordance with section OPS.SPA.SFL. Exposure in this case is limited to the 'take-off and landing phases'.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~What is the practical effect of this bounding of exposure? Consider a couple of examples:~~		
~~a. A clearing: an operator may consider a take-off/landing in a clearing when there is sufficient power, with all engines operating, to clear all obstacles in the take-off path by an adequate margin (this, in ICAO, is meant to indicate 35 ft). Thus, the clearing may be bounded by bushes, fences, wires and, in the extreme, by power lines, high trees etc. Once the obstacle has been cleared – by using a steep or a vertical climb (which itself may infringe the HV diagram) – the helicopter reaches 200 ft, and from that point a safe forced landing must be possible. The effect is that whilst operation to a clearing is possible, operation to a clearing in the middle of a forest is not (except when operated in accordance with OPS.SPA.005.SFL (d)(3)).~~		
~~b. An aerodrome surrounded by rocks: the same applies when operating to a landing site that is surrounded by rocky ground. Once 200 ft has been reached, a safe forced landing must be possible.~~		
~~c. An elevated FATO or helideck: when operating to an elevated FATO or helideck in Performance Class 3, exposure is considered to be twofold: firstly, to a deck-edge strike if the engine fails after the decision to transition has been taken; and secondly, to operations in the HV diagram due to the height of the elevated FATO or~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~helideck. Once the take-off surface has been cleared and the helicopter has reached the knee of the HV diagram, the helicopter should be capable of making a safe forced landing.~~		
~~5. Operation in accordance with OPS.SPA.005.SFL (d) does not permit excursions into a hostile environment such as and is specifically concerned with the absence of space to abort the take-off or landing when the take-off and landing space are limited; or when operating in the HV diagram.~~	The original text 'per se' has been translated as 'such as' instead of retaining the original, or using the more correct 'as such'.	Noted. A return to the original text removes this anomaly.
~~6. Specifically, the use of this exception to the requirement for a safe forced landing (during take-off or landing) does not permit semi-continuous operations over a hostile environment such as a forest or hostile sea area. It can therefore be seen as a limited alleviation from AMC4 OPS.CAT.355.H 1.a. which states that: "operations are only conducted to/from those aerodromes/operating sites and over such routes, areas and diversions contained in a non-hostile environment…".~~	The proposal is to remove this paragraph and to introduce the MS alleviation for 50 % or 5 minutes en-route.	Not accepted. The text reflects the JAR-OPS text; any change/new principles should be subject to a proposal for a new Rulemaking task.
• ~~**AMC OPS.SPA.005.SFL(e) Applicability**~~		
~~**OPERATIONS AT A PUBLIC INTEREST SITE**~~		
~~The exemption specified in OPS.SPA.005.SFL (e) should only be approved by the competent authority provided the helicopter mass does not exceed the maximum mass specified in the Helicopter Flight~~	8 % –requirement The requirement will be an issue at	Noted. This has been a long standing

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Manual for a climb gradient of 8 % in still air; at the appropriate take-off safety speed (V_{TOSS}) with the critical power units operating at an appropriate power rating.~~	higher altitudes and/or higher temperatures. This leads to an obligation to reduce mission weight, e.g. fuel quantity. Example (EC145) To achieve the 8 % climb gradient in respect of the fuel requirement, the endurance will be limited to 55 minutes in day conditions and 42 minutes at night.	requirement of the PIS Appendix.~~.~~
• ~~GM1 OPS.SPA.005.SFL(e) Applicability~~		
~~HELICOPTER MASS LIMITATIONS FOR OPERATIONS AT A PUBLIC INTEREST SITE~~	It is not apparent where this data comes from. JAR-OPS 3 and CS-29 CAT A does not address it.	Noted. Flight manuals provide the data to establish this climb gradient.
~~1. The helicopter mass limitation at take-off or landing specified in AMC OPS.SPA.005.SFL (e) should be determined using the climb performance data from 35 ft to 200 ft at V_{TOSS} (First segment of the take-off flight path) contained in the Category A supplement of the Helicopter Flight Manual (or equivalent manufacturer data acceptable to the EASA according to AMC OPS.GEN.010(a)(9)&(10)).~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~2. The first segment climb data to be considered is established for a climb at the take-off safety speed V_{TOSS}, with the landing gear extended (when the landing gear is retractable), with the critical power unit inoperative and the remaining power units operating at an appropriate power rating (the 2 min 30 sec or 2 min One Engine Inoperative power rating, depending on the helicopter type certification). The appropriate V_{TOSS}, is the value specified in the Category A performance section of the Helicopter Flight Manual for vertical take-off and landing procedures (VTOL or equivalent).~~		
~~3. The ambient conditions at the aerodrome or operating site (pressure-altitude and temperature) should be taken into account.~~		
~~4. The data is usually provided in charts one of the following ways:~~		
~~a. Height gain in ft over a horizontal distance of 100 ft in the first segment configuration (35 ft to 200 ft, V_{TOSS}, 2 min 30 sec / 2 min OEI power rating). This chart should be entered with a height gain of 8 ft per 100 ft horizontally travelled, resulting in a mass value for every pressure-altitude/temperature combination considered.~~		
~~b. Horizontal distance to climb from 35 ft to 200 ft in the first segment configuration (V_{TOSS}, 2 min 30 sec / 2 min OEI power rating). This chart should be entered with a~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~horizontally distance of 628 m (2 062 ft), resulting in a mass value for every pressure-altitude/temperature combination considered.~~		
~~c. Rate of climb in the first segment configuration (35 ft to 200 ft,~~ $\cancel{V_{TOSS}}$~~, 2 min 30 sec / 2 min OEI power rating). This chart can be entered with a rate of climb equal to the climb speed (~~$\cancel{V_{TOSS}}$~~) value in knots (converted to True Airspeed) multiplied by 8.1, resulting in a mass value for every pressure-altitude/temperature combination considered.~~		
~~**• GM2 OPS.SPA.005.SFL(d) Applicability**~~		
~~**HELICOPTER OPERATIONS TO/FROM A PUBLIC INTEREST SITE**~~		
~~1. General~~		
~~Appendix 1 to JAR-OPS 3.005(i) – contained alleviations for public interest sites – was introduced in January 2002 to address problems that had been encountered by States at hospital (and lighthouse) sites due to the applicable performance requirements of performance class 1 and 2. These problems were enumerated in ACJ to Appendix 1 to JAR-OPS 3.005(d) paragraph 8, part of which is reproduced~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~below.~~		
~~"8 Problems with hospital sites~~		
~~During implementation of JAR-OPS 3, it was established that a number of States had encountered problems with the impact of performance rules where helicopters were operated for HEMS. Although States accept that progress should be made towards operations where risks associated with a critical power unit failure are eliminated, or limited by the exposure time concept, a number of landing sites exist which do not (or never can) allow operations to Performance Class 1 or 2 requirements.~~		
~~These sites are generally found in a congested hostile environment:~~		
~~- in the grounds of hospitals; or~~		
~~- on hospital buildings.~~		
~~The problem of hospital sites is mainly historical and, whilst the authority could insist that such sites not be used – or used at such a low weight that critical power unit failure performance is assured, it would seriously curtail a number of existing operations.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Even though the rule for the use of such sites in hospital grounds for HEMS operations (Appendix 1 to JAR-OPS 3.005(d) sub-paragraph (c)(2)(i)(A)) attracted alleviation until 2005, it was only partial and will still impact upon present operations.~~		
~~Because such operations are performed in the public interest, it was felt that the authority should be able to exercise its discretion so as to allow continued use of such sites provided that it is satisfied that an adequate level of safety can be maintained – notwithstanding that the site does not allow operations to Performance Class 1 or 2 standards. However, it is in the interest of continuing improvements in safety that the alleviation of such operations be constrained to existing sites, and for a limited period.”~~		
~~As stated in that ACJ and embodied in the text of the appendix, the solution was short term (until 31 December 2004). During the comment period of NPA 18, representations were made to the JAA that the alleviation should be extended to 2009. The review committee, in not accepting this request, had in mind that this was a short-term solution to address an immediate problem, and a permanent solution should be sought.~~		
~~2. Public Interest Sites after 1 January 2005~~		
~~Although elimination of such sites would remove the problem, it is recognized that phasing out, or rebuilding existing hospital and lighthouses, is a long-term goal which may not be cost-effective, or~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~even possible, in some Member States.~~		
~~It should be noted, however, that existing paragraph (e)(3) of OPS.SPA.005.SFL (which is transferred from JAR-OPS 3) limits the problem by confining approvals to public interest sites established before 1 July 2002 (established in this context means either: built before that date; or brought into service before that date – this precise wording was used to avoid problems associated with a ground level where no building would be required). Thus, the problem of these sites is contained and reducing in severity. This date was set approximately 6 months after the intended implementation of this original appendix.~~		
~~EASA adopted the JAA philosophy that from 1st January 2005 the approval of a public interest site would be confined to those sites where a CAT A procedure alone cannot solve the problem. The determination of whether the helicopter can or cannot be operated in accordance performance class 1 criteria should be established with the helicopter at a realistic payload and fuel to complete the mission. However, in order to reduce the risk at those sites, AMC OPS.SPA.005.SFL (e) should be applied.~~	Delete "CAT A" and add "performance class 1".	Not accepted. The reference is appropriate.
~~Additionally and in order to promote understanding of the problem, the text contained in paragraph (e) of the JAR-OPS 3 appendix had been amended to refer to performance class 1 and not to Annex 14 as in the original appendix. Thus Part C of the Operations Manual should reflect the non-conformance with that Subpart.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~The following paragraphs discuss the problem and solutions.~~		
~~3. The problem associated with public interest sites~~		
~~There are a number of problems: some of which can be solved with the use of appropriate helicopters and procedures; and others which, because of the size of the FATO or the obstacle environment, cannot.~~		
~~They consist of:~~		
~~a. Helicopters that could not meet the required performance class 1;~~		
~~b. The size of the FATO of the public interest site (smaller than that required by the manufacturers' procedure);~~		
~~c. An obstacle environment that prevents the use of the manufacturers procedure (obstacles in the back-up area);~~		
~~d. An obstacle environment that does not allow recovery following a power unit failure in the critical phase of take-off (a line of buildings requiring a demanding gradient of climb) at a realistic payload and fuel to complete the mission; or~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~e. A ground level public interest site (exposure is not permitted).~~		
~~3.1 Problems associated with a; it was recognised at the time of the adoption of the original appendix that, although the number of helicopters not meeting the absolute performance criteria of a. above were dwindling, existing HEMS and lighthouse fleets could not be replaced until 2005. The limited alleviations should at the time of implementation of the Community Implementing Rules be non existent.~~		
~~3.2 Problems associated with b.; the inability to climb and conduct a rejected landing back to the public interest site following an engine failure before the Decision Point (DP).~~		
~~3.3 Problems associated with c.; as in b.~~		
~~3.4 Problems associated with d; climb into an obstacle following an engine failure after DP.~~		
~~3.5 Problems associated with e.; may be related to:~~		
~~a. the size of the FATO which is too small for the manufacturers' procedure;~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~b. no room for back-up;~~		
~~c. an obstacle in the take-off path; or~~		
~~d. a mixture of all three.~~		
~~With the exception of case a., problems cannot be solved in the immediate future but can, when mitigated with the use of the latest generation of helicopters (operated at a weight that can allow useful payloads and endurance), minimise exposure to risk.~~		
~~4. Long Term Solution~~		
~~Although not offering a complete solution, it was felt that a significant increase in safety could be achieved by applying an additional performance margin to such operations. This solution could also be seen as mitigation proportional to the problem and would allow the time restriction of 2004 to be removed.~~		
~~The required performance level of 8 % climb gradient in the first segment, reflects ICAO Annex 14 Volume II in Table 4-3 – Dimensions and slopes of obstacle limitations surfaces for performance class 2.~~	In 4 the second paragraph is a general requirement made by ICAO; HEMS operations should be more demanding.	Not accepted. ICAO currently requires 4.5 % for operation with OEI; the 8 % is a twin engine requirement and, as such, represents a substantial increase concomitant

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		with the exposure.
~~The performance delta is achieved without the provision of further manufacturer's data by using existing graphs to provide the Reduced take-off mass (RTOM).~~		
~~4.1 Solution with relation to b.; although the problem still exists, the safest procedure is a dynamic take-off reducing the time taken to achieve Vstayup and thus allowing Visual Flight Rules (VFR) recovery – if the failure occurs at or after Vy and 200 feet, an Instrument Flight Rules (IFR) recovery is possible.~~		
~~4.2 Solution with relation to c.; as in b. above.~~		
~~4.3 Solution with relation to d.; once again this does not give a complete solution, however the performance delta minimise the time during which a climb over the obstacle cannot be achieved.~~		
~~4.4 Solution with relation to e.; as in 4.1 to 4.3 above.~~		
~~• GM3 OPS.SPA.005.SFL(e) Applicability~~		
~~• IMPROVEMENT PROGRAMME FOR PUBLIC INTEREST SITES~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~1. General~~		
~~Although it is accepted that there will be a number of public interest sites that will remain for some time, it is in the interest of safety that the numbers are reduced and eventually, as a goal, all sites eliminated. A reduction of sites can be achieved in two ways:~~		
~~a. By an improvement in the performance of helicopters such that HOGE OEI (Hover out of ground effect one engine inoperative) is possible at weights where the mission can be performed.~~		
~~b. By the use of a site improvement programme: to take out of service those sites where the exposure is greatest; or by improving sites such that the performance requirement can be met.~~		
~~2. Improvement in performance~~		
~~The advent of more powerful modern twin-engine helicopters has put into reach the ability to achieve the aim stated in 1.a. above. Today, most of these helicopters are at the point where HOGE OEI with mission payload is possible.~~		
~~3. Improvement of Sites~~		
~~Where a site could be improved by redevelopment, for example by increasing the size of the FATO, it should be done; where the~~		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~problems of a site are due to the obstacle environment, a programme to re-site the facility or remove the obstacle(s) should be undertaken as a priority.~~		
~~4. Summary~~		
~~As stated in paragraph 1. above, it is in the interest of States to reduce the risk of an accident due to an engine failure on take-off or landing. This could be achieved with a combination of policies:~~		
~~a. the use of more appropriate helicopters;~~		
~~b. improvement by redevelopment of a site; or~~		
~~c. the re-siting of facilities to alternative locations.~~		
~~The improvement policy should be achieved in a reasonable time horizon – and this should be an element of the compliance program.~~		
~~The approval to operate to public interest sites could be conditional upon such improvement programs being put into place. Unless such a policy is instituted, there will be no incentive for public interest sites to be eliminated in a reasonable time horizon.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~Section VII~~Subpart H – Helicopter operations with night vision imaging systems		
~~AMC OPS.SPA.001.NVIS(b)(1) Night Vision Imaging System (NVIS) operations~~		Moved to SPA.NVIS.130.
~~TRAINING PROGRAMME~~		Moved to SPA.NVIS.130.
~~1. The specific NVIS training and checking programme for Flight Crew Members should contain at least the following:~~		Moved to SPA.NVIS.130.
~~1.1 Training~~ ~~a. NVIS working principles, eye physiology, vision at night, limitations and techniques to overcome these limitations;~~ ~~b. preparation and testing of NVIS equipment;~~ ~~c. preparing the helicopter for NVIS operations;~~ ~~d. normal and emergency procedures including all NVIS failure modes;~~ ~~e. maintenance of conventional night flying training and recency;~~ ~~f. crew co-ordination concept specific to NVIS operations;~~ ~~g. practice of the transition to and from night vision goggle procedures; and~~ ~~h. awareness of specific dangers relating to the operating~~		Moved to SPA.NVIS.130.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~environment;~~		
~~1.2 Checking:~~		Moved to SPA.NVIS.130.
~~a. Night Proficiency Checks as appropriate including emergency procedures to be used on NVIS operations.~~	Many comments request the possibility to combine NVIS checks with PPC or HHO checks. The choice shall be left to the operator as long as it is approved by the national authority.	The comment was rejected. There is no reason why elements of these checks cannot be aggregated – it was never intended that there would be separate checks for all different types of operation. If night operations are being conducted, then it is likely that they will be conducted with NVIS in place. Moved to SPA.NVIS.130.
~~• b. Line checks with special emphasis on the following:~~ ~~• i. local area meteorology;~~ ~~• ii. NVIS flight planning;~~ ~~• iii. NVIS in flight procedures;~~ ~~• iv. transitions to and from NVGs;~~ ~~• v. normal NVIS procedures; and~~		Moved to SPA.NVIS.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~vi. crew co-ordination.~~		
~~2. NVIS technical crew members. The specific NVIS training and checking programme for NVIS technical crew member should contain at least the following:~~ ~~a. NVIS working principles, eye physiology, vision at night, limitations and techniques to overcome these limitations.~~ ~~b. Duties in the NVIS role, with and without night vision goggles.~~ ~~c. The NVIS installation.~~ ~~d. Operation and use of the NVIS equipment.~~ ~~e. Preparing the helicopter and specialist equipment for NVIS operations.~~ ~~f. Normal and emergency procedures.~~ ~~g. Crew co-ordination concepts specific to NVIS operations.~~ ~~h. Awareness of specific dangers relating to the operating environment.~~		Moved to SPA.NVIS.130.
GM1-SPA.NVIS.110(f) Equipment requirements for NVIS operations		
MODIFICATION OR MAINTENANCE TO THE HELICOPTER		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
It is important that the operator reviews and considers all modifications or maintenance to the helicopter with regard to the NVIS airworthiness approval. Special emphasis needs to be paid to modification and maintenance of equipment such as light emitting or reflecting devices, transparencies and avionics equipment, as the function of this equipment may interfere with the NVGs.		
GM1-SPA.NVIS.130 Crew requirements for NVIS operations		
UNDERLYING ACTIVITY		
Examples of an underlying activity are: **1. commercial air transport;** **2. helicopter emergency medical service (HEMS); and** **3. helicopter hoist operation (HHO).**		
GM1-SPA.NVIS.130(e)Crew requirements for NVIS operations		
OPERATIONAL APPROVAL		
When determining the composition of the minimum crew, the competent authority should take account of the type of operation that is to be conducted. The minimum crew should		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
be part of the operational approval. **If the operational use of NVIS is limited to the en-route phase of a commercial air transport flight, a single-pilot operation might be approved.** **Where operations to/from a HEMS operating site are to be conducted, a crew of at least one pilot and one NVIS technical crew member would be necessary (this could be the suitably qualified HEMS technical crew member).** **A similar assessment could be made for night HHO, when operating to unprepared sites.**		
AMC1- SPA.NVIS.130(f)(1) Crew requirements for NVIS operations		
TRAINING AND CHECKING SYLLABUS		
1. The flight crew training syllabus should include the following items: **a. NVIS working principles, eye physiology, vision at night, limitations and techniques to overcome these limitations;** **b. preparation and testing of NVIS equipment;** **c. preparation of the helicopter for NVIS operations;** **d. normal and emergency procedures including all**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
NVIS failure modes; **e. maintenance of unaided night flying;** **f. crew co-ordination concept specific to NVIS operations;** **g. practice of the transition to and from NVG procedures;** **h. awareness of specific dangers relating to the operating environment; and** **i. risk analysis, mitigation and management.** **2. The flight crew checking syllabus should include:** **a. night proficiency checks, including emergency procedures to be used on NVIS operations; and** **b. line checks with special emphasis on the following:** **i. local area meteorology;** **ii. NVIS flight planning;** **iii. NVIS in-flight procedures;** **iv. transitions to and from night vision goggles (NVG~~s~~);** **v. normal NVIS procedures; and** **vi. crew coordination specific to NVIS operations.** **3. Whenever the crew is required to also consist of an NVIS technical crew member, he/she should be trained and**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
checked in the following items: **a. NVIS working principles, eye physiology, vision at night, limitations, and techniques to overcome these limitations;** **b. duties in the NVIS role, with and without NVGs;** **c. the NVIS installation;** **d. operation and use of the NVIS equipment;** **e. preparing the helicopter and specialist equipment for NVIS operations;** **f. normal and emergency procedures;** **g. crew co-ordination concepts specific to NVIS operations;** **h. awareness of specific dangers relating to the operating environment; and** **i. risk analysis, mitigation and management.**		
AMC1-SPA.NVIS.130(f)Crew requirements		
CHECKING OF NVIS CREW MEMBERS		
The checks required in SPA.NVIS.130(f) may be combined with those checks required for the underlying activity.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
GM1-~~-OPS.~~SPA.NVIS.~~0~~130~~1.NVIS~~(f~~b~~)~~(1)~~Crew requirements~~Night Vision Imaging System (NVIS) operations~~		
TRAINING **GUIDELINES AND CONSIDERATIONS**~~PROGRAMME~~		
1. ~~PURPOSE~~**Purpose** The purpose of this G~~uidance~~ ~~M~~aterial is to recommend the minimum training guidelines and any associated considerations necessary for the safe operation of a helicopter while operating with night vision imaging systems **(NVISs)**. To provide an appropriate level of safety, training procedures should accommodate the capabilities and limitations of the NVIS and associated systems as well as the restraints of the operational environment.		
2. ~~ASSUMPTIONS~~**Assumptions**		
The following assumptions were used in the creation of this ~~document~~**material**:		
~~2.1~~**a.** Most civilian operators may not have the benefit of formal NVIS training, similar to that offered by the military. Therefore, the stated considerations are predicated on that individual who has no prior knowledge of NVIS or how to use them in flight. The degree to which other		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
applicants who have had previous formal training should be exempted from this training will be ~~dependant~~**dependent** on their prior NVIS experience.		
~~2.2~~**b.** While NVIS are principally an aid to **visual flight rules (**VFR**)_** night flight, the 2 dimensional nature of the NVG image necessitates frequent reference to the flight instruments for spatial and situational awareness information. The reduction of peripheral vision and increased reliance on focal vision exacerbates this requirement to monitor flight instruments. Therefore, any basic NVIS training syllabus should include some instruction on basic instrument flight.		
3. ~~TWO TIERED APPROACH: BASIC & ADVANCED TRAINING~~**Two-tiered approach: basic and advance training**		
To be effective, the NVIS training philosophy would be based on a two-tiered approach: basic and advanced NVIS training. The basic NVIS training would serve as the baseline standard for all individuals seeking an NVIS endorsement. The content of this initial training would not be dependent on any operational requirements. The training required for any individual pilot should take into account the previous NVIS flight experience. The advanced training would build on the basic training by focusing on developing specialized skills required to operate a helicopter during NVIS operations in a particular operational environment. Furthermore, while there is a need to stipulate		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
minimum flight hour requirements for an NVIS endorsement, the training should also be event based. This necessitates that operators be exposed to all of the relevant aspects, or events, of NVIS flight in addition to acquiring a minimum number of flight hours. NVIS training should include flight in a variety of actual ambient light and weather conditions.		
4. ~~TRAINING REQUIREMENTS~~**Training requirements**	One MS asks for a sentence saying that the training should be done during dark night. If a pilot is trained during a very short period, he could be trained during light nights only, which is not acceptable as it is not representative.	Not accepted. The Agency has a definition of "night". Furthermore in GM OPS.SPA.001.NVIS (b)(1) subparagraph 3. It is stated that NVIS training should include flight in a variety of actual ambient light and weather conditions.
~~4.1~~**a.**Flight **c**~~C~~rew ~~G~~**g**round ~~T~~**t**raining		
The ground training necessary to initially qualify a pilot to act as the pilot of a helicopter using night vision goggles should include at least the following subjects:		
~~4.1.1~~**i.** Applicable aviation regulations that relate to NVIS limitations and flight operations.		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~4.1.2~~**ii.** Aero-‑medical factors relating to the use of NVGs to include how to protect night vision, how the eyes adapt to operate at night, self-‑imposed stresses that affect night vision, effects of lighting (internal and external) on night vision, cues utilized to estimate distance and depth perception at night, and visual illusions.		
~~4.1.3~~**iii.** NVG performance and scene interpretation.		
~~4.1.4~~**iv.** Normal, abnormal, and emergency operations of NVGs.		
~~4.1.5~~**v.** NVIS operations flight planning to include night terrain interpretation and factors affecting terrain interpretation.		
The ground training should be the same for flight crew and crew members other than flight crew. An example of a ground training syllabus is presented in Table 1.		
~~4.2~~**b.** Flight ~~C~~**c**rew ~~F~~**f**light ~~T~~**t**raining		
The flight training necessary to initially qualify a pilot to act as the pilot of a helicopter using NVGs may be performed in a helicopter or **F**STD approved for the		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
purpose, and should include at least the following subjects:		
~~4.2.1~~**i.** Preparation and use of internal and external helicopter lighting systems for NVIS operations.		
~~4.2.2~~**ii.** Pre-flight preparation of NVGs for NVIS operations.		
~~4.2.3~~**iii.** Proper piloting techniques (during normal, abnormal, and emergency helicopter operations) when using NVGs during the take**-**off, climb, en-route, descent, and landing phases of flight that includes unaided flight and aided flight.		
~~4.2.4~~**iv.** Normal, abnormal, and emergency operations of the NVIS during flight.		
Crew members other than flight crew should be involved in relevant parts of the flight training. An example of a flight training syllabus is presented in Table 2.		
~~4.3~~**c.** Training crew members other than flight crew		
Crew members other than flight crew **(including the technical crew member)** should be trained to operate around helicopter employing NVIS. These individuals		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
should complete all phases of NVIS ground training that is given to flight crew. Due to the importance of crew coordination, it is imperative that all crew members are familiar with all aspects of NVIS flight. Furthermore, these crew members may have task qualifications specific to their position in the helicopter or areas o**f**~~r~~ responsibility. To this end, they should demonstrate competency in those areas, both on the ground and in flight.		
~~4.4~~**d.** Ground personnel training		
Non-flying personnel who support NVIS operations should also receive adequate training in their areas of expertise. The purpose is to ensure, for example, that correct light discipline is used when helicopters are landing in a remote area.		
~~4.5~~**e.** Instructor ~~Q~~**q**ualifications		
A NVIS flight instructor should at least have the following licen**c**~~s~~es and qualifications:		
~~4.5.1~~**i.** ~~Is~~ at least **flight instructor (**FI(H)**)** or **type rating instructor (**TRI(H)**)** with the applicable type rating on which NVIS training will be given; **and**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~4.5.2Is qualified as Pilot-in-command for NVIS operations on the appropriate type and operation;~~		
~~4.5.3~~~~2~~**ii.** ~~Has~~ logged at least ~~one hundred~~**100** NVIS flights **or 30 hours' flight time under NVIS** as ~~P~~**p**ilot-in-command**/commander**.	Many comments request to have more flexibility and to add the text 'has logged at least one hundred NVIS flights or 30 hrs. flight time under NVIS as pilot-in-command.	Accepted. Most of the Swiss operators and FOCA, who have extensive experience of civil NVIS operations, have proposed a more liberal and flexible wording to make it possible to obey the GM. The ADAC proposal is an equivalent and probably attainable alternative.
~~4.6~~**g.** NVIS **e**~~E~~quipment **m**~~M~~inimum **r**~~R~~equirements (training)		
While minimum equipment lists and standard NVIS equipment requirements may be stipulated elsewhere, the following procedures and minimum equipment requirements should also be considered:		
~~4.6.1~~**i.** NVIS: the following is recommended for minimum NVIS equipment and procedural requirements: ~~a~~**A.** **b**~~B~~ack-up power supply; ~~b~~**B.** NVIS adjustment kit or eye lane; ~~c~~**C.** **u**~~U~~se of helmet with the appropriate NVG		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
attachment; ~~d~~**D.** ~~B~~**b**oth the instructor and student should wear the same NVG type, generation and model.		
~~4.6.2~~**ii.** Helicopter NVIS ~~C~~**c**ompatible ~~L~~**l**ighting, ~~F~~**f**light **i**~~I~~nstruments, and **e**~~E~~quipment: **g**~~G~~iven the limited peripheral vision cues and the need to enhance situational awareness, the following is recommended for minimum compatible lighting requirements: ~~a~~**A.** NVIS compatible instrument panel flood lighting that can illuminate all essential flight instruments; ~~b~~**B.** NVIS compatible hand-held utility lights; ~~c~~**C.** **p**~~P~~ortable NVIS compatible flashlight; ~~d~~**D.** ~~For helicopter operations, IR landing or searchlight;~~ ~~e.~~ **a**~~A~~ means for removing or extinguishing internal NVIS non-compatible lights**;**~~.~~ ~~4.7~~**E.**NVIS pre-flight briefing/checklist **(a** ~~A~~n example of a NVIS pre-flight briefing/checklist is in Table 1 of GM4-SPA.NVIS.130(f)**);**~~.~~ ~~4.8~~**F.** **t**~~T~~raining references**:**	One commentator asked to cancel the reference to IR landing or searchlight since they associate the IR light as covered operations. They also do not use IR light since they do not fly down to hover with NVGs	Comment accepted. The Swiss experience of civil NVIS operations is extensive and should be taken into account.
~~A~~ **a** number of training references are available, some of which are listed below: ~~a.~~**-** **DO 295 US CONOPS civil operator training**	1. One MS highlighted that there are other people than the US army with considerable experience in	1. Accepted. The last sentence of paragraph 4.8 has been changed to "There may also be

A: Rule	B: Summary of comments	C: Reasons for change, remarks
guidelines for integrated NVIS equipment - United States Marine Corp MAWTS-1 Night Vision Device (NVD) Manual; ~~b.~~- U.S. Army Night Flight (TC 1-204); ~~c.~~- U.S. Army NVIS Operations, Exportable Training Package; ~~d.~~- U.S. Army TM 11-5855-263-10; ~~e.~~- Air Force TO 12S10-2AVS6-1; ~~f.~~- Navy NAVAIR 16-35AVS-7; **and** ~~g.~~- U.S. Border Patrol, Helicopter NVIS Ground and Flight Training Syllabus.	military and civil NVIS. 2. A source of information to highlight should also be DO 295 US CONOPS civil operator training guidelines for integrated NVIS equipment.	further documents available from European civil or military sources". 2. Accepted. DO 295 US CONOPS civil operator training guidelines for integrated NVIS equipment will be added to the list of documents
There may also be further documents available from European **civil or** military sources.		
GM2-SPA.NVIS.130(f)Crew requirements		
~~TABLE 1 GROUND TRAINING AREAS OF INSTRUCTION~~**INSTRUCTION - GROUND TRAINING AREAS OF INSTRUCTION**		
A detailed example of possible subjects to be instructed in a NVIS ground instruction is included below. (The exact details may not always be applicable, e.g. due to goggle configuration differences.)		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td>Table 1: Ground training areas of instruction
<table>
<tr><td>Item</td><td>Subject Area</td><td>Subject Details</td><td>Recommended Time</td></tr>
</table>
</td><td>The theory shall be treated with all subjects, no minimum time required.</td><td>Not accepted. It is important to remember that the guidance material only gives a pointer to what is regarded a reasonable level, and these times are only recommendations.</td></tr>
</table>

A: Rule				**B: Summary of comments**	**C: Reasons for change, remarks**
1	General Anatomy and Characteristics of the Eye	Anatomy: • Overall structure of the eye: • Cones • Rods Visual Deficiencies: • Myopia; • Hyperopia; • Astigmatism; • Presbyopia. Effects of Light on Night Vision & NV Protection Physiology: • Light levels ~ Illumination; ~ Luminance; ~ Reflectance; ~ Contrast. • Types of vision: ~ photopic; ~ mesopic; ~ scotopic. • Day versus night vision • Dark adaptation process: ~ Dark Adaptation; ~ Pre-adaptive State. • Purkinje Shift • Ocular Chromatic Aberration • Photochromatic Interval	1 hour		

A: Rule				B: Summary of comments	C: Reasons for change, remarks
2	Night Vision Human Factors	• Night blind spot (as compared to day blind spot) • Field of view and peripheral vision • Distance estimation and depth perception: ~ Monocular cues; ~ Motion parallax; ~ Geometric perspective; ~ Size constancy; ~ Overlapping contours or interposition of objects. • Aerial perspective: ~ Variations in colour or shade; ~ Loss of detail or texture; ~ Position of light source; and ~ Direction of shadows. • Binocular cues • Night vision techniques: ~ Off-centre vision; ~ Scanning; ~ Shapes and silhouettes.	1 hour		
		• Vestibular Illusions • Somatogyral Illusions: ~ Leans; ~ Graveyard Spin; ~ Coriolis Illusion. • Somatogravic Illusions: ~ Oculographic Illusions; ~ Elevator Illusion; ~ Oculoagravic Illusions.			

A: Rule	B: Summary of comments	C: Reasons for change, remarks
• Proprioceptive Illusions • Dealing with Spatial Disorientation • Visual Illusions: ~ Auto kinetic illusion; ~ Confusion with ground lights; ~ Relative motion; ~ Reversible perspective illusion; ~ False vertical and horizontal cues; ~ Altered planes of reference; ~ Height /Depth perception illusion; ~ Flicker vertigo; ~ Fascination (Fixation); ~ Structural illusions; and ~ Size-distance illusion.		
• Helicopter Design Limitations: ~ Windscreen condition; ~ Helicopter instrument design; ~ Helicopter structural obstruction; ~ Interior lights; and ~ Exterior lights. • Self-imposed stresses: ~ Drugs; ~ Exhaustion; ~ Alcohol; ~ Tobacco; ~ Hypoglycaemia; ~ Injuries;		

A: Rule				B: Summary of comments	C: Reasons for change, remarks
		~ Physical Fitness. • Stress & Fatigue: ~ Acute vs. Chronic; ~ Prevention. • Hypoxia Issues and Night Vision • Weather/Environmental conditions: ~ Snow (white-out); ~ Dust (brown-out); ~ Haze; ~ Fog; ~ Rain; ~ Light levels. • Astronomical Lights (moon, star, northern lights); and • Effects of cloud cover.			
3	NVIS General Characteristics	• Definitions and types of NVIS: ~ Light spectrum; ~ Types of NVIS. • Thermal-imaging devices • Image-intensifier devices • Image-intensifier operational theory • Types of Image intensifier systems: ~ Generation 1; ~ Generation 2; ~ Generation 3; ~ Generation 4; ~ Type I / II; ~ Class A & B Minus Blue Filter.	1 hour		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
• NVIS Equipment ~ Shipping and storage case; ~ Carrying case; ~ Binocular Assembly; ~ Lens Caps; ~ Lens Paper; ~ Operators Manual; ~ Power Pack (Dual Battery); and ~ Batteries.		
• Characteristics of NVIS: ~ Light amplification; ~ Light intensification; ~ Frequency sensitivity; ~ Visual range acuity; ~ Unaided peripheral vision; ~ Weight; ~ Flip-up device; ~ Break-away feature; ~ Neck cord; ~ Maintenance Issues ~ Human Factor Issues • Description and Functions of NVIS components:		

A: Rule				B: Summary of comments	C: Reasons for change, remarks
			~ Helmet visor cover and extension strap; ~ Helmet NVIS mount and attachment points; ~ Different Mount options forvarious helmets; ~ Lock release button; ~ Vertical adjustment knob; ~ Low battery indicator; ~ Binocular assembly; ~ Monocular Tubes; ~ Fore and aft adjustment knob; ~ Eye span knob; ~ Tilt adjustment Lever; ~ Objective focus rings; ~ Eyepiece focus rings; and ~ Battery pack.			
4	NVIS Care & Cleaning	• Handling procedures; • NVIS operating instructions: ~ Pre-mounting inspection; ~ Mounting procedures; ~ Focusing procedures; ~ Faults. • Post-Flight Procedures; • Deficiencies: Type and Recognition of Faults: ~ Acceptable faults: - Black spots; - Chicken wire;	1 hour		

A: Rule				B: Summary of comments	C: Reasons for change, remarks
		- Fixed pattern noise (honeycomb effect); - Output brightness variation; - Bright spots; - Image disparity; - Image distortion ; - Emission points. ~ Unacceptable faults: - Shading; - Edge glow; - Fashing, flickering or intermittent operation. • Cleaning Procedures; • Care of Batteries; • Hazardous Material Considerations;			
5	Pre & Post Flight Procedures	• Inspect NVIS; • Carrying case condition; • Nitrogen purge due date; • Collimation test due date; and • Screens diagram(s) of any faults; • NVIS kit: complete; • NVIS binocular assembly condition; • Battery pack and quick disconnect condition; and • Batteries life expended so far. • Mount battery pack onto helmet: ~ Verify no LED showing (good battery); and	1 hour		

A: Rule				**B: Summary of comments**	**C: Reasons for change, remarks**
		~ Fail battery by opening cap and L.E.D. illuminates (both compartments). • Mount NVIS onto helmet; • Adjust and focus NVIS; • Eye-span to known inter-pupillary distance; • Eye piece focus ring to Zero; • Adjustments: ~ Vertical; ~ Fore and aft; ~ Tilt; and ~ Eye-span (fine-tuning). • Focus (one eye at a time at 20 Ft, then at 30 Ft from an eye chart); ~ Objective focus ring; ~ Eye piece focus ring; ~ Verify both images are harmonised; and ~ Read eye-chart 20/40 line from 20 feet. • NVIS Mission Planning; • NVIS Light Level Planning; • NVIS Risk Assessment;			
6	NVIS Terrain Interpretation and	• Night Terrain Interpretation; • Light sources: ~ Natural; ~ Lunar; ~ Solar; ~ Starlight; ~ Northern lights;	1 hour		

A: Rule					**B: Summary of comments**	**C: Reasons for change, remarks**
	Environmental Factors	~ Artificial; ~ Cultural; ~ Infra-red. • Meteorological conditions: ~ Clouds/Fog; ~ Indications of restriction to visibility: ~ Loss of celestial lights; ~ Loss of ground lights; ~ Reduced ambient light levels; ~ Reduced visual acuity; ~ Increase in video noise; and ~ Increase in halo effect.				
		• Cues for visual recognition: ~ Object size; ~ Object shape; ~ Contrast; ~ Ambient light; ~ Colour; ~ Texture; ~ Background; and ~ Reflectivity. • Factors affecting terrain interpretation: ~ Ambient light; ~ Flight Altitudes; ~ Terrain Type. • Seasons; • Night Navigation cues: ~ Terrain relief;				

A: Rule				B: Summary of comments	C: Reasons for change, remarks
		~ Vegetation; ~ Hydrographical features; and ~ Cultural features.			
7	NVIS Training and Equipment Requirements	Cover the relevant regulations and guidelines that pertain to night and NVIS flight to include as a minimum: • Crew experience requirements; • Crew training requirements; • Airspace requirements; • Night / NVIS MEL; • NVIS / night weather limits; • NVIS equipment minimum standard requirements.	1 hour		
8	NVIS Emergency	Cover relevant emergency procedures: • Inadvertent IMC procedures; • NVIS goggle failure;	1 hour		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
<table><tr><td></td><td>Procedures</td><td>• Helicopter emergencies; ~ With goggles; ~ Transition from goggles.</td><td></td></tr><tr><td>9</td><td>NVIS Flight Techniques</td><td>Respective flight techniques for each phase of flight for the type and class of helicopter used for NVIS training</td><td>1 hour</td></tr><tr><td>10</td><td>Basic Instrument Techniques</td><td>Present and confirm understanding of basic instrument flight techniques: • Instrument scan; • Role of instruments in NVIS flight; • Unusual attitude recovery procedures.</td><td>1 hour</td></tr><tr><td>11</td><td>Blind Cockpit Drills</td><td>Perform Blind Cockpit Drills • Switches; • Circuit Breakers; • Exit mechanisms; • External / Internal Lighting; • Avionics.</td><td>1 hour</td></tr></table> ~~Table 2 Flight Training Areas of Instruction~~		
GM3-SPA.NVIS.130(f)Crew requirements		
FLIGHT TRAINING - AREAS OF INSTRUCTION		
A detailed example of possible subjects to be instructed in a NVIS flight instruction is included below.		

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td>Table 1:Flight training areas of instruction</td><td></td><td></td></tr>
<tr><td>
<table>
<tr><td>Item</td><td>Subject Area</td><td>Subject Details</td><td>Recommended Time</td></tr>
<tr><td>1</td><td>Ground Operations</td><td>• NVIS equipment assembly;
• Pre-flight Inspection of NVISs;
• Helicopter pre-flight;
• NVIS flight planning:
~ Light Level Planning;
~ Meteorology;
~ Obstacles and known hazards ;
~ Risk analysis matrix;
~ CRM concerns;
~ NVIS EP Review.
• Start-up/Shut down;
• Goggling and Degoggling.</td><td>1 hour</td></tr>
<tr><td>2</td><td>General Handling</td><td>• Level turns, climbs, and descents;
• For helicopters, confined areas and sloped landings;
• Operation specific flight tasks;
• Transition from aided to unaided flight;
• Demonstration of NVIS related ambient and cultural effects.</td><td>1 hour</td></tr>
</table>
</td><td>Various comments request to lower from 5 hours to 4 hours based on Swiss experience.</td><td>Not accepted. It is only a difference of 1 hour of flight training between GM OPS.SPA.001.NVIS (b)(1) and the proposal. It´s unclear what a “4 hours training system” really means. The guidance material only gives a pointer to what is regarded as a reasonable level.</td></tr>
</table>

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3 · Take-offs and Landings · • At both improved illuminated areas such as airports/airfields and unimproved unlit areas such as open fields; • Traffic pattern; • Low speed manoeuvres for helicopters. · 1 hour 4 · Navigation · • Navigation over variety of terrain and under different cultural lighting conditions. · 1 hour 5 · Emergency Procedures · • Goggle failure; • Helicopter emergencies; • Inadvertent IMC; • Unusual attitude recovery. · 1 hour ~~Table 3 NVIS Pre-Flight briefing/Checklist~~		
GM4-SPA.NVIS.130(f)Crew requirements		
NVIS PRE-FLIGHT BRIEFING/CHECKLIST		
A detailed example of a pre-flight briefing/checklist is included below.		
Table 1:NVIS pre-flight briefing/checklist		
Item · Subject		

A: Rule		B: Summary of comments	C: Reasons for change, remarks
1	Weather: • METAR/Forecast; • Cloud cover/dew point spread/precipitation.		
2	OPS Items: • NOTAM's; • IFR publications backup/Maps; • Goggles adjusted using test set (RTCA Document DO-275 [NVIS MOPS] Appendices G & H gives suggested NVG pre-flight and adjustment procedures and a ground test checklist).		
3	Ambient Light: • Moon rise/set/phase/position/elevation; • % illumination and MLX for duration of flight; • Recommended minimum MLX: 1.5.		

A: Rule		B: Summary of comments	C: Reasons for change, remarks
4	Mission: • Mission outline; • Terrain appreciation; • Detailed manoeuvres; • Flight timings; • Start/airborne/debrief; • Airspace coordination for NVIS; • Obstacles/minimum safe altitude; • NVIS goggle up/degoggle location/procedure; • Instrument IFR checks.		
5	Crew: • Crew day/experience; • Crew position; • Equipment: NVIS, case, video, flashlights; • Lookout duties: LS – left 90 to R45, RS – right 90 to L45; • Calling of hazards/movements landing light; • Transfer of control terminology; • Below 100 ft AGL – NFP ready to assume control.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
6 — Helicopter: • Helicopter configuration; • Fuel & CG. 7 — Emergencies: • NVIS failure: cruise and low level flight; • Inadvertent IMC/IFR Recovery; • Helicopter Emergency: critical & non-critical. **~~AMC OPS.SPA.010.NVIS(a) Equipment requirements for NVIS operations~~**		
~~RADIO ALTIMETER~~		Moved to SPA.NVIS.110.
~~1. For NVIS operations a radio altimeter and low height warning system is required. It is recommended that these have the following characteristics:~~		Moved to SPA.NVIS.110.
~~1.1 The radio altimeter should:~~ ~~a. be of an analogue type display presentation giving both an instantaneous impression of absolute height and also rate of change of height that requires minimal interpretation;~~ ~~b. be positioned to be instantly visible and discernable from each~~	Several comments on the need to have an analogue display. For instance BK117 C2 and other helicopters have the read altimeter imbedded in the EFIS.	Not accepted. Analogue means that it should not be only numbers but anything else depicting movement. An analogue radar altimeter could be part of a digit display.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~cockpit crew station (this may require more than one display);~~ ~~c. have an integral visual low height warning that operates at a height selectable by the pilot;~~ ~~d. have an integral fail/no track indicator with repeater light to give unambiguous warning of radio altimeter fail or no track conditions.~~		Moved to SPA.NVIS.110.
~~1.2 The visual warning system should:~~ ~~a. provide clear visual warning at each cockpit crew station of height below the pilot selectable warning height;~~ ~~b. have an instrument panel coaming repeater light at each cockpit crew station to ensure adequate attention getting capability for head up operations.~~		Moved to SPA.NVIS.110.
~~1.3 The audio warning system should:~~ ~~a. be unambiguous and readily cancellable. Voice warnings have been found to be effective and unambiguous;~~ ~~b. not extinguish any visual low height warnings when cancelled;~~ ~~c. operate at the same pilot selectable height as the visual warning.~~		Moved to SPA.NVIS.110.
~~AMC OPS.SPA.030.NVIS Crew requirements for NVIS operations~~		Moved to SPA.NVIS.130

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~GENERAL~~		Moved to SPA.NVIS.130
~~1. The following should apply to the crew for NVIS operations:~~		
~~1.1 Selection. The procedures manual or operations manual, where required, should contain criteria for the selection of crew members for the NVIS task. A pilot-in-command should have at least 20 hours PIC night VMC flying before commencing training.~~	Several commentators indicate that requiring 20 hours as PIC should not be applicable to NVIS since NVIS is a safety device. The minimum requirement to use NVIS is to have completed night training. The use of NVIS is then to be established by the respective national authority.	Not accepted. Although NVIS is a safety device, it introduces a number of hazards which are not present without NVIS. It is expected that before conducting operations at night, a pilot must be not only trained for flying at night but able to conduct the operation as well as fly the aircraft. Moved to SPA.NVIS.130.
~~1.2 Qualification. Successful completion of training in accordance with the procedures contained in the Procedures Manual or operations manual, where required.~~		Moved to SPA.NVIS.130.
~~1.3 Recency. All pilots and NVIS technical crew members conducting NVIS operations should have completed 3 night NVIS flights in the last 90 days. Recency may be re-established on an NVIS proficiency check in a helicopter or an FSTD approved for the purpose.~~	One commentator asks to have the minimum acceptable requirement as 1 NVIS mission with 3 landings in 90 days and can be combined with other checks or training like	Not accepted. without an acceptable rationale the minimum recency should be maintained as published. Moved to OPS.SPA.130.NVIS

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	HHO.	
AMC1-SPA.NVIS.140 Information and documentation		
OPERATIONS MANUAL		
The operations manual should include: **1. equipment to be carried and its limitations;** **2. the minimum equipment list (MEL) entry covering the equipment specified;** **3. risk analysis, mitigation and management;** **4. pre- and post-flight procedures and documentation;** **5. selection and composition of crew;** **6. crew coordination procedures, including:** **a. flight briefing;** **b. procedures when one crew member is wearing NVGs and/or procedures when two or more crew members are wearing NVGs;** **c. procedures for the transition to and from NVIS flight;** **d. use of the radio altimeter on an NVIS flight; and**		

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e. inadvertent instrument meteorological conditions (IMC) and helicopter recovery procedures, including unusual attitude recovery procedures; 7. the NVIS training syllabus; 8. in-flight procedures for assessing visibility, to ensure that operations are not conducted below the minima stipulated for non-assisted night VFR operations; 9. weather minima, taking the underlying activity into account; and 10. the minimum transition heights to/from a NVIS flight.		
GM1-SPA.NVIS.140 Information and documentation		
CONCEPT OF OPERATIONS **Night Vision Imaging System for Civil Operators**		
Foreword This document, initially incorporated in JAA TGL-34, prepared by a Sub-Group of EUROCAE Working Group 57 "Night Vision Imaging System (NVIS) Standardisation" is an abbreviated and modified version of the RTCA Report DO-268 "Concept Of Operations – Night Vision Imaging Systems For Civil Operators" which was prepared in the USA by RTCA Special		

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Committee 196 (SC-196) and approved by the RTCA Technical Management Committee in March 2001. **The EUROCAE Working Group 57 (WG-57) Terms of Reference included a task to prepare a Concept of Operations (CONOPS) document describing the use of NVIS in Europe. To complete this task, a Sub-Group of WG-57 reviewed the RTCA SC-196 CONOPS (DO-268) to assess its applicability for use in Europe. Whilst the RTCA document was considered generally applicable, some of its content, such as crew eligibility and qualifications and the detail of the training requirements, was considered to be material more appropriately addressed in Europe by at that time other Joint Aviation Requirements (JAR) documents such as JAR-OPS and JAR-FCL. Consequently, WG-57 condensed the RTCA CONOPS document by removing this material which is either already addressed by other JAR documents or will be covered by the Agency's documents in the future.** **In addition, many of the technical standards already covered in the Minimum Operational Performance Standards (MOPS) for Integrated Night Vision Imaging System Equipment (DO-275) have been deleted in this European CONOPS.**		
Executive summary **The hours of darkness add to a pilot's workload by decreasing those visual cues commonly used during daylight operations.**		

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The decreased ability of a pilot to see and avoid obstructions at night has been a subject of discussion since aviators first attempted to operate at night. Technology advancements in the late 1960s and early 1970s provided military aviators some limited ability to see at night and therein changed the scope of military night operations. Continuing technological improvements have advanced the capability and reliability of night vision imaging systems to the point that they are receiving increasing scrutiny are generally accepted by the public and are viewed by many as a tool for night flight. **Simply stated, night vision imaging systems are an aid to night VFR flight. Currently, such systems consist of a set of night vision goggles and normally a complimentary array of cockpit lighting modifications. The specifications of these two sub-system elements are interdependent and, as technology advances, the characteristics associated with each element are expected to evolve. The complete description and performance standards of the night vision goggles and cockpit lighting modifications appropriate to civil aviation are contained in the Minimum Operational Performance Standards for Integrated Night Vision Imaging System Equipment.**		
An increasing interest on the part of civil operators to conduct night operations has brought a corresponding increased level of interest in employing night vision imaging systems. However, the night vision imaging systems do have performance limitations. Therefore, it is incumbent on the		

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operator to employ proper training methods and operating procedures to minimise these limitations to ensure safe operations. In turn, operators employing night vision imaging systems must have the guidance and support of their regulatory agency in order to safely train and operate with these systems.		
The role of the regulatory agencies in this matter is to develop the technical standard orders for the hardware as well as the advisory material and inspector handbook materials for the operations and training aspect. In addition, those agencies charged with providing flight weather information should modify their products to include the night vision imaging systems flight data elements not currently provided.		
An FAA study (DOT/FAA/RD-94/21, 1994) best summarised the need for night vision imaging systems by stating, "When properly used, NVGs can increase safety, enhance situational awareness, and reduce pilot workload and stress that are typically associated with night operations."		
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1 Terminology **1.1 Night vision goggles** **An NVG is a binocular appliance that amplifies ambient light and is worn by a pilot. The NVG enhances the wearer's ability to maintain visual surface reference at night.**		
1.1.1 Type **Type refers to the design of the NVG with regards to the manner in which the image is relayed to the pilot. A Type 1 NVG is one in which the image is viewed directly in-line with the image intensification process. A Type 1 NVG is also referred to as "direct view" goggle. A Type 2 NVG is one in which the image intensifier is not in-line with the image viewed by the pilot. In this design, the image may be reflected several times before being projected onto a combiner in front of the pilot's eyes. A Type 2 NVG is also**		

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referred to as an "indirect view" goggle.		
1.1.2 Class **Class is a terminology used to describe the filter present on the NVG objective lens. The filter restricts the transmission of light below a determined frequency. This allows the cockpit lighting to be designed and installed in a manner that does not adversely affect NVG performance.** **1.1.2.1 Class A** **Class A or "minus blue" NVGs incorporate a filter, which generally imposes a 625 nanometercutoff. Thus, the use of colours in the cockpit (e.g., colour displays, colour warning lights, etc.) may be limited. The blue green region of the light spectrum is allowed through the filter.**		
1.1.2.2 Class B **Class B NVGs incorporate a filter that generally imposes a 665 nanometercutoff. Thus, the cockpit lighting design may incorporate more colours since the filter eliminates some yellows and oranges from entering the intensification process.**		

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1.1.2.3 Modified class B **Modified Class B NVGs incorporate a variation of a Class B filter but also incorporates a notch filter in the green spectrum that allows a small percentage of light into the image intensification process. Therefore, a Modified Class B NVG allows pilots to view fixed head-up display (HUD) symbology through the NVG without the HUD energy adversely affecting NVG performance.**		
1.1.3 Generation **Generation refers to the technological design of an image intensifier. Systems incorporating these light-amplifying image intensifiers were first used during WWII and were operationally fielded by the US military during the Vietnam era. These systems were large, heavy and poorly performing devices that were unsuitable for aviation use, and were termed Generation I (Gen I). Gen II devices represented a significant technological advancement and provided a system that could be head-mounted for use in ground vehicles. Gen III devices represented another significant technological advancement in image intensification, and provided a system that was designed for aviation use. Although not yet fielded, there are prototype NVGs that include technological advances that may necessitate a Gen IV designation if placed into production. Because of the variations in interpretations as to**		

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generation, NVGs will not be referred to by the generation designation.		
1.1.4 OMNIBUS **The term OMNIBUS refers to a US Army contract vehicle that has been used over the years to procure NVGs. Each successive OMNIBUS contract included NVGs that demonstrated improved performance. There have been five contracts since the mid 1980s, the most current being OMNIBUS V. There may be several variations of NVGs within a single OMNIBUS purchase, and some NVGs from previous OMNIBUS contracts have been upgraded in performance to match the performance of goggles from later contracts. Because of these variations, NVGs will not be referred to by the OMNIBUS designation.**		
1.1.5 Resolution and visual acuity **Resolution refers to the capability of the NVG to present an image that makes clear and distinguishable the separate components of a scene or object.** **Visual acuity is the relative ability of the human eye to resolve detail and interpret an image.** **1.2 Aviation night vision imaging system (NVIS)**		

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The Night Vision Imaging System is the integration of all elements required to successfully and safely operate an aircraft with night vision goggles. The system includes at a minimum NVGs, NVIS lighting, other aircraft components, training, and continuing airworthiness.		
1.2.1 Look under (under view) **Look under is the ability of pilots to look under or around the NVG to view inside and outside the aircraft.** **1.3 NVIS lighting** **An aircraft lighting system that has been modified or designed for use with NVGs and which does not degrade the performance of the NVG beyond acceptable standards, is designated as NVIS lighting. This can apply to both interior and exterior lighting.**		
1.3.1 Design considerations **As the choice of NVG filter drives the cockpit lighting design, it is important to know which goggle will be used in which cockpit. Since the filter in a Class A NVG allows wavelengths above 625 nanometers into the intensification process, it should not be used in a cockpit designed for Class B or Modified Class B NVGs. However, since the filter in a Class B and Modified Class B NVGs is more restrictive than that in a**		

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Class ANVG, the Class B or Modified Class B NVG can be used with either Class A or Class B cockpit lighting designs.		
1.3.2 Compatible **Compatibility, with respect to an NVIS system, includes a number of different factors: compatibility of internal and external lighting with the NVG, compatibility of the NVG with the crew station design (e.g., proximity of the canopy or windows, proximity of overhead panels, operability of controls, etc.), compatibility of crew equipment with the NVG and compatibility with respect to colour discrimination and identification (e.g., caution and warning lights still maintain amber and red colours). The purpose of this paragraph is to discuss compatibility with respect to aircraft lighting. An NVIS lighting system, internal and external, is considered compatible if it adheres to the following requirements:**		
1. the internal and external lighting does not adversely affect the operation of the NVG during any phase of the NVIS operation; **2. the internal lighting provides adequate illumination of aircraft cockpit instruments, displays and controls for unaided operations and for "look-under" viewing during aided operations; and** **3. The external lighting aids in the detection and separation**		

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by other aircraft. **NVIS lighting compatibility can be achieved in a variety of ways that can include, but is not limited to, modification of light sources, light filters or by virtue of location. Once aircraft lighting is modified for using NVGs, it is important to keep in mind that changes in the crew station (e.g., addition of new display) must be assessed relative to the effect on NVIS compatibility.**		
1.4. NVIS operation **A night flight wherein the pilot maintains visual surface reference using NVGs in an aircraft that is NVIS approved** **1.4.1 Aided** **Aided flight is flight with NVGs in an operational position.** **1.4.2 Unaided** **Unaided flight is a flight without NVGs or a flight with NVGs in a non-operational position.**		
2 System description **2.1 NVIS capabilities** **NVIS generally provides the pilot an image of the outside**		

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scene that is enhanced compared to that provided by the unaided, dark-adapted eye. However, NVIS may not provide the user an image equal to that observed during daylight. Since the user has an enhanced visual capability, situational awareness is generally improved.		
2.1.1 Critical elements **The following critical elements are the underlying assumptions in the system description for NVIS:** **1. aircraft internal lighting has been modified or initially designed to be compatible;** **2. environmental conditions are adequate for the use of NVIS (e.g. enough illumination is present, weather conditions are favourable, etc.);** **3. the NVIS has been properly maintained in accordance with the minimum operational performance standards;** **4. a proper pre-flight has been performed on the NVIS confirming operation in accordance with the continued airworthiness standards and training guidelines; and** **5. the pilot(s) has been properly trained and meets recency of experience requirements.**		
Even when insuring that these conditions are met, there still are many variables that can adversely affect the safe and effective use of NVIS (e.g., flying towards a low angle moon,		

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flying in a shadowed area, flying near extensive cultural lighting, flying over low contrast terrain, etc.). It is important to understand these assumptions and limitations when discussing the capabilities provided by the use of NVIS.		
2.1.2 Situation awareness **Situation awareness, being defined as the degree of perceptual accuracy achieved in the comprehension of all factors affecting an aircraft and crew at a given time, is improved at night when using NVG during NVIS operations. This is achieved by providing the pilot with more visual cues than is normally available under most conditions when operating an aircraft unaided at night. However, it is but one source of the factors necessary for maintaining an acceptable level of situational awareness.**		
2.1.2.1 Environment detection and identification **An advantage of using NVIS is the enhanced ability to detect, identify, and avoid terrain and/or obstacles that present a hazard to night operations. Correspondingly, NVIS aid in night navigation by allowing the aircrew to view waypoints and features.** **Being able to visually locate and then (in some cases) identify objects or areas critical to operational success will also enhance operational effectiveness. Finally, use of NVIS may**		

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allow pilots to detect other aircraft more easily.		
2.1.3 Emergency situations **NVIS generally improve situational awareness, facilitating the pilot's workload during emergencies. Should an emergency arise that requires an immediate landing, NVIS may provide the pilot with a means of locating a suitable landing area and conducting a landing. The pilot must determine if the use of NVIS during emergencies is appropriate. In certain instances, it may be more advantageous for the pilot to remove the NVG during the performance of an emergency procedure.**		
2.2.1 NVG design characteristics **There are limitations inherent in the current NVG design.** **2.2.1.1 Visual acuity** **The pilot's visual acuity with NVGs is less than normal daytime visual acuity.**		
2.2.1.2 Field of view **Unaided field of view (FOV) covers an elliptical area that is approximately 120° lateral by 80° vertical, whereas the field**		

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of view of current Type I NVG systems is nominally 40° and is circular. Both the reduced field of view of the image and the resultant decrease in peripheral vision can increase the pilot's susceptibility to misperceptions and illusions. Proper scanning techniques must be employed to reduce the susceptibility to misperception and illusions.		
2**.2.1.3 Field of regard** **The NVG has a limited FOV but, because it is head-mounted, that FOV can be scanned when viewing the outside scene. The total area that the FOV can be scanned is called the field of regard (FOR). The FOR will vary depending on several factors: physiological limit of head movement, NVG design (e.g., protrusion of the binocular assembly, etc.) and cockpit design issues (e.g., proximity of canopy or window, seat location, canopy bow, etc.).**		
2**.2.1.4 NVG weight & centre of gravity** **The increased weight and forward CG projection of head supported devices may have detrimental effects on pilot performance due to neck muscle strain and fatigue. There also maybe an increased risk of neck injury in crashes.**		
2**.2.1.5 Monochromatic image**		

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The NVG image currently appears in shades of green. Since there is only one colour, the image is said to be "monochromatic". This colour was chosen mostly because the human eye can see more detail at lower brightness levels when viewing shades of green. Colour differences between components in a scene helps one discriminate between objects and aids in object recognition, depth perception and distance estimation. The lack of colour variation in the NVG image will degrade these capabilities to varying degrees.		
2.2.1.6 Ambient or artificial light **The NVG requires some degree of light (energy) in order to function. Low light levels, non-compatible aircraft lighting and poor windshield/window light transmissibility, diminish the performance capability of the NVG. It is the pilot's responsibility to determine when to transition from aided to unaided due to unacceptable NVG performance.**		
2.2.2 Physiological and other conditions **2.2.2.1 Cockpit resource management** **Due to the inherent limitations of NVIS operations, there is a requirement to place emphasis on NVIS related cockpit resource management (CRM). This applies to both single and multi-pilot cockpit environments. Consequently, NVIS flight**		

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requires effective CRM between the pilot(s), controlling agencies and other supporting personnel. An appropriate venue for addressing this issue is the pre-flight NVIS mission brief.		
2.2.2.2 Fatigue **Physiological limitations that are prevalent during the hours of darkness along with the limitations associated with NVGs, may have a significant impact on NVIS operations. Some of these limitations are the effects of fatigue (both acute and chronic), stress, eyestrain, working outside the pilot's normal circadian rhythm envelope, increased helmet weight, aggressive scanning techniques associated with NVIS, and various human factors engineering concerns that may have a direct influence on how the pilot works in the aircraft while wearing NVGs. These limitations may be mitigated through proper training and recognition, experience, adaptation, rest, risk management, and proper crew rest/duty cycles.**		
2.2.2.3 Over-confidence **Compared to other types of flight operations, there may be an increased tendency by the pilot to over-estimate the capabilities of the NVIS.** **2.2.2.4 Spatial orientation**		

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There are two types of vision used in maintaining spatial orientation: central (focal) vision and peripheral (ambient) vision. Focal vision requires conscious processing and is slow, whereas peripheral information is processed subconsciously at a very fast rate. During daytime, spatial orientation is maintained by inputs from both focal vision and peripheral vision, with peripheral vision providing the great majority of the information. When using NVGs, peripheral vision can be significantly degraded if not completely absent. In this case, the pilot must rely on focal vision to interpret the NVG image as well as the information from flight instruments in order to maintain spatial orientation and situation awareness. Even though maintaining spatial orientation requires more effort when using NVGs than during daytime, it is much improved over		
night unaided operations where the only information is obtained through flight instruments. However, anything that degrades the NVG image to a point where the horizon is not visualised and/or ground reference is lost or significantly degraded will necessitate a reversion to flight on instruments until adequate external visual references can be established. Making this transition quickly and effectively is vital in order to avoid spatial disorientation. Additionally, added focal task loading during the operation (e.g., communications, looking at displays, processing navigational information, etc.) will compete with the focal requirement for interpreting the NVG image and flight instruments. Spatial disorientation can result		

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when the task loading increases to a point where the outside scene and/or the flight instruments are not properly scanned. This potential can be mitigated to some extent through effective training and experience.		
2.2.2.5 Depth perception & distance estimation **When flying, it is important for pilots to be able to accurately employ depth perception and distance estimation techniques. To accomplish this, pilots use both binocular and monocular vision. Binocular vision requires the use of both eyes working together, and, practically speaking, is useful only out to approximately 100 ft.**		
Binocular vision is particularly useful when flying close to the ground and/or near objects (e.g. landing a helicopter in a small landing zone). Monocular vision can be accomplished with either eye alone, and is the type of vision used for depth perception and distance estimation when viewing beyond approximately 100 ft. Monocular vision is the predominant type of vision used when flying fixed wing aircraft, and also when flying helicopters and using cues beyond 100 ft. When viewing an NVG image, the two eyes can no longer provide accurate binocular information, even though the NVG used when flying is a binocular system. This has to do with the way the eyes function physiologically (e.g. accommodation, stereopsis, etc.) and the design of the NVG (i.e. a binocular system with a fixed channel for each eye). Therefore,		

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binocular depth perception and distance estimation tasking when viewing terrain or objects with an NVG within		
100 ft is significantly degraded. Since monocular vision does not require both eyes working together, the adverse impact on depth perception and distance estimation is much less, and is mostly dependent on the quality of the NVG image. If the image is very good and there are objects in the scene to use for monocular cueing (especially objects with which the pilot is familiar), then distance estimation and depth perception tasking will remain accurate. However, if the image is degraded (e.g., low illumination, airborne obscurants, etc.) and/or there are few or unfamiliar objects in the scene, depth perception and distance estimation will be degraded to some extent. In summary, pilots using NVG will maintain the ability to accurately perceive depth and estimate distances, but it will depend on the distances used and the quality of the NVG image. **Pilots maintain some ability to perceive depth and distance when using NVGs by employing monocular cues. However, these capabilities may be degraded to varying degrees.**		
2.2.2.6 Instrument lighting brightness considerations **When viewing the NVG image, the brightness of the image will affect the amount of time it takes to adapt to the brightness level of the instrument lighting, thereby affecting**		

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the time it takes to interpret information provided by the instruments. For example, if the instrument lighting is fairly bright, the time it takes to interpret information provided by the instruments may be instantaneous. However, if the brightness of the lighting is set to a very low level, it may take several seconds to interpret the information, thus increasing the heads-down time and increasing the risk of spatial disorientation. It is important to ensure that instrument lighting is kept at a brightness level that makes it easy to rapidly interpret the information. This will likely be brighter than one is used to during unaided operations.		
2.2.2.7 Dark adaptation time from NVG to unaided operations **When viewing an NVG image, both rods and cones are being stimulated (i.e., mesopic vision), but the brightness of the image is reducing the effectiveness of rod cells. If the outside scene is bright enough (e.g., urban area, bright landing pad, etc.), both rods and cones will continue to be stimulated. In this case there will be no improvement in acuity over time and the best acuity is essentially instantaneous. In some cases (e.g., rural area with scattered cultural lights), the outside scene will not be bright enough to stimulate the cones and some amount of time will be required for the rods to fully adapt. In this case it may take the rods one to two minutes to fully adapt for the best acuity to be realised. If the outside scene is very dark (e.g., no cultural lights and no moon), it may take up to five minutes to fully adapt to the**		

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outside		
scene after removing the NVGs. The preceding are general guidelines and the time required to fully adapt to the outside scene once removing the NVG depends on many variables: the length of time the NVG has been used, whether or not the pilot was dark adapted prior to flight, the brightness of the outside scene, the brightness of cockpit lighting, and variability in visual function among the population. It is important to understand the concept and to note the time requirements for the given operation.		
2.2.2.8 Complacency **Pilots must understand the importance of avoiding complacency during NVG flights. Similar to other specialised flight operations, complacency may lead to an acceptance of situations that would normally not be permitted. Attention span and vigilance are reduced, important elements in a task series are overlooked, and scanning patterns, which are essential for situational awareness, break down (usually due to fixation on a single instrument, object or task). Critical but routine tasks are often skipped.**		
2.2.2.9 Experience		

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High levels of NVIS proficiency, along with a well-balanced NVIS experience base, will help to offset many of the visual performance degradations associated with night operations. NVIS experience is a result of proper training coupled with numerous NVIS operations. An experienced NVIS pilot is acutely aware of the NVIS operational envelope and its correlation to various operational effects, visual illusions and performance limitations. This experience base is gained (and maintained) over time through a continual, holistic NVIS training programme that exposes the pilot to NVIS operations conducted under various moon angles, percentage of available illumination, contrast levels, visibility levels, and varying degrees of cloud coverage. A pilot should be exposed to as many of these variations as practicable during the initial NVIS qualification programme. Continued exposure during the NVIS recurrent training will help strengthen and solidify this experience base.		
3 Operations **Operations procedures should accommodate the capabilities and limitations of the systems described in Section 3 of this GM as well as the restraints of the operational environment.** **All NVG operations should fulfil all applicable requirements in accordance with Regulation (EC) No 216/2008.**		

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3.1 Pilot eligibility **About 54% of the civil pilot population wears some sort of ophthalmic device to correct vision necessary to safely operate an aircraft. The use of inappropriate ophthalmic devices with NVGs may result in vision performance decrement, fatigue, and other human factor problems, which could result in increased risk for aviation accidents and incidents.**		
3.2 Operating environment considerations **3.2.1 Weather and atmospheric obscurants** **Any atmospheric condition, which absorbs, scatters, or refracts illumination, either before or after it strikes terrain, may reduce the usable energy available to the NVG.**		
3.2.1.1 Weather **During NVIS operations, pilots can see areas of moisture that are dense (e.g., clouds, thick fog, etc.) but may not see areas that are less dense (e.g., thin fog, light rain showers, etc.). The inability to see some areas of moisture may lead to hazardous flight conditions during NVIS operations and will be discussed separately in the next section.** **The different types of moisture will have varying effects and**		

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it is important to understand these effects and how they apply to NVIS operations. For example:		
1. It is important to know when and where fog may form in the flying area. Typically, coastal, low-lying river, and mountainous areas are most susceptible. **2. Light rain or mist may not be observed with NVIS but will affect contrast, distance estimation, and depth perception. Heavy rain is more easily perceived due to large droplet size and energy attenuation.** **3. Snow occurs in a wide range of particle sizes, shapes, and densities. As with clouds, rain, and fog, the denser the airborne snow, the greater the effect on NVG performance. On the ground, snow has mixed effect depending on terrain type and the illumination level. In mountainous terrain, snow may add contrast, especially if trees and rocks protrude through the snow. In flatter terrain, snow may cover high contrast areas, reducing them to areas of low contrast. On low illumination nights, snow may reflect the available energy better than the terrain it covers and thus increase the level of illumination.**		
All atmospheric conditions reduce the illumination level to some degree and recognition of this reduction with NVGs can be difficult. Thus, a good weather briefing, familiarity with the local weather patterns and understanding the effects on		

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NVG performance are important for a successful NVIS flight.		
3.2.1.2 Deteriorating weather **It is important to remain cognizant of changes in the weather when using NVGs. It is possible to "see through" areas of light moisture when using NVGs, thus increasing the risk of inadvertently entering IMC. Some ways to help reduce this possibility include the following:** **1. Be attentive to changes in the NVG image. Halos may become larger and more diffuse due to diffraction of light in moisture. Scintillation in the image may increase due to a lowering of the illumination level caused by the increased atmospheric moisture. Loss of scene detail may be secondary to the lowering illumination caused by the changing moisture conditions.**		
2. Obtain a thorough weather brief with emphasis on NVG effects prior to flight. **3. Be familiar with weather patterns in the flying area.** **4. Occasionally scan the outside scene. The unaided eye may detect weather conditions that are not detectable to the NVG.** **Despite the many methods of inadvertent instrument meteorological conditions (IMC) prevention, one should have**		

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established IMC recovery procedures and be familiar with them.		
3.2.1.3 Airborne obscurants **In addition to weather, there may be other obscurants in the atmosphere that could block energy from reaching the NVG, such as haze, dust, sand, or smoke. As with moisture, the size and concentration of the particles will determine the degree of impact. Examples of these effects include the following:**		
1. high winds during the day can place a lot of dust in the air that will still be present at night when the wind may have reduced in intensity; **2. forest fires produce heavy volumes of smoke that may cover areas well away from the fire itself;** **3. the effects of rotor wash may be more pronounced when using NVGs depending on the material (e.g. sand, snow, dust, etc.); and** **4. pollution in and around major cultural areas may have an adverse effect on NVG performance.**		
3.2.1.4 Winter operations **Using NVGs during winter conditions provide unique issues and challenges to pilots.**		

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3.2.1.4.1 Snow **Due to the reflective nature of snow, it presents pilots with significant visual challenges both en-route and in the terminal area. During the en-route phase of a flight the snow may cause distractions to the flying pilot if any aircraft external lights (e.g., anti-collision beacons/strobes, position lights, landing lights, etc.) are not compatible with NVGs. In the terminal area, whiteout landings can create the greatest hazard to unaided night operations. With NVGs the hazard is not lessened, and can be more disorienting due to lights reflecting from the snow that is swirling around the aircraft during the landing phase. Any emergency vehicle lighting or other airport lighting in the terminal area may exaggerate the effects.**		
3.2.1.4.2 Ice fog **Ice fog presents the pilot with hazards normally associated with IMC in addition to problems associated with snow operations. The highly reflective nature of ice fog will further aggravate any lighting problems. Ice fog conditions can be generated by aircraft operations under extremely cold temperatures and the right environmental conditions.**		
3.2.1.4.3 Icing **Airframe ice is difficult to detect while looking through NVGs.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
The pilot will need to develop a proper crosscheck to ensure airframe icing does not exceed operating limits for that aircraft. Pilots should already be aware of icing indicator points on their aircraft. These areas require consistent oversight to properly determine environmental conditions.		
3.2.1.4.4 Low ambient temperatures **Depending on the cockpit heating system, fogging of the NVGs can be a problem and this will significantly reduce the goggle effectiveness. Another issue with cockpit temperatures is the reduced battery duration. Operations in a cold environment may require additional battery resources.**		
3.2.2 Illumination **NVGs require illumination, either natural or artificial, to produce an image. Although current NVG technology has significantly improved low light level performance, some illumination, whether natural or artificial, is still required to provide the best possible image.** **3.2.2.1 Natural illumination** **The main sources of natural illumination include the moon and stars. Other sources can include sky glow, the aurora borealis, and ionisation processes that take place in the upper atmosphere.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3.2.2.1.1 Moon phase **The moon provides the greatest source of natural illumination during night time. Moon phase and elevation determines how much moonlight will be available, while moonrise and moonset times determine when it will be available. Lunar illumination is reported in terms of percent illumination, 100% illumination being full moon. It should be noted that this is different from the moon phase (e.g., 25% illumination does not mean the same thing as a quarter moon). Currently, percent lunar illumination can only be obtained from sources on the Internet, military weather facilities and some publications (e.g. Farmers Almanac).**		
3.2.2.1.2 Lunar azimuth and elevation **The moon can have a detrimental effect on night operations depending on its relationship to the flight path. When the moon is on the same azimuth as the flight path, and low enough to be within or near the NVG field of view, the effect on NVG performance will be similar to that caused by the sun on the unaided eye during daytime. The brightness of the moon drives the NVG gain down, thus reducing image detail. This can also occur with the moon at relatively high elevations. For example, it is possible to bring the moon near the NVG field of view when climbing to cross a ridgeline or other obstacle, even when the moon is at a relatively high elevation. It is important to consider lunar azimuth and**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
elevation during pre-flight planning. Shadowing, another effect of lunar azimuth and elevation, will be discussed separately.		
3.2.2.1.3 Shadowing **Moonlight creates shadows during night time just as sunlight creates shadows during daytime. However, night time shadows contain very little energy for the NVG to use in forming an image. Consequently, image quality within a shadow will be degraded relative to that obtained outside the shadowed area. Shadows can be beneficial or can be a disadvantage to operations depending on the situation.**		
3.2.2.1.3.1 Benefits of shadows **Shadows alert aircrew to subtle terrain features that may not otherwise be noted due to the reduced resolution in the NVG image. This may be particularly important in areas where there is little contrast differentiation; such as flat featureless deserts, where large dry washes and high sand dunes may go unnoticed if there is no contrast to note their presence. The contrast provided by shadows helps make the NVG scene appear more natural.**		
3.2.2.1.3.2 Disadvantages due to shadows **When within a shadow, terrain detail can be significantly degraded, and objects can be regarding flight in or around**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
shadowed areas is the pilot's response to loss of terrain detail. During flight under good illumination conditions, a pilot expects to see a certain level of detail. If flight into a shadow occurs while the pilot is preoccupied with other matters (e.g., communication, radar, etc.), it is possible that the loss in terrain detail may not have been immediately noted. Once looking outside again, the pilot may think the reduced detail is due to an increase in flight altitude and thus begin a descent - even though already at a low altitude. Consideration should be given during mission planning to such factors as lunar azimuth and elevation, terrain type (e.g., mountainous, flat, etc.), and the location of items significant to operation success (e.g., ridgelines, pylons, targets, waypoints, etc.). Consideration of these factors will help predict the location of shadows and the potential adverse effects.		
3.2.2.1.4 Sky glow **Sky glow is an effect caused by solar light and continues until the sun is approximately 18 degrees below the horizon. When viewing in the direction of sky glow there may be enough energy present to adversely affect the NVG image (i.e., reduce image quality). For the middle latitudes the effect on NVG performance may last up to an hour after official sunset. For more northern and southern latitudes the effect may last for extended periods of times (e.g., days to weeks) during seasons when the sun does not travel far below the horizon.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
This is an important point to remember if planning NVG operations in those areas. Unlike sky glow after sunset, the sky glow associated with sunrise does not have an obvious effect on NVG performance until fairly close to official sunrise. The difference has to do with the length of time the atmosphere is exposed to the sun's irradiation, which causes ionisation processes that release near-IR energy. It is important to know the difference in these effects for planning purposes.		
3**.2.2.2 Artificial illumination** **Since the NVGs are sensitive to any source of energy in the visible and near infrared spectrums, there are also many types of artificial illumination sources (e.g., flares, IR searchlights, cultural lighting, etc). As with any illumination source, these can have both positive and detrimental effects on NVG utilisation. For example, viewing a scene indirectly illuminated by a searchlight can enable the pilot to more clearly view the scene; conversely, viewing the same scene with the searchlight near or within the NVG field of view will reduce the available visual cues. It is important to be familiar with the effects of cultural lighting in the flying area in order to be able to avoid the associated problems and to be able to use the advantages provided. Also, it is important to know how to properly use artificial light sources (e.g., aircraft IR spotlight). It should be noted that artificial light sources may not always be available or dependable, and this should be**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
taken into consideration during flight planning.		
3.2.3 Terrain contrast **Contrast is one of the more important influences on the ability to correctly interpret the NVG image, particularly in areas where there are few cultural features. Any terrain that contains varying albedos (e.g., forests, cultivated fields, etc.) will likely increase the level of contrast in a NVG image, thus enhancing detail. The more detail in the image, the more visual information aircrews have for manoeuvring and navigating. Low contrast terrain (e.g., flat featureless desert, snow-covered fields, water, etc.) contains few albedo variations, thus the NVG image will contain fewer levels of contrast and less detail.**		
3.3 Aircraft considerations **3.3.1 Lighting** **Factors such as aircraft internal and external lighting have the potential to adversely impact NVG gain and thus image quality. How well the windshield, canopy, or window panels transmit near infrared energy can also affect the image. Cleanliness of the windshield directly impacts this issue.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3.3.2 Cockpit ergonomics **While wearing NVGs, the pilot may have limited range of head movement in the aircraft. For example, switches on the overhead console may be difficult to read while wearing NVGs. Instruments, controls, and switches that are ordinarily accessible, may now be more difficult to access due to the extended mass (fore/aft) associated with NVGs.** **In addition, scanning may require a more concentrated effort due to limited field of view. Lateral viewing motion can be hindered by cockpit obstructions (i.e. door post or seat back design).**		
3.3.3 Windshield reflectivity **Consideration within the cockpit and cabin should be given to the reflectivity of materials and equipment upon the windshield. Light that is reflected may interfere with a clear and unobstructed view. Items such as flight suits, helmets, and charts, if of a light colour such as white, yellow, and orange, can produce significant reflections. Colours that impart the least reflection are black, purple, and blue. This phenomena is not limited to windshields but may include side windows, chin bubbles, canopies, etc.**		
3.4 Generic operating considerations		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
This section lists operating topics and procedures, which should be considered when employing NVIS. The list and associated comments are not to be considered all inclusive. NVIS operations vary in scope widely and this section is not intended to instruct a prospective operator on how to implement an NVIS programme.		
3.4.1 Normal procedures **3.4.1.1 Scanning** **When using NVGs there are three different scan patterns to consider and each is used for different reasons: instrument scan, aided scan outside, and unaided scan outside. Normally, all three are integrated and there is a continuous transition from one to the other depending on the mission, environmental conditions, immediate tasking, flight altitude and many other variables. For example, scanning with the NVG will allow early detection of external lights. However, the bloom caused by the lights will mask the aircraft until fairly close or until the lighting scheme is changed. Once close to the aircraft (e.g., approximately one-half mile for smaller**		
aircraft), visual acquisition can possibly be made unaided or with the NVG. Whether to use the NVG or unaided vision depends on many variables (e.g., external lighting configuration, distance to aircraft, size of aircraft, environmental conditions, etc.). The points to be made are		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
that a proper scan depends on the situation and variables present, and that scanning outside is critical when close to another aircraft. Additionally, for a multi-crew environment, coordination of scan responsibilities is vital.		
3.4.1.1.1 Instrument crosscheck scan **In order to effect a proper and effective instrument scan, it is important to predict when it will be important. A start can be made during pre-flight planning when critical phases of flight can be identified and prepared for. For example, it may be possible when flying over water or featureless terrain to employ a good instrument crosscheck. However, the most important task is to make the appropriate decision during flight as conditions and events change. In this case, experience, training and constant attention to the situation are vital contributors to the pilot's assessment of the situation.**		
3.4.1.1.2 NVG scan **To counteract the limited field of view, pilots should continually scan throughout the field of regard. This allows aircrew to build a mental image of the surrounding environment. How quickly the outside scene is scanned to update the mental image is determined by many variables. For example, when flying over flat terrain where the highest obstacle is below the flight path, the scan may be fairly slow.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
However, if flying low altitude in mountainous terrain, the scan will be more aggressive and rapid due to the presence of more information and the increased risk. How much of the field of regard to scan is also determined by many variables. For example, if a pilot is anticipating a turn, more attention may be placed in the area around the turn point, or in the direction of the new heading. In this situation, the scan will be limited briefly to only a portion of the field of regard.		
As with the instrument scan, it is very important to plan ahead. It may, for example, be possible to determine when the scan may be interrupted due to other tasks, when it may be possible to become fixated on a specific task, or when it is important to maximise the outside scan. An important lesson to learn regarding the NVG scan is when not to rely on visual information. It is easy to overestimate how well one can see with NVGs, especially on high illumination nights, and it is vital to maintain a constant awareness regarding their limitations. This should be pointed out often during training and, as a reminder, should be included as a briefing item for NVG flights.		
3**.4.1.1.3 Unaided scan** **Under certain conditions, this scan can be as important as the others can. For example, it may be possible to detect distance and/or closure to another aircraft more easily using unaided vision, especially if the halo caused by the external lights is**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
masking aircraft detail on the NVG image. Additionally, there are other times when unaided information can be used in lieu of or can augment NVG and instrument information.		
3.4.1.1.4 Scan patterns **Environmental factors will influence scan by limiting what may be seen in specific directions or by degrading the overall image. If the image is degraded, aircrew may scan more aggressively in a subconscious attempt to obtain more information, or to avoid the chance of missing information that suddenly appears and/or disappears. The operation itself may influence the scan pattern. For example, looking for another aircraft, landing zone, or airport may require focusing the scan in a particular direction. In some cases, the operation may require aircrew in a multi place aircraft to assign particular pilots responsibility for scanning specific sectors.** **The restrictions to scan and the variables affecting the scan patter are not specific to night operations or the use of NVGs, but, due to the NVG's limited field of view, the degree of impact is magnified.**		
3.4.1.2 Pre-flight planning **3.4.1.2.1 Illumination criteria** **The pilot should provide a means for forecasting the**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
illumination levels in the operational area. The pilot should make the effort to request at least the following information in addition to that normally requested for night VFR: cloud cover and visibility during all phases of flight, sunset, civil and nautical twilight, moon phase, moonrise and moonset, and moon and/or lux illumination levels, and unlit tower NOTAMS.		
3.4.1.2.2 NVIS operations **An inspection of the power pack, visor, mount, power cable and the binocular assembly should be performed in accordance with the operations manual.** **To ensure maximum performance of the NVGs, proper alignment and focus must be accomplished following the equipment inspection. Improper alignment and focus may degrade NVIS performance.**		
3.4.1.2.3 Aircraft pre-flight **A normal pre-flight inspection should be conducted prior to an NVIS flight with emphasis on proper operation of the NVIS lighting. The aircraft windshield must also be clean and free of major defects, which might degrade NVIS performance.**		
3.4.1.2.4 Equipment **The basic equipment required for NVIS operations should be**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
those instruments and equipment specified within the current applicable regulations for VFR night operations. Additional equipment required for NVIS operations, e.g. NVIS lighting system and a radio altimeter must be installed and operational. All NVIS equipment, including any subsequent modifications, shall be approved.		
3.4.1.2.5 Risk assessment **A risk assessment is suggested prior to any NVIS operation. The risk assessment should include as a minimum:** **1. illumination Level** **2. weather** **3. pilot recency of experience** **4. pilot experience with NVG operations** **5. pilot vision** **6. pilot rest condition and health** **7. windshield/window condition** **8. NVG tube performance** **9. NVG battery condition** **10. types of operations allowed** **11. external lighting environment.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3.4.1.3 Flight operations **3.4.1.3.1 Elevated terrain** **Safety may be enhanced by NVGs during operations near elevated terrain at night. The obscuration of elevated terrain is more easily detected with NVGs thereby allowing the pilot to make alternate flight path decisions.**		
3.4.1.3.2 Over-water **Flying over large bodies of water with NVGs is difficult because of the lack of contrast in terrain features. Reflections of the moon or starlight may cause disorientation with the natural horizon. The radio altimeter must be used as a reference to maintain altitude.**		
3.4.1.4 Remote area considerations **A remote area is a site that does not qualify as an aerodrome as defined by the applicable regulations. Remote area landing sites do not have the same features as an aerodrome, so extra care must be given to locating any obstacles that may be in the approach/departure path.** **A reconnaissance must be made prior to descending at an unlighted remote site. Some features or objects may be easy to detect and interpret with the unaided eye. Other objects**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
will be invisible to the unaided eye, yet easily detected and evaluated with NVGs.		
3.4.1.5 Reconnaissance **The reconnaissance phase should involve the coordinated use of NVGs and white lights. The aircraft's external white lights such as landing lights, searchlights, and floodlights, should be used during this phase of flight. The pilot should select and evaluate approach and departure paths to the site considering wind speed and direction, and obstacles or signs of obstacles.**		
3.4.1.6 Sources of high illumination **Sources of direct high illumination may have the potential to reduce the effectiveness of the NVGs. In addition, certain colour lights, such as red, will appear brighter, closer and may display large halos.**		
3.4.2 Emergency procedures **No modification for NVG operations is necessary to the aircraft emergency procedures as approved in the operations manual or approved checklist. Special training may be required to accomplish the appropriate procedures.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3.4.3 Inadvertent IMC **Some ways to help reduce the potential for inadvertent flight into IMC conditions are:** **1. obtaining a thorough weather brief (including pilot reports);** **2. being familiar with weather patterns in the local flying area; and** **3. by looking beneath the NVG at the outside scene.** **However, even with thorough planning a risk still exists. To help mitigate this risk it is important to know how to recognise subtle changes to the NVG image that occur during entry into IMC conditions. Some of these include the onset of scintillation, loss of scene detail, and changes in the appearance of halos.**		
4 Training **To provide an appropriate level of safety, training procedures must accommodate the capabilities and limitations of the systems described in Section 3 of this GM as well as the restraints of the operational environment.**		
To be effective, the NVIS training philosophy would be based on a two-tiered approach: basic and advanced NVIS training.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
The basic NVIS training would serve as the baseline standard for all individuals seeking an NVIS endorsement. The content of this initial training would not be dependent on any operational requirements. The advanced training would build on the basic training by focusing on developing specialised skills required to operate an aircraft during NVIS operations in a particular operational environment. Furthermore, while there is a need to stipulate minimum flight hour requirements for an NVIS endorsement, the training must also be event based. This necessitates that pilots be exposed to all of the relevant aspects, or events, of NVIS flight in addition to acquiring a minimum number of flight hours.		
5. Continuing airworthiness **The reliability of the NVIS and safety of operations are dependent on the pilots adhering to the instructions for continuing airworthiness. Personnel who conduct the maintenance and inspection on the NVIS must be qualified and possess the appropriate tools and facilities to perform the maintenance.**		
Acronyms used in this GM		
AC Advisory Circular **AGL** above ground level		

A: Rule		B: Summary of comments	C: Reasons for change, remarks
ATC	**air traffic control**		
CONOPs	**concept of operations**		
CG	**centre of gravity**		
CRM	**cockpit resource management**		
DOD	**Department of Defence**		
DOT	**Department of Transportation**		
EFIS	**electronic flight instrumentation**		
EMS	**emergency medical service**		
FAA	**Federal Aviation Administration**		
FLIR	**forward looking infrared radar**		
FOR	**field of regard**		
FOV	**field of view**		
GEN	**generation**		
HUD	**head-up display**		
IFR	**instrument flight rules**		
IMC	**instrument meteorological**		
IR	**infrared**		
JAA	**Joint Aviation Authorities**		
MOPS	**Minimum Operational**		
NAS	**national airspace system**		
NOTAMS	**Notices to Airmen**		
NVD	**night vision device**		
NVED	**night vision enhancement device**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
NVG night vision goggles **NVIS** night vision imaging system **SC** special committee **TFR** temporary flight restrictions **VA** visual acuity **VFR** visual flight rules **VMC** visual meteorological conditions		
Glossary of terms used in this GM		
1. 'Absorptance': the ratio of the radiant energy absorbed by a body to that incident upon it. **2. 'Albedo': the ratio of the amount of light reflected from a surface to the amount of incident light.** **3. 'Automatic brightness control (ABC)': one of the automatic gain control circuits found in second and third generation NVG devices. It attempts to provide consistent image output brightness by automatic control of the micro channel plate voltage.** **4. 'Automatic gain control (AGC)': comprised of the automatic brightness control and bright source protection circuits. Is designed to maintain image brightness and protect the user and the image tube from excessive light levels. This is accomplished by controlling**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
the gain of the intensifier tube. **5. 'Blackbody': an ideal body of surface that completely absorbs all radiant energy falling upon with no reflection.**		
6. 'Blooming': common term used to denote the "washing out" of all or part of the NVG image due to de-gaining of the image intensifier tube when a bright light source is in or near the NVG field of view. **7. 'Bright source protection (BSP)': protective feature associated with second and third generation NVGs that protects the intensifier tube and the user by controlling the voltage at the photo cathode.** **8. 'Brownout': condition created by blowing sand, dust, etc., which can cause the pilots to lose sight of the ground. This is most commonly associated with landings in the desert or in dusty LZs.** **9. 'Civil nautical twilight': the time when the true altitude of the centre of the sun is six degrees below the horizon. Illuminance level is approximately 3.40 lux and is above the usable level for NVG operations.** **10. 'Diopter': a measure of the refractive (light bending) power of a lens.**		
11. 'Electro-optics (EO)': the term used to describe the interaction between optics and electronics, leading to		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
transformation of electrical energy into light or vice versa. **12. 'Electroluminescent (EL)': referring to light emission that occurs from application of an alternating current to a layer of phosphor.** **13. 'Foot-candle': a measure of illuminance; specifically, the illuminance of a surface upon which one lumen is falling per square foot.** **14. 'Foot-Lambert': a measure of luminance; specifically the luminance of a surface that is receiving an illuminance of one foot-candle.** **15. 'Gain': when referring to an image intensification tube, the ratio of the brightness of the output in units of foot-lambert, compared to the illumination of the input in foot-candles. A typical value for a GEN III tube is 25,000 to 30,000 Fl/fc. A "tube gain" of 30,000 Fl/fc provides an approximate "system gain" of 3,000. This means that the intensified NVG image is 3,000 times brighter to the aided eye than that of the unaided eye.**		
16. 'Illuminance': also referred to as illumination. The amount, ratio or density of light that strikes a surface at any given point. **17. 'Image intensifier': an electro-optic device used to detect and intensify optical images in the visible and near infrared region of the electromagnetic spectrum for the**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
purpose of providing visible images. The component that actually performs the intensification process in a NVG. This component is composed of the photo cathode, MCP, screen optic, and power supply. It does not include the objective and eyepiece lenses. **18. 'Incandescent': refers to a source that emits light based on thermal excitation, i.e., heating by an electrical current, resulting in a very broad spectrum of energy that is dependent primarily on the temperature of the filament.** **19. 'Infrared': that portion of the electromagnetic spectrum in which wavelengths range from 0.7 microns to 1 mm. This segment is further divided into near infrared (0.7-3.0 microns), mid infrared (3.0-6.0 microns), far infrared (6.0-15 microns), and extreme infrared (15 microns-1 mm). A NVG is sensitive to near infrared wavelengths approaching 0.9 microns.** **20. 'Irradiance': the radiant flux density incident on a surface. For the purpose of this document the terms irradiance and illuminance shall be interchangeable.**		
21. 'Lumen': a measurement of luminous flux equal to the light emitted in a unit solid angle by a uniform point source of one candle intensity. **22. 'Luminance': the luminous intensity (reflected light) of a surface in a given direction per unit of projected area.**		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
This is the energy used by NVGs. **23. 'Lux': a unit measurement of illumination. The illuminance produced on a surface that is one-meter square, from a uniform point source of one candle intensity, or one lumen per square meter.** **24. 'Microchannel plate': a wafer containing between 3 and 6 million specially treated microscopic glass tubes designed to multiply electrons passing from the photo cathode to the phosphor screen in second and third generation intensifier tubes.** **25. 'Micron': a unit of measure commonly used to express wavelength in the infrared region; equal to one millionth of a meter.**		
26. 'Nanometer (nm)': a unit of measure commonly used to express wavelength in the visible and near infrared region; equal to one billionth of a meter. **27. 'Night vision device (NVD)': an electro-optical device used to provide a visible image using the electromagnetic energy available at night.** **28. 'Photon': a quantum (basic unit) of radiant energy (light).** **29. 'Photopic vision': vision produced as a result of the response of the cones in the retina as the eye achieves a light adapted state (commonly referred to as day vision).**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
30. 'Radiance': the flux density of radiant energy reflected from a surface. For the purposes of this manual the terms radiance and luminance shall be interchangeable.		
31. 'Reflectivity': the fraction of energy reflected from a surface. **32. 'Scotopic vision': that vision produced as a result of the response of the rods in the retina as the eye achieves a dark-adapted state (commonly referred to as night vision).** **33. 'Situational awareness (SA)': degree of perceptual accuracy achieved in the comprehension of all factors affecting an aircraft and crew at a given time.** **34. 'Starlight': the illuminance provided by the available (observable) stars in a subject hemisphere. The stars provide approximately 0.00022 lux ground illuminance on a clear night. This illuminance is equivalent to about one-quarter of the actual light from the night sky with no moon.** **35. 'Stereopsis': visual system binocular cues that are used for distance estimation and depth perception. Three dimensional visual perception of objects. The use of NVGs seriously degrades this aspect of near-depth perception.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
36. 'Transmittance': the fraction of radiant energy that is transmitted through a layer of absorbing material placed in its path. **37. 'Ultraviolet': that portion of the electromagnetic spectrum in which wavelengths range between 0.1 and 0.4 microns.** **38. 'Wavelength': the distance in the line of advance of a wave from any one point to the next point of corresponding phase; is used to express electromagnetic energy including IR and visible light.** **39. 'Whiteout': a condition similar to brownout but caused by blowing snow.**		
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~~Section VIII~~Subpart I – Helicopter hoist operations		
~~AMC OPS.SPA.001.HHO(b)(3) Helicopter hoist operations (HHO)~~		
~~TRAINING PROGRAMME~~		
~~1. Flight Crew Members.~~		Moved to SPA.HHO.130.
~~1.1 The specific HHO training programme for flight crew members should include the following subjects:~~ ~~a. Fitting and use of the hoist;~~ ~~b. Preparing the helicopter and hoist equipment for HHO;~~ ~~c. Normal and emergency hoist procedures by day and, when required, by night;~~		Moved to SPA.HHO.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~d. Crew co-ordination concept specific to HHO;~~ ~~e. Practice of HHO procedures; and~~ ~~f. The dangers of static electricity discharge.~~		
~~1.2 Flight crew member proficiency checks should include procedures likely to be used at HHO sites with special emphasis on:~~ ~~a. Local area meteorology;~~ ~~b. HHO flight planning;~~ ~~c. HHO departures;~~ ~~d. A transition to and from the hover at the HHO site;~~ ~~e. Normal and simulated emergency HHO procedures; and~~ ~~f. Crew co-ordination.~~		Moved to SPA.HHO.130.
~~These checks should also be conducted by night if night HHO operations are undertaken by the operator.~~	Many comments stating that training at night was a risky requirement.	Noted. The text is transferred from JAR-OPS 3 and there have not been any discussions in HSST on this issue. Operations at night require training and checks by night, as the conduct of these risky operations without training may involve even greater risk.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
		Moved to SPA.HHO.130.
~~2. HHO Technical Crew Member.~~		Moved to SPA.HHO.130.
~~The specific HHO training programme for technical crew members who perform assigned duties relating to the operation of a hoist should include the following additional items:~~ ~~a. Duties in the HHO role;~~ ~~b. Fitting and use of the hoist;~~ ~~c. Operation of hoist equipment;~~ ~~d. Preparing the helicopter and specialist equipment for HHO;~~ ~~e. Normal and emergency procedures;~~ ~~f. Crew co-ordination concepts specific to HHO;~~ ~~g. Operation of inter-communications and radio equipment;~~ ~~h. Knowledge of emergency hoist equipment;~~ ~~i. Techniques for handling HHO passengers;~~ ~~j. Effect of the movement of personnel on the centre of gravity and mass during HHO;~~ ~~k. Effect of the movement of personnel on performance during normal and emergency flight conditions;~~ ~~l. Techniques for guiding pilots over HHO sites;~~		Moved to SPA.HHO.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~m. Awareness of specific dangers relating to the operating environment; and~~ ~~n. The dangers of static electricity discharge.~~		
AMC1-~~OPS.~~SPA.HHO.~~0~~130~~1.HHO~~(a~~b~~)(2~~4~~) Crew requirements for HHO ~~operationsHelicopter hoist operations (HHO)~~	Numbering incorrect.	
~~OPERATING PROCEDURES~~**RELEVANT EXPERIENCE**		
~~1. The Helicopter.~~		
~~During HHO, the helicopter should be capable of sustaining a critical power unit failure with the remaining engine(s) at the appropriate power setting, without hazard to the suspended person(s)/cargo, third parties, or property.~~	A comment from one authority stating that further guidance was need on the use of 'appropriate power setting'.	Not accepted. In this case (unlike performance) the power setting is provided in the airworthiness guidance of AC 29-2C. For HEC D, the recovery has to be achieved with the boundaries and settings applied in the appropriate graphs in the RFM. Text removed as it is already contained in SPA.HHO.125.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~2. The Crew.~~		Moved to SPA.HHO.130.
~~2.1 Selection.~~		Moved to SPA.HHO.130.
~~The operations manual should contain criteria for the selection of flight crew members for the HHO task, taking previous experience into account.~~		Moved to SPA.HHO.130.
~~2.2 Experience.~~		
~~2.2.1~~ The experience considered should take into account the geographical characteristics (sea, mountain, big cities with heavy traffic, etc.).		
~~2.2.2 The minimum experience level for a pilot-in-command conducting HHO flights should not be less than:~~	Many comments (mostly from Switzerland) stating that the minima are too high, and refer to the national variant. Examples given relate mostly to aerial work activities.	Not accepted. The requirement was a direct transposition from JAR-OPS. The national variant could be submitted for a future Rulemaking task. To change the rule based on one country's national variant is considered inappropriate at this moment. Aerial work activities are not covered by this Subpart.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		Moved to SPA.HHO.130.
• ~~a. Offshore:~~ • ~~i. 1 000 hours pilot-in-command of helicopters or 1 000 hours as co-pilot in HHO operations of which 200 hours is as pilot-in-command under supervision; and~~ ~~ii. 50 hoist cycles conducted offshore, of which 20 cycles should be at night if night operations are being conducted.~~		Moved to SPA.HHO.130.
• ~~b. Onshore:~~ • ~~i. 500 hours pilot-in-command of helicopters or 500 hours as co-pilot in HHO operations of which 100 hours is as pilot-in-command under supervision;~~ • ~~ii. 200 hours operating experience in helicopters gained in an operational environment similar to the intended operation; and~~ ~~iii. 50 hoist cycles, of which 20 cycles should be at night if night operations are being conducted.~~		Moved to SPA.HHO.130.
~~c. Successful completion of training in accordance with the procedures contained in the operations manual and relevant experience in the role and environment under which HHO is conducted.~~		Moved to SPA.HHO.130.
~~2.3 Recency.~~	A comment suggested an amendment to the recency	Not accepted. This AMC is a transfer of

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	requirement to credit the night recency if the day recency requirements were met.	Appendix 1 to JAR-OPS 3.005 (h) and has not been subject to any discussions in HSST. HHO - or CAT hoisting to HEC Class D standards - is a commercial activity which requires a high level of experience and recency. The minimum level of safety is provided by the regulation. Moved to SPA.HHO.130.
~~All pilots and technical crew members conducting HHO should, in addition to the recency requirements in Part OR.OPS, have completed in the last 90 days:~~ ~~a. When operating by day: Any combination of 3 day or night hoist cycles, each of which should include a transition to and from the hover.~~ ~~b. When operating by night: 3 night hoist cycles, each of which should include a transition to and from the hover.~~		Moved to SPA.HHO.130.
~~2.4 Crew Composition~~		Moved to SPA.HHO.130.
~~2.4.1 The minimum crew for day or night operations should be as stated in the operations manual and will be dependent on the type of helicopter, the weather conditions, the type of task,~~		Moved to SPA.HHO.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~and, in addition for offshore operations, the HHO site environment, the sea state and the movement of the vessel.~~		
AMC1-SPA.HHO.130(a)(5) Crew requirements for HHO ~~operations~~		
CRITERIA FOR TWO ~~2~~ PILOT HHO		
~~2.4.2~~ A crew of two pilots should be used when:	A comment stated: the text refers to the requirement for two pilots to be employed when operations are carried out below the VFR minima. This should be reviewed as by definition operations carried out below the VFR minima would have to be carried out under IMC and as such IFR minima should be applied.	Not Accepted. There is a subtle difference between the text here and the text for VFR and IFR rules. In this case the hoisting operation will be carried out visually but recovery from an engine failure will have to be conducted with an IMC departure. It is for this reason that it was decided to require two pilots under these circumstances. One pilot can concentrate on the hoisting and the other pilot act as a safety pilot and take appropriate precautions/action as is necessary. This is the original text

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		transposed from JAR-OPS 3, Section 2.
1~~a~~. ~~T~~**t**he weather conditions are below **v**~~V~~isual **f**~~F~~light **r**~~R~~ules (VFR) minima at the offshore vessel or structure**;**~~.~~		
2~~b~~. ~~T~~**t**here are adverse weather conditions at the HHO site (i.e. turbulence, vessel movement, visibility)**; and**~~.~~		
3~~c~~. ~~T~~**t**he type of helicopter requires a second pilot to be carried because of: i. cockpit visibility; ii. handling characteristics; or iii lack of automatic flight control systems.		
~~3. The Manual~~		Moved to SPA.HHO.140.
~~When required in the interest of safety, relevant extracts from the operations manual should be made available to the organisation for which the HHO is being provided.~~		Moved to SPA.HHO.140.
~~4. Passenger briefing~~		Moved to SPA.HHO.140.
~~Prior to any HHO flight, or series of flights, HHO passengers should be briefed and made aware of the dangers of static electricity~~		Moved to SPA.HHO.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~discharge and other HHO considerations.~~		
~~AMC~~ AMC1~~OPS.~~-SPA.HHO.~~010~~110~~.HHO~~(a) Equipment requirements for HHO		
AIRWORTHINESS APPROVAL FOR HUMAN EXTERNAL CARGO		
1. Hoist installations ~~which~~ **that** have been certificated according to any of the following standards should be considered to satisfy the airworthiness criteria for ~~H~~**h**uman ~~E~~**e**xternal **c**~~C~~argo (HEC) operations: a. CS 27.865 or CS 29.865; b. JAR 27 Amendment 2 (27.865) or JAR 29 Amendment 2 (29.865) or later; c. FAR 27 Amendment 36 (27.865) or later - including compliance with CS 27.865(c)(6); **or** d. FAR 29 Amendment 43 (29.865) or later.		
2. Hoist installations ~~which~~ **that** have been certificated prior to the issuance of the airworthiness criteria for HEC as defined in ~~paragraph~~ 1**.** may be considered as eligible for HHO ~~operations~~ provided that following a risk assessment either:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. **t**~~T~~he service history of the hoist installation is found satisfactory to the competent authority; or	The judgement whether the in-service history of a hoist-installation can be deemed acceptable by the competent authority should be based on clearly defined criteria. It is proposed that the basis for the judgement should be an in-service history exceeding a minimum time-span and a minimum of hoist installations in-service. It is proposed to deem the in-service history of a hoist-installation acceptable if no incident classified as hazardous or catastrophic has occurred during the to be defined time-span and amongst all the hoist installations in-service which have to exceed a to be defined number. Any incident being attributable to mis–use or operation/–maintenance not in accordance with the applicable documentation issued by the TC/—STC holder shall not be part of the in-service history representing the baseline for the	Noted. In general the text is supported but it is not exactly clear as to what the criteria should be.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	authority's decision.	
b. **f**~~F~~or hoist installations with an unsatisfactory service history, additional substantiation to allow acceptance by the competent authority should be provided by the ~~H~~**h**oist ~~I~~**i**nstallation **c**~~C~~ertificate ~~H~~**h**older (TC or STC) on the basis of the following requirements: i. The hoist installation should withstand a force equal to a limit static load factor of 3.5, or some lower load factor, not less than 2.5, demonstrated to be the maximum load factor expected during hoist operations, multiplied by the maximum authorised external load. ii. The reliability of the primary and back-up quick release systems at **helicopter**~~aircraft~~ level should be established and **f**~~F~~ailure **m**~~M~~ode and **e**~~E~~ffect **a**~~A~~nalysis at equipment level should be available. The assessment of the design of the primary and back-up quick release systems should consider any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system. iii. The operations or flight manual contains one-engine-inoperative **(OEI)** hover performance data and procedures for the weights, altitudes, and temperatures throughout the flight envelope for	The commentator requests that the last element (v) be removed because an operational authority could not make this judgment.	Noted. The concern of the commentator is understood but the text is aimed at airworthiness authorities and not operators. The text was intended to indicate that the assessment (for grandfathering hoists) had to consider issues that had not been expressly mentioned in the previous points.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
which hoist operations are accepted. iv. Information concerning the inspection intervals and retirement life of the hoist cable should be provided in the instructions for continued airworthiness. v. Any airworthiness issue reported from incidents or accidents and not addressed by i., ii., iii. and iv. should be addressed.		
AMC1-SPA.HHO.130(f)(1) Crew requirements for HHO		
TRAINING AND CHECKING SYLLABUS		
1. The flight crew training syllabus should include the following items: **a. fitting and use of the hoist;** **b. preparing the helicopter and hoist equipment for HHO;** **c. normal and emergency hoist procedures by day and, when required, by night;** **d. crew coordination concepts specific to HHO;** **e. practice of HHO procedures; and** **f. the dangers of static electricity discharge.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2. The flight crew checking syllabus should include: **a. proficiency checks, which should include procedures likely to be used at HHO sites with special emphasis on:** **i. local area meteorology;** **ii. HHO flight planning;** **iii. HHO departures;** **iv. a transition to and from the hover at the HHO site;** **v. normal and simulated emergency HHO procedures; and** **vi. crew coordination.** **3. HHO technical crew members should be trained and checked in the following items:** **a. duties in the HHO role;** **b. fitting and use of the hoist;** **c. operation of hoist equipment;** **d. preparing the helicopter and specialist equipment for HHO;** **e. normal and emergency procedures;** **f. crew coordination concepts specific to HHO;** **g. operation of inter-communication and radio**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
equipment; **h. knowledge of emergency hoist equipment;** **i. techniques for handling HHO passengers;** **j. effect of the movement of personnel on the centre of gravity and mass during HHO;** **k. effect of the movement of personnel on performance during normal and emergency flight conditions;** **l. techniques for guiding pilots over HHO sites;** **m. awareness of specific dangers relating to the operating environment; and** **n. the dangers of static electricity discharge.**		
AMC1-SPA.HHO.140 Information and documentation		
OPERATIONS MANUAL		
The operations manual should include: **1. performance criteria;** **2. if applicable, the conditions under which offshore HHO transfer may be conducted including the relevant limitations on vessel movement and wind speed;**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3. the weather limitations for HHO. **4. the criteria for determining the minimum size of the HHO site, appropriate to the task;** **5. the procedures for determining minimum crew; and** **6. the method by which crew members record hoist cycles.**		
~~Section IX~~Subpart J - Helicopter emergency medical service operations		
GM1-~~OPS.~~SPA.HEMS.~~001~~100.~~HEMS~~(a) Helicopter emergency medical service (HEMS)operations ~~(HEMS)~~	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
THE HEMS PHILOSOPHY		
1. Introduction		
This ~~Guidance Material (~~GM~~)~~ outlines the HEMS philosophy. Starting with a description of acceptable risk and introducing a taxonomy used in other industries, it describes how risk has been addressed in ~~OPS.HEMS~~**this Subpart** to provide a system of safety to the appropriate standard. It discusses the		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
difference between HEMS **and**~~,~~ ~~Air~~ **air** ~~A~~**a**mbulance ~~and SAR~~ - in regulatory terms. It also discusses the application of ~~O~~**o**perations to ~~P~~**p**ublic Interest Sites in the HEMS context.		
2. Acceptable risk		
The broad aim of any aviation legislation is to permit the widest spectrum of operations with the minimum risk. In fact it may be worth considering who/what is at risk and who/what is being protected. In this view three groups are being protected: a. ~~T~~**t**hird parties (including property) - highest protection**;**~~.~~ b. ~~P~~**p**assengers (including patients)**;**~~.~~ c. **c**~~C~~rew members (including technical crew members) – lowest. It is for the Legislator to facilitate a method for the assessment of risk - or as it is more commonly known, safety management (refer to Part-OR).		
3. Risk management		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
Safety management textbooks[1] describe four different approaches to the management of risk. All but the first have been used in the production of this section and, if it is considered that the engine failure accountability of ~~P~~**p**erformance ~~C~~**c**lass 1 equates to zero risk, then all four are used (this of course is not strictly true as there are a number of helicopter parts - such as the tail rotor which, due to a lack of redundancy, cannot satisfy the criteria):		
a. Applying the taxonomy to HEMS gives: i. ~~Z~~**z**ero **r**~~R~~isk; no risk of accident with a harmful consequence – ~~P~~**p**erformance **c**~~C~~lass 1 (within the qualification stated above) - the HEMS **o**~~O~~perating ~~B~~**b**ase. ii. **d**~~D~~e ~~M~~**m**inimis; minimised to an acceptable safety target - for example the exposure time concept where the target is less than 5 x 10^{-8} (in the case of elevated **final approach and take-off areas (elevated FATOs)** ~~landing sites~~ at hospitals in a congested hostile environment the risk is contained to the deck edge strike case - and so in effect minimised to an exposure of seconds).		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
iii. ~~C~~**c**omparative **r**~~R~~isk; comparison to other exposure - the carriage of a patient with a spinal injury in an ambulance that is subject to ground effect compared to the risk of a HEMS flight (consequential and comparative risk). iv. **a**~~A~~s ~~L~~**l**ow as ~~R~~**r**easonably **p**~~P~~ractica**ble**~~l~~; where additional controls are not economically or reasonably practica**ble**~~l~~ - operations at the HEMS operating site (the accident site).		
~~It is stated in OPS.SPA.001.HEMS (b)(2) that "...the operator shall comply with the requirements contained in OPS.GEN, OPS.CAT and Part-OR, except for the variations contained in this Section."~~		
b. **HEMS operations are conducted in accordance with the requirements contained in Part-CAT and Part-OR, except for the variations contained in SPA.HEMS, for which a specific approval is required.** In simple terms there are three areas in HEMS operations where risk, beyond that allowed in ~~OPS.GEN, OPS.CAT and Part-OR~~**Part-CAT and Part-OR are identified** ~~, is defined~~and **related risks** accepted: i. in the en-route phase**,**~~:~~ where alleviation is given from height and visibility rules; ii. at the accident site**,**~~:~~ where alleviation is given from		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
the performance and size requirement; and iii. at an elevated hospital site in a congested hostile environment,~~;~~ where alleviation is given from the deck edge strike - providing elements of the **CAT.POL.H.305**~~OPS.SPA.SFL.~~ are satisfied.		
In mitigation against these additional and considered risks, experience levels are set, specialist training is required (such as instrument training to compensate for the increased risk of inadvertent entry into cloud); and operation with two crew (two pilots, or one pilot and a HEMS technical crew member) is mandated. (HEMS crews - including medical passengers - are also expected to operate in accordance with good **crew resource management (**CRM**)** principles.)		
4. Air ambulance		
In regulatory terms, air ambulance is considered to be a normal transport task where the risk is no higher than for operations to the full~~ OPS.GEN, ~~OPS.CAT and Part-OR compliance. This is not intended to contradict/complement medical terminology but is simply a statement of policy; none of the risk elements of HEMS should be extant and therefore none of the additional requirements of HEMS need be applied.		
To~~If we can~~ provide a road ambulance analogy:		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
a. ~~I~~**i**f called to an emergency; an ambulance would proceed at great speed, sounding its siren and proceeding against traffic lights - thus matching the risk of operation to the risk of a potential death (= HEMS operations).		
b. ~~F~~**f**or a transfer of a patient (or equipment) where life and death (or consequential injury of ground transport) is not an issue; the journey would be conducted without sirens and within normal rules of motoring - once again matching the risk to the task (= air ambulance operations).		
The underlying principle is; the aviation risk should be proportiona**te**~~l~~ to the task.		
It is for the medical professional to decide between HEMS or air ambulance - not the pilot! For that reason, medical staff who undertake to task medical sorties should be fully aware of the additional risks that are (potentially) present under HEMS operations (and the pre-requisite for the operator to hold a HEMS approval). (For example in some countries, hospitals have princip**a**le and alternative sites. The patient may be landed at the safer alternative site (usually in the grounds of the hospital) thus eliminating risk - against the small inconvenience of a short ambulance transfer from the site to the hospital.)		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
Once the decision between HEMS or air ambulance has been taken by the medical professional, the ~~pilot-in-command~~**commander** makes an operational judgement over the conduct of the flight.		
Simplistically, the above type of air ambulance operations could be conducted by any operator holding an AOC (HEMS operators hold an AOC) - and usually are when the carriage of medical supplies (equipment, blood, organs, drugs etc.) is undertaken and when urgency is not an issue.		
5. Operating under a HEMS approval		
There are only two possibilities; transportation as passengers or cargo under the full auspices of~~ OPS.GEN,~~ OPS.CAT and Part-OR (this does not permit any of the alleviations of part OPS.SPA.HEMS - landing and take-off performance ~~must~~ **should** be in compliance with the performance ~~subpart~~**Subpart**s of Part OPS.CAT); or operations under a HEMS approval as contained in this S**ubpart**~~ection~~.		
6. HEMS operational sites	Some opposing comments on this issue were received. Most of the commentators requested alleviation from this requirement indicated that there is an urgent	Not accepted. There is currently no reason to deviate from the requirements already contained in JAR-OPS 3. There seems to be

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	need to transpose TGL 43 into the EASA system. There were other comments requesting that for HEMS no performance class 3 should be allowed at all.	misunderstanding on the application of HEMS regulations to mountain rescue operations. It is considered and explained in TGL 43 that certain operations should be classified as mountain rescue. Mountain rescue will not be addressed at this moment as it is believed to be outside the scope of the Agency, considering how the Basic Regulation addresses 'similar service' and its close relationship with search and rescue.
The HEMS philosophy attributes the appropriate levels of risk for each operational site; this is derived from practical considerations and in consideration of the probability of use. The risk is expected to be inversely proportional to the amount of use of the site. The types of site are:		
a. HEMS operating base**:**~~;~~ from which all operations will start and finish. There is a high probability of a large number of take-offs and landings at this HEMS operating base and for that reason no alleviation from operating procedures or performance rules are contained in this s**ubpart**~~ection~~.		

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
b. HEMS operating site**:**~~;~~ because this is the primary pick up site related to an incident or accident, its use can never be pre-planned and therefore attracts alleviations from operating procedures and performance rules, when appropriate.		
c. The hospital site**:**~~;~~ is usually at ground level in hospital grounds or, if elevated, on a hospital building. It may have been established during a period when performance criteria were not a consideration. The amount of use of such sites depends on their location and their facilities; normally, it will be greater than that of the HEMS operating site but less than for a HEMS operating base. Such sites attract some alleviation under this s**ubpart**~~ection~~.		
7. Problems with hospital sites	Most of the comments indicate widespread misunderstanding of the rules by some the operators and authorities. Proposals are made to change the content to meet those misunderstandings.	Not accepted. The fact that an authority has not implemented the public interest site appendix, does not justify a change in the rules. The intent of the public interest site and the approval for its use is explained in detail in the AMC and GM to CAT.POL.H.225. Exposure during take-off and landing is not equal to PC3; the

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		fact that some helicopters are unable to meet PC2 requirements at altitude does not justify the use of PC3 in HEMS operations below those altitudes where PC2 would otherwise be possible.
During implementation of the original HEMS rules contained in JAR-OPS 3, it was established that a number of States had encountered problems with the impact of performance rules where helicopters were operated for HEMS. Although States accept that progress should be made towards operations where risks associated with a critical ~~power unit~~**engine** failure are eliminated, or limited by the exposure time concept, a number of landing sites exist which do not (or never can) allow operations to **p**~~P~~erformance **c**~~C~~lass 1 or 2 requirements.		
These sites are generally found in a congested hostile environment: a. in the grounds of hospitals; or b. on hospital buildings.		
The problem of hospital sites is mainly historical and, whilst the authority could insist that such sites not be used - or used at such a low weight that critical ~~power unit~~**engine** failure performance is assured, it would seriously curtail a number of existing operations. **Even though the rule for the use of such sites in hospital**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
grounds for HEMS operations attracts alleviation, it is only partial and will still impact upon present operations.		
Because such operations are performed in the public interest, it was felt that the authority should be able to exercise its discretion so as to allow continued use of such sites provided that it is satisfied that an adequate level of safety can be maintained - notwithstanding that the site does not allow operations to **p**~~P~~erformance **c**~~C~~lass 1 or 2 standards. However, it is in the interest of continuing improvements in safety that the alleviation of such operations be constrained to existing sites, and for a limited period.		
It is felt that the use of public interest sites should be controlled. This will require that a State directory of sites be kept and approval given only when the operator has an entry in the route manual section of the operations manu**a**~~e~~l.		
The directory (and the entry in the ~~OM~~**operations manua**~~e~~**l**) should contain for each approved site**:**~~÷~~ **i.** the dimensions; **ii.** any non-conformance with Annex 14; **iii.** the main risks; and~~,~~ **iv.** the contingency plan should an incident occur. Each entry should also contain a diagram (or annotated photograph) showing the main aspects of the site.		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
8. Summary		
In summary, the following points are considered to be germane to the HEMS philosophy and HEMS regulations: a. ~~A~~**a**bsolute levels of safety are conditioned by society**;**~~.~~ b. ~~P~~**p**otential risk must only be to a level **proportionate**~~appropriate~~ to the task**;**~~.~~ c. ~~P~~**p**rotection is afforded at levels appropriate to the occupants**;**~~.~~ d. ~~T~~**t**his s**ubpart**~~ection~~ addresses a number of risk areas and mitigation is built in**;**~~.~~ e. ~~O~~**o**nly HEMS operations are dealt with by this section**;**~~.~~ f. ~~T~~**t**here are three main categories of HEMS sites and each is addressed appropriately**; and**~~.~~ g. State alleviation from the requirement at a hospital site is available but such alleviations should be strictly controlled by a system of registration.		
~~9. References~~		
~~Managing the Risks of Organizational Accidents – Professor James Reason.~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
AMC1-~~OPS.~~SPA.HEMS.~~0~~130~~1.HEMS~~(a~~b~~)(2~~4~~) Crew requirements for HEMS operations~~Helicopter emergency medical service operations (HEMS)~~	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
~~OPERATING PROCEDURES~~**EXPERIENCE**		
~~1. The crew.~~		Moved to SPA.HEMS.130.
~~1.1 Selection.~~		Moved to SPA.HEMS.130.
~~The operations manual should contain specific criteria for the selection of flight crew members for the HEMS task, taking previous experience into account.~~		Moved to SPA.HEMS.130.
~~1.2 Experience.~~		Moved to SPA.HEMS.130.
The minimum experience level for a ~~pilot-in-command~~**commander** conducting HEMS flights should take into account the geographical characteristics of the operation (sea, mountain, big cities with heavy traffic, etc.)~~ and should not be less than:~~**.**		
~~• a. Either:~~ ~~i. 1 000 hours pilot-in-command of aircraft of which~~	Some comments related to the fact that the number of hours is not an	Not accepted. Flight hours have always been

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~500 hours is as pilot-in-command on helicopters; or~~ ~~ii. 1 000 hours as co-pilot in HEMS operations of which 500 hours is as pilot-in-command under supervision; and, 100 hours pilot-in-command of helicopters.~~	objective criterion and may be too strict in some cases.	used to indicate the minimum level of experience required. Moved to SPA.HEMS.130.
~~b. 500 hours operating experience in helicopters gained in an operational environment similar to the intended operation; and~~		Moved to SPA.HEMS.130.
~~c. For pilots engaged in night operations, 20 hours Visual Meteorological Conditions (VMC) at night as pilot-in-command; and~~		Moved to SPA.HEMS.130.
~~d. Successful completion of training in accordance with 1.5.1.~~		Moved to SPA.HEMS.130.
AMC1-SPA.HEMS.130(a)(4) Crew requirements for HEMS operations		
~~1.3~~ RECENCY~~.~~	Some (duplicate) comments requested clarification on the recency and number of checks required to be conducted and which checks could be combined.	Noted. The training programmes need to be approved by the competent authority in accordance with Part-OR. This Part allows the combination of certain training/checking. However it should be clearly

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
		understood that recency requirements are something different to training/checking.
~~All pilots conducting HEMS operations should have completed a minimum of 30 minutes flight by sole reference to instruments in a helicopter or in a synthetic training device (STD) within the last 6 months.~~ This recency may be obtained in a **v**~~V~~isual **f**~~F~~light **r**~~R~~ules (VFR) helicopter using vision limiting devices such as goggles or screens, or in a**nF**STD.	One Member State commented that this training should be conducted by an FI.	Not accepted. This is a mitigating procedure to prevent pilots from losing control when inadvertently entering IMC. It is not a recognised procedure in the sense of FCL. Partially moved to SPA.HEMS.130.
~~1.4 Crew composition.~~	Some commentators' share the view that single pilot operations should be allowed for HEMS. The requirement for 2 crew (either 2 pilots, or 1 pilot and 1 HEMS technical crew member) would preclude certain helicopters that are certificated as Class A and eligible for PC1 operations.	Not accepted. Due to the nature of HEMS operations, such as reduced operating minima, landing at unsurveyed sites and low level operations, certain alleviations are contained in the appendix. These alleviations can only be used when appropriately mitigated. The mitigation for the above 3 issues is 'an extra pair of eyes' in the front of the

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		helicopter. Following the above it is well known and understood that this precludes some small helicopters from HEMS operations. Moved to SPA.HEMS.130.
~~a. Day flight.~~		Moved to SPA.HEMS.130.
~~The minimum crew by day should be one pilot and one HEMS technical crew member. This can be reduced to one pilot only in exceptional circumstances.~~	Some comments requested these exceptional circumstances to be defined.	Accepted. These exceptional circumstances are now defined in the rule. Moved to SPA.HEMS.130.
~~b. Night flight.~~		Moved to SPA.HEMS.130.
~~The minimum crew by night should be two pilots. However, one pilot and one HEMS technical crew member may be employed in specific geographical areas defined by the operator in the operations manual taking into account the following:~~ ~~i. Adequate ground reference;~~ ~~ii. Flight following system for the duration of the HEMS~~	Comments indicated that there is a vast number of operators that had problems understanding the intent of changes, such as the removal of the statement that the operations manual is subject to the acceptance/approval of the authority. This is already contained	Moved to SPA.HEMS.130.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~mission;~~ ~~iii. Reliability of weather reporting facilities;~~ ~~iv. HEMS minimum equipment list;~~ ~~v. Continuity of a crew concept;~~ ~~vi. Minimum crew qualification, initial and recurrent training;~~ ~~vii. Operating procedures, including crew co-ordination;~~ ~~viii. Weather minima;~~ ~~ix. Additional considerations due to specific local conditions.~~	in Part-OR, which is applicable to HEMS operators as they are required to hold an AOC.	
~~1.5 Crew training and checking~~	Comments indicated inconsistencies between several Parts and Sections in the NPA where training and checking requirements are listed. In some cases the same requirements for different operations are not always contained in the rule.	Accepted
~~1.5.1 Flight crew members~~		Moved to SPA.HEMS.130.
~~• a. The specific HEMS training programme for the flight crew members should include the following subjects:~~		Moved to SPA.HEMS.130.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~i. Meteorological training concentrating on the understanding and interpretation of available weather information;~~ ~~ii. Preparing the helicopter and specialist medical equipment for subsequent HEMS departure;~~ ~~iii. Practice of HEMS departures;~~ ~~iv. The assessment from the air of the suitability of HEMS operating sites; and~~ ~~v. The medical effects air transport may have on the patient.~~		
~~b. Flight crew member checking~~		Moved to SPA.HEMS.130.
~~i. VMC day proficiency checks, or also at night if night HEMS operations are undertaken by the operator, including flying landing and take-off profiles likely to be used at HEMS operating sites.~~		Moved to SPA.HEMS.130.
~~ii. Line checks, with special emphasis on the following:~~ ~~A. Local area meteorology;~~ ~~B. HEMS flight planning;~~ ~~C. HEMS departures;~~ ~~D. The selection from the air of HEMS operating sites;~~ ~~E. Low level flight in poor weather; and~~		Moved to SPA.HEMS.130.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
~~F. Familiarity with established HEMS operating sites in operators local area register.~~		
~~Where due to the size, the configuration, or the performance of the helicopter, the line check cannot be conducted on an operational flight; it may be conducted on a specially arranged representative flight. This flight may be immediately adjacent to, but not simultaneous with, one of the biannual proficiency checks.~~		
~~1.5.2HEMS Technical crew member~~		Moved to SPA.HEMS.130.
~~The specific HEMS training programme for technical crew members who perform assigned duties relating to assisting the pilot in his duties should include the following items in addition to Part-OR:~~		Moved to SPA.HEMS.130.
~~a. Duties in the HEMS role;~~		
~~b. Navigation (map reading, navigation aid principles and use);~~		
~~c. Operation of radio equipment;~~		
~~d. Use of onboard medical equipment;~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~e. Preparing the helicopter and specialist medical equipment for subsequent HEMS departure;~~		
~~f. Instrument reading, warnings, use of normal and emergency check lists in assistance of the pilot as required;~~		
~~g. Basic understanding of the helicopter type in terms of location and design of normal and emergency systems and equipment;~~		
~~h. Crew coordination;~~		
~~i. Practice of response to HEMS call out;~~		Moved to SPA.HEMS.130.
~~j. Conducting refuelling and rotors running refuelling;~~		
~~k. HEMS operating site selection and use;~~		
~~l. Techniques for handling patients, the medical consequences of air transport and some knowledge of hospital casualty reception;~~		
~~m. Marshalling signals;~~		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~n. Underslung load operations as appropriate;~~		
~~o. Winch operations as appropriate;~~		
~~p. The dangers to self and others of rotor running helicopters including loading of patients;~~		
~~q. The use of the helicopter inter-communications system.~~		
~~2. Medical passenger~~		Moved to SPA.HEMS.130.
~~Prior to any HEMS flight, or series of flights, the medical passenger should be briefed on the following:~~ ~~a. Familiarisation with the helicopter type(s) operated;~~ ~~b. Entry and exit under normal and emergency conditions both for self and patients;~~ ~~c. Use of the relevant onboard specialist medical equipment;~~ ~~d. The need for the pilot-in-command's approval prior to use of specialised equipment;~~ ~~e. Method of supervision of other medical staff;~~ ~~f. The use of helicopter inter-communication systems; and~~ ~~g. Location and use of onboard fire extinguishers.~~	Comment indicates that there are many examples where the 'medical passenger' is a member of a permanent HEMS team and where there is no need for a briefing prior to any or series of flights, if the 'medical passenger' is trained at regular intervals (comments propose a 6-monthly recurrent basis).	Partially accepted. AMC1-CAT.OP.AH.170 permits training programmes, which would therefore apply to the HEMS medical passenger.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~3. Ground emergency service personnel~~		Moved to SPA.HEMS.130.
~~3.1 An operator should take all reasonable measures to ensure that ground emergency service personnel are familiar with the following:~~ ~~a. Two way radio communication procedures with helicopters;~~ ~~b. The selection of suitable HEMS operating sites for HEMS flights;~~ ~~c. The physical danger areas of helicopters;~~ ~~d. Crowd control in respect of helicopter operations; and~~ ~~e. The evacuation of helicopter occupants following an on-site helicopter accident.~~	Comments to this section indicated that the requirement is too strict and should be relaxed, as the operator is unable to provide familiarisation training to such personnel.	Moved to SPA.HEMS.130.
~~3.2 The task of training large numbers of emergency service personnel is formidable. Wherever possible, helicopter operators should afford every assistance to those persons responsible for training emergency service personnel in HEMS support.~~		
~~4. Operations manual. When required in the interest of safety, relevant extracts from the operations manual should be made available to the organisation for which the HEMS is being provided.~~		Moved to SPA.HEMS.140.

A: Rule	**B: Summary of comments**	**C: Reasons for change, remarks**
A~~G~~MC1-~~OPS.~~SPA.HEMS.~~0~~130~~1.HEMS~~(~~b~~e)(~~4~~2) (ii)(B)Crew requirements for HEMS operations~~Helicopter emergency medical service operations (HEMS)~~	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
~~OPERATING PROCEDURES~~**FLIGHT FOLLOWING SYSTEM**		
A flight following system ~~(as referred to in AMC OPS.SPA.001.HEMS (b)(4) 1.4. b. ii.)~~ is a system providing contact with the helicopter throughout its operational area.	This comment requested the method of providing contact to be specified as either radio contact or by electronic information system in regard of position, track, etc.	Not accepted. By specifying the means, there is a risk that other acceptable methods which are not listed are excluded.
A~~G~~MC~~2~~1-~~OPS.~~SPA.HEMS.1~~0~~30~~1.HEMS~~(~~b~~e)~~(5)~~Crew requirements for HEMS operations~~Helicopter emergency medical service operations (HEMS)~~	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	Editorial changes have been made in the order of the text to better reflect the distinction between primary and secondary duties of the HEMS technical crew member.
~~OPERATING PROCEDURES~~**HEMS TECHNICAL CREW MEMBER**		
1. When the crew is composed of one pilot and one **HEMS** technical crew member, the latter should be seated in the front seat (co-pilot seat) during the flight, so as to be able to **carry out his/her primary task of assisting** ~~accomplish the tasks~~	One Member State requested that the text be amended to clarify that a stretcher is not a certificated seat.	Not accepted. Although a stretcher can never be certificated to replace a seat, it is not necessary to highlight

A: Rule			B: Summary of comments	C: Reasons for change, remarks
	~~that~~ the ~~pilot-in-command~~/**commander** ~~may~~ **in**~~delegate, as necessary~~:			this fact. The text between brackets (co-pilot seat) is clear enough.
	a.	**collision avoidance**~~Assistance in navigation~~; ~~**and**~~		
	b.	**the selection of the landing site**~~Assistance in radio communication/radio navigation means selection~~; **and**		
	c~~d~~.	**the detection of obstacles during approach and take-off phases**~~Monitoring of parameters;~~**.**		
2.	**The commander may delegate other aviation tasks to the HEMS technical crew member, as necessary:**			
	a~~e~~.	**assistance in navigation**~~Collision avoidance~~;		
	b~~f~~.	**a**~~A~~ssistance in **radio communication/radio navigation means selection**~~the selection of the landing site~~;		
	c~~g~~.	~~Assistance in the detection of obstacles during approach and take-off phases~~**reading of checklists; and**~~.~~		
	d.	**monitoring of parameters.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
3~~2~~. The ~~pilot-in-command/~~**/commander** may also delegate to the **HEMS** technical crew member tasks on the ground: a. **a**~~A~~ssistance in preparing the helicopter and dedicated medical specialist equipment for subsequent HEMS departure**; or**~~.~~ b. **a**~~A~~ssistance in the application of safety measures during ground operations with rotors turning (including: crowd control, embarking and disembarking of passengers, refuelling etc.).		
4~~3~~. ~~When a technical crew member is carried it is his/her primary task to assist thepilot-in-command. However,~~**T**~~t~~here **may be <u>exceptional</u> circumstances** ~~are occasions~~ when **it is** ~~this may~~ not ~~be~~ possible **for the HEMS technical crew member to carry out his/her primary task as defined under 1. a**~~A~~ **a**~~A~~**bove.**~~:~~		
~~a.~~ ~~At a HEMS operating site a pilot-in-command may be required to fetch additional medical supplies, the technical crew member may be left to give assistance to ill or injured persons whilst the pilot-in-command undertakes this flight. (~~This is to be regarded as exceptional and is only to be conducted at the discretion of the pilot-in-command**/commander**, taking into account the dimensions and environment of the HEMS operating site.)		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
~~b. After arriving at the HEMS Operating Site, the installation of the stretcher may preclude the technical crew member from occupying the front seat.~~		
~~c. The medical passenger requires the assistance of the technical crew member in flight.~~		
~~d. In the cases described in a., b. or c. above, the reduction of operating minima contained in Table 1 of OPS.SPA.020.HEMS shall not be used.~~		
~~e. With the exception of a. above, a pilot-in-command should not land at a HEMS operating site without the technical crew member assisting from the front seat (co-pilot seat).~~		
5~~4~~. When two pilots are carried, there is no requirement for a **HEMS** technical crew member, provided that the pilot **monitoring**~~non-flying (PNF)~~ performs the aviation tasks of a technical crew member.		
~~GM~~ GM1-~~OPS.~~SPA.HEMS.1~~0~~20~~.HEMS(a)~~ HEMS Operating Minima	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	The comments were mainly duplicates of those also made against the rule itself, which indicate that one Member State allows operations with a visibility down to 500 m.

<table>
<tr><th>A: Rule</th><th>B: Summary of comments</th><th>C: Reasons for change, remarks</th></tr>
<tr><td>REDUCED VISIBILITY</td><td></td><td></td></tr>
<tr><td>**(a)** In the rule the ability to reduce the visibility for short periods has been included. This will allow the ~~pilot-in-command~~**commander** to assess the risk of flying temporarily into reduced visibility against the need to provide emergency medical service, taking into account the advisory speeds included in **Table 1**~~the AMC~~. Since every situation is different it was not felt appropriate to define the short period in terms of absolute figures. It is for the ~~pilot-in-command~~**commander** to assess the **aviation** risk to third parties, the crew and the aircraft **such that it is proportionate**~~in comparison~~ to the **task**~~mission parameters~~, using the principles of GM**1-**~~OPS.~~SPA.~~001.~~HEMS**.100**(a).</td><td>One Member State requested to define the maximum period to be 60 second at V_Y.</td><td>Not accepted.
'Short period' cannot be defined and should remain at the pilot's discretion. The example provided could even be a too long period in some cases.</td></tr>
<tr><td>**(b) When flight with a visibility of less than 5 km is permitted, the forward visibility should not be less than the distance travelled by the helicopter in 30 seconds so as to allow adequate opportunity to see and avoid obstacles (see table below).**
Table 1: Operating minima – reduced visibility
<table><tr><th>Visibility (m)</th><th>Advisory speed (kt~~s~~)</th></tr><tr><td>800</td><td>50</td></tr><tr><td>1 500</td><td>100</td></tr></table></td><td>The reference to the former ACJ OPS 3.465 is missing.</td><td>Since OPS.GEN.147 has been removed from the Part, as rules of the air are currently drafted within the SERA project, the table with advisory speeds has been inserted in here so that the guidance is available.</td></tr>
</table>

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2 000 | **120**		
GM1-SPA.HEMS.125 (b)(2) Performance requirements for HEMS operations		
PERFORMANCE CLASS 2 OPERATIONS AT A HEMS OPERATING SITE		
As the risk profile at a HEMS operating site is already well known, operations without an assured safe forced landing capability do not need a separate approval and the requirements does not call for the additional risk assessment that is specified in CAT.POL.H.305, (b)(1).		
AMC1~~-OPS.~~-SPA.HEMS.~~025~~125~~.HEMS~~(b)(3) Performance requirements for HEMS operations	It is noted that there has been a large number of duplicate comments from operators from the alpine region.	
HEMS OPERATING SITE DIMENSIONS	The majority of the duplicate comments state that this should not be applicable to mountain operations, due to the site	Not accepted. As HEMS operations are considered to be CAT, it is necessary to limit the risk to a

A: Rule	B: Summary of comments	C: Reasons for change, remarks
	diversity, and to city areas, where 2D may be too restrictive.	reasonable level as already described in the HEMS philosophy. It is equally important in the mountains to provide clearance from obstacles. Whilst it is understood that this may be in a different form from a flat landing site, the obligation is still there to ensure that it is safe to land. The only exception is for HEMS HHO, which is clearly indicated in that particular rule.
1. When selecting a HEMS operating site it should have a minimum dimension of at least 2 **x** D **(the largest dimensions of the helicopter when the rotors are turning)**. For night operations, unsurveyed HEMS operating sites should have dimensions of at least 4 **x** D in length and 2 **x** D in width.	One industry representative indicated that the limiting figures should be deleted, as the landing is always the pilot-in-command's decision, and it was unclear whether this related to the obstacle free area.	Not accepted. Although the decision on the suitability of the size can only be that of the commander, there should be a safeguard in terms of risk-taking as the operations is classified as CAT, therefore limiting figures are deemed necessary as guidance in what risk to take. The rule itself already stipulates that the site shall be big enough to provide adequate clearance

A: Rule	B: Summary of comments	C: Reasons for change, remarks
		from all obstructions; the use of dimensions is meant as guidance in relation to this rule and therefore needs no further explanation.
	One Member State commented that the 2D is not consistent with ICAO Annex 14, in the sense that the load bearing area should be at least 1.5D and the surface free of obstacles should measure 2D.	Not accepted. A HEMS operating is by definition has nothing to do with ICAO Annex 14. The required dimensions are only stated to ensure obstacle clearance.
2. For night operations, the illumination may be either from the ground or from the helicopter.		
GM1-SPA.HEMS.130(e)(2)(ii) Crew requirements for HEMS operations		GM added to better explain what is intended with the term specific geographical area.
SPECIFIC GEOGRAPHICAL AREAS		
In defining those specific geographical areas, the operator should take account of the cultural lighting and topography. In those areas where the cultural lighting an topography make it unlikely that the visual cues would degrade sufficiently to make flying of the aircraft problematical, a		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
HEMS technical crew member is assumed to be able to sufficiently assist the pilot, since under such circumstances instrument and control monitoring would not be required. In those cases where instrument and control monitoring would be required the operations should be conducted with two pilots.		
AMC1-SPA.HEMS.130(f)(1) Crew requirements for HEMS operations		
TRAINING AND CHECKING SYLLABUS		
1. The flight crew training syllabus should include the following items: **a. meteorological training concentrating on the understanding and interpretation of available weather information;** **b. preparing the helicopter and specialist medical equipment for subsequent HEMS departure;** **c. practice of HEMS departures;** **d. the assessment from the air of the suitability of HEMS operating sites; and** **e. the medical effects air transport may have on the patient.**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
2. The flight crew checking syllabus should include: **a. proficiency checks, which should include landing and take-off profiles likely to be used at HEMS operating sites; and** **b. line checks, with special emphasis on the following:** **i. local area meteorology;** **ii. HEMS flight planning;** **iii. HEMS departures;** **iv. the selection from the air of HEMS operating sites;** **v. low level flight in poor weather; and** **vi. familiarity with established HEMS operating sites in the operator's local area register.** **3. HHO technical crew members should be trained and checked in the following items:** **a. duties in the HEMS role;** **b. map reading, navigation aid- principles and use;** **c. operation of radio equipment;** **d. use of on board medical equipment;** **e. preparing the helicopter and specialist medical equipment for subsequent HEMS departure;** **f. instrument reading, warnings, use of normal and**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
emergency check–lists in assistance of the pilot as required; **g. basic understanding of the helicopter type in terms of location and design of normal and emergency systems and equipment;** **h. crew coordination;** **i. practice of response to HEMS call out;** **j. conducting refuelling and rotors running refuelling;** **k. HEMS operating site selection and use;** **l. techniques for handling patients, the medical consequences of air transport and some knowledge of hospital casualty reception;** **m. marshalling signals;** **n. underslung load operations as appropriate;** **o. winch operations as appropriate;** **p. the dangers to self and others of rotor running helicopters including loading of patients; and** **q. the use of the helicopter inter-communications system.**		
AMC1-SPA.HEMS.130(f)(2)(ii)(B) Crew requirements for HEMS operations		Renamed from AMC OPS.SPA.001.HEMS(b)(4) subparagraph 1.5.1b.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
LINE CHECKS		
Where due to the size, the configuration, or the performance of the helicopter, the line check cannot be conducted on an operational flight, it may be conducted on a specially arranged representative flight. This flight may be immediately adjacent to, but not simultaneous with, one of the biannual proficiency checks.		
AMC1-SPA.HEMS.135(a) HEMS medical passenger and other personnel briefing		
HEMS MEDICAL PASSENGER BRIEFING		
The briefing should ensure that the medical passenger understands his/her role in the operation, which includes: **1. familiarisation with the helicopter type(s) operated;** **2. entry and exit under normal and emergency conditions both for self and patients;** **3. use of the relevant onboard specialist medical equipment;** **4. the need for the commander's approval prior to use of specialised equipment;** **5. method of supervision of other medical staff;**		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
6. the use of helicopter inter-communication systems; and **7. location and use of on board fire extinguishers.**		
AMC2-SPA.HEMS.135(a) HEMS medical passenger and other personnel briefing		
HEMS MEDICAL PASSENGER BRIEFING		
The operator may also make use of a training programme as mentioned in AMC1-CAT.OP.AH.170.		
AMC1-SPA.HEMS.135(b)HEMS medical passenger and other personnel briefing		Renamed from AMC OPS.SPA.001.HEMS(b)(4) subparagraph 3.2.
GROUND EMERGENCY SERVICE PERSONNEL		
1. The task of training large numbers of emergency service personnel is formidable. Wherever possible, helicopter operators should afford ~~every~~ assistance to those persons responsible for training emergency service personnel in HEMS support~~,~~**. ~~t~~This can be achieved by various means, such as, but not limited to, the production of flyers, publication of relevant information on the operator's web site and provision of extracts from the operations**	Comments to this section indicated that the requirement is too strict and should be relaxed, as the operator is unable to provide familiarisation training for such personnel.	Partially accepted. The original GM has been expanded to indicate more precisely what the intent of the rule and guidance is.

A: Rule	B: Summary of comments	C: Reasons for change, remarks
manual. 2. The elements that should be covered include: a. two-way radio communication procedures with helicopters; b. the selection of suitable HEMS operating sites for HEMS flights; c. the physical danger areas of helicopters; d. crowd control in respect of helicopter operations; and e. the evacuation of helicopter occupants following an on-site helicopter accident.		
AMC1-SPA.HEMS.140 Information and documentation		
OPERATIONS MANUAL		
The operations manual should include: 1. the use of portable equipment on board; 2. guidance on take-off and landing procedures at previously unsurveyed HEMS operating sites; 3. the final reserve fuel, in accordance with SPA.HEMS.150; 4. operating minima;		

A: Rule	B: Summary of comments	C: Reasons for change, remarks
5. recommended routes for regular flights to surveyed sites, including the minimum flight altitude; **6. guidance for the selection of the HEMS operating site in case of a flight to an unsurveyed site;** **7. the safety altitude for the area overflown; and** **8. procedures to be followed in case of inadvertent entry into cloud.**		

~~Table 1 – List of existing Navigation specifications and summary of relative requirements~~

	~~RNAV 10~~	~~RNAV 5~~	~~RNAV 1~~	~~RNP 4~~	~~BASIC RNP 1~~	~~RNP APCH~~
	~~Identical to existing RNP 10~~	~~Worldwide standardisation of the European B-RNAV~~	~~Worldwide harmonisation of the European P-RNAV and US RNAV Type B~~	~~RNP 4~~	~~New standard~~	~~Identical to the existing ICAO "RNAV (GNSS) Approach"~~

~~PBN Requirements~~ ~~- Accuracy (cross-track and along-track)~~ ~~- Equipment malfunction~~ ~~- Continuity~~ ~~- Navigation error due to GNSS Signal in Space error~~	~~10NM 95%~~ ~~Major~~ ~~Major~~ ~~Error > 20 NM, Prob < 10-7/h~~	~~5NM 95%~~ ~~Major~~ ~~Minor~~ ~~Error > 10 NM, Prob < 10-7/h~~	~~1NM 95%~~ ~~Major~~ ~~Minor~~ ~~Error > 2 NM, Prob < 10-7/h~~	~~4NM 95%~~ ~~Major~~ ~~Major~~ ~~Error > 8 NM, Prob < 10-7/h~~	~~1NM 95%~~ ~~Major~~ ~~Minor~~ ~~Error > 2 NM, Prob < 10-7/h~~	~~1-0.3NM 95%~~ ~~Major~~ ~~Minor~~ ~~Error > 2-0.6 NM, Prob < 10-7/h~~
~~On Board Performance Monitoring and Alerting~~				~~Error > 8NM, Prob < 10-5~~	~~Error > 2NM, Prob < 10-5~~	~~Error > 2-0,6NM, Prob < 10-5~~
~~Minimum equipment~~	~~2 long range navigation systems using one or a combination of:~~ ~~- GNSS~~ ~~- IRS~~	~~1 navigation system using one or a combination of:~~ ~~- GNSS~~ ~~- DME/DME~~ ~~- VOR/DME~~ ~~- IRS~~	~~2 navigation system using:~~ ~~- GNSS~~ ~~- DME/DME~~ ~~- DME/DME/IRS~~	~~2 long range navigation systems using (at least):~~ ~~- GNSS~~	~~Navigation system using (at least):~~ ~~- GNSS~~	~~Navigation system using (at least):~~ ~~- GNSS~~
~~Specific requirements concerning the positioning function~~	~~- GNSS~~ ~~- IRS~~ ~~- 2IRS + GNSS approved "primary~~	~~- GNSS~~ ~~- DME/DME~~ ~~- VOR/DME~~ ~~- IRS~~	~~- GNSS~~ ~~- DME/DME~~ ~~- DME/DME/IRS~~			

	~~means in oceanic”~~					

~~Table 2 – List of existing Navigation specifications and summary of relative requirements~~

	~~RNAV 10~~	~~RNAV 5~~	~~RNAV 1~~	~~RNP 4~~	~~BASIC RNP 1~~	~~RNP APCH~~
~~Functional requirements – Display~~	~~No~~	~~Yes~~[1]	~~Yes~~[1] +	~~Yes~~[1]	~~Yes~~[1] +	~~Yes~~[1] ~~++~~
~~Navigation Functionalities~~	~~No~~	~~No~~	~~Yes~~[2]	~~Yes~~[2]	~~Yes~~[2]	~~Yes~~[2]
~~Operating procedures~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~	~~Yes~~
~~Flight crew knowledge and training~~	~~Yes~~[3]	~~Yes~~[3]	~~Yes~~[3]	~~Yes~~[3]	~~Yes~~[3]	~~Yes~~[3]
~~Navigation databases~~			~~LOA~~[4]	~~LOA~~[4]	~~LOA~~[4]	~~LOA~~[4]
~~Oversight of operators~~	~~Yes~~[5]	~~Yes~~[5]	~~Yes~~[5]	~~Yes~~[5]	~~Yes~~[5]	~~Yes~~[5]

~~No : No requirement for this item.~~

~~Yes : There are requirements~~

~~1234 or 5: The requirements are similar~~

~~+ or ++ : There are additional requirements for the specific Navigation Specification~~

~~Table 3 Acceptable means of compliance for existing navigation specifications contained in EASA AMC 20~~

~~Area of application~~	~~Navigation accuracy~~	~~Designation of Navigation Standard~~	~~Designation of Navigation Specification~~	~~EASA material~~
~~Oceanic / Remote~~	~~10 NM~~	~~RNP 10~~	~~RNAV 10~~	~~AMC 20-12 "Recognition of FAA order 8400.12a for RNP 10 Operations"~~
	~~4 NM~~	~~RNP 4~~	~~RNP 4~~	~~No document~~
~~En Route Continental~~	~~5 NM~~	~~B-RNAV~~	~~RNAV 5~~	~~AMC 20-4 "Airworthiness Approval and Operational Criteria For the Use of Navigation Systems in European Airspace Designated For Basic RNAV Operations"~~
~~Terminal~~	~~1 NM~~	~~P-RNAV~~ ~~USRNAV type B~~	~~RNAV 1~~	~~AMC 20-16 "Airworthiness and operational approval for Precision RNAV operations in designated European airspace"~~
		~~N/A~~	~~Basic-RNP 1~~	~~No document~~
		~~N/A~~	~~Advanced-RNP 1~~ ~~(provision only)~~	~~No document~~

~~Approach~~	~~0.3 NM~~	~~RNAV (GNSS)~~	~~RNP APCH~~	~~AMC 20-27 "Airworthiness and operational approval for RNP approach (RNP APCH) operations"~~
	~~0.3-0.1 NM~~	~~RNP SAAAR~~	~~RNP AR APCH~~	~~AMC 20-26 "Airworthiness and operational approval for RNP ARapproach (RNP AR APCH) operations"~~

Table 1: Planning minima for the ETOPS en-route alternate aerodrome

Type of a~~A~~pproach ~~Facility~~	**Planning minima**
Precision ~~A~~**a**pproach~~ procedure.~~	**DH/A + 200 ft** **RVR/VIS + 800 m***
Non-**p**~~P~~recision **a**~~A~~pproach or Circling ~~A~~**a**pproach	**MDH/A + 400 ft*** **RVR/VIS + 1 500 m**

**** : VIS: visibility; MDH/A: minimum descent height/altitude***

SPA.ETOPS.115 ETOPS en-route alternate aerodrome planning minima