European Union Aviation Safety Agency

Explanatory Note to Decision 2022/012/R

All-weather operations

AMC & GM TO AIR OPERATIONS RULES

RELATED NPA/CRD 2018-06 (A) AND (C), NPA/CRD 2019-09, NPA/CRD 2020-02
RELATED OPINION NO 02/2021 — RMT.0379

EXECUTIVE SUMMARY

The objective of this Decision is to facilitate the implementation of the new requirements introduced into Regulation (EU) No 965/2012 (the 'Air OPS Regulation') related to all-weather operations (AWOs) by Commission Implementing Regulation (EU) 2021/2237 (the 'AWO Regulation').

The AWO Regulation, which will apply from 30 October 2022, includes elements from two different areas: all-weather operations and operator flight crew training.

The AWO Regulation introduced a performance-based, 'technology-neutral' approach to the regulation of AWOs, which aims at facilitating a better integration and use of new, advanced technology as well as new operational procedures to support AWOs and at ensuring the availability of aerodrome infrastructure, information, and procedures to support AWOs.

Domain:	New technologies and concepts		
Related rules:	AMC and GM to Annexes I-VIII to the Air OPS Regulation		
Affected stakeholders:	Competent authorities, aircraft operators, and pilots		
Driver:	Safety	**Rulemaking group:**	Yes
Impact assessment:	Yes	**Rulemaking Procedure:**	Standard

EASA rulemaking procedure milestones

Start Terms of Reference	**NPA consultation**	**Proposal to the Commission** Opinion	**Adoption by Commission** Implementing Rules	**Decision** Acceptable Means of Compliance and Guidance Material
9.12.2015	13.7.2018 13.9.2019 7.2.2020	27.5.2021	15.12.2021	30.6.2022

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1. About this Decision

The European Union Aviation Safety Agency (EASA) developed Decision 2022/012/R in line with Regulation (EU) 2018/1139[1] (the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the European Plan for Aviation Safety (EPAS) for 2022-2026 Volume II[3] under rulemaking task (RMT).0379. The scope and timescales of the task were defined in the related ToR for RMT.0379.

EASA developed the *draft* text of this Decision and published it for consultation through the following NPAs: NPA 2018-06 (A), NPA 2018-06 (C), NPA 2019-09, and NPA 2020-02. For further information on the NPAs published, on the comments received, and the methodology employed for their revision, please refer to Section 1.1 of Opinion No 02/2021[4].

The comments received and EASA's responses to them are presented in the following Comment-Response Documents (CRDs):

— CRD 2018-06 (A)

— CRD 2018-06 (C)

— CRD 2019-09

— CRD 2020-02

Based on the input from the consultation, EASA published Opinion No 02/2021 on 27 May 2021. The Opinion was addressed to the European Commission, which adopted the AWO Regulation[5] based on the Opinion.

EASA developed the *final* text of this Decision based on the input received during the consultation of the NPAs and well as during the adoption procedure for the AWO Regulation, and published the Decision on the Official Publication[6] of EASA.

The major milestones of the RMT are presented on the cover page.

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1 Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1535612134845&uri=CELEX:32018R1139).

2 EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 01-2022 of 2 May 2022 on the procedure to be applied by EASA for the issuing of opinions, certification specifications and other detailed specifications, acceptable means of compliance and guidance material ('Rulemaking Procedure'), and repealing Management Board Decision No 18-2015 (https://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-no-01-2022-rulemaking-procedure-repealing-mb).

3 https://www.easa.europa.eu/downloads/134919/en

4 https://www.easa.europa.eu/downloads/128172/en

5 Commission Implementing Regulation (EU) 2021/2237 of 15 December 2021 amending Regulation (EU) No 965/2012 as regards the requirements for all-weather operations and for flight crew training and checking (OJ L 450, 16.12.2021, p 21) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R2237&qid=1656082047773).

6 https://www.easa.europa.eu/official-publication

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2. In summary — why and what

2.1. Why we need to amend the AMC and GM — issue/rationale

The main objective of this Decision is to support the implementation of the new AWO provisions introduced by the AWO Regulation). More details on the amendments introduced by the AWO Regulation can be found in Section 2.1. of EASA Opinion No 02/2021.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation. This Decision will contribute to achieving the overall objectives by addressing the issues described in Section 2.1.

More details on the specific objectives of this Decision can be found in Section 2.2 *AWOs — what we want to achieve — objectives* of EASA Opinion No 02/2021.

2.3. How we want to achieve it — general

Detailed explanations on the amendments introduced by the AWO Regulation were included in Sections 2.3 *AWOs — how we want to achieve it — overview of the proposals* and 2.4 *How we want to achieve it — overview of the proposals* of EASA Opinion No 02/2021. These explanations are relevant to understand the amendments introduced by this Decision.

2.3.1 New terms in GM to Annex I (Definitions)

Most of the definitions related to aircraft systems used for operations with operational credits have been removed from Annex I to Air OPS Regulation[7] and now appear in GM to Annex I. This is because the new performance-based implementing rules do not refer to specific technologies, only to the level of performance required of the system.

GM31 to Annex I: Definition of terms related to AWOs

The new GM31 to Annex I contains the definitions of the following terms relating to low-visibility operations (LVOs) and operations with operational credits used in the AMC and GM:

'Advanced aircraft' and 'basic aircraft': both definitions have been transposed from ICAO Annex 6 Part I Amendment 47, Part II Amendment 40, and Part III Amendment 24.

'AFM or additional data from the TC/STC holder': the definition has been introduced to support the suitability assessment for LVOs. In regard to the wording 'equivalence between different aircraft models (types)', the intention is to highlight those statements of similarity that indicate equivalence of behaviour between different aircraft models to be used in assessing previous operational data between aircraft models. This is also applicable to desktop assessment or operational demonstration.

[7] Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0965&qid=1655718930469).

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'EFVS-Approach (EFVS-A)': this definition is the same as the one in CS-AWO and describes an EFVS that can be certified for operations using EFVS but not for use below 100 ft above the threshold without natural visual reference, i.e. not suitable for EFVS to touchdown.

'EFVS-Landing (EFVS-L)': this definition is the same as the one in CS-AWO and describes an EFVS that can be certified for EFVS operations to touchdown. A landing system using EFVS will have additional functionality compared to an approach system using EFVS.

'Head-up display (HUD) or equivalent display system': this definition has been moved from the implementing rules and amended. It is now the same as the definition in CS-AWO and considers the possibility that future technological developments may result in systems that achieve the same performance as a HUD without meeting the previous definition. One example of such a system could be a head-mounted device.

'Landing system': the definition has been transposed from CS-AWO, with point (a) transposed from AMC AWO.A.ALS.101(a) and point (b) transposed from CS AWO.A.EFVS.102. The landing system is affected by the slope of the TDZ. The slope and tolerance of the TDZ is defined in CS ADR-DSN.B.060 point (c).

'CS ADR-DSN.B.060 Longitudinal slopes of runways

[…]

(c) Along no portion of a runway should the longitudinal slope exceed:

(1) 1.25 % where the code number is 4, except that for the first and last quarter of the length of the runway where the longitudinal slope should not exceed 0.8 %;

(2) 1.5 % where the code number is 3, except that for the first and last quarter of the length of a precision approach runway Category II or III where the longitudinal slope should not exceed 0.8 %; and

(3) 2 % where the code number is 1 or 2.'

The ICAO definition of 'Performance-based aerodrome operating minima (PBAOM)' in Annex 6 has not been transposed into the Air OPS Regulation. PBAOM is an ICAO concept which means lower aerodrome operating minima for a given take-off, approach or landing operation, than is available when using a basic aircraft. The PBAOM is derived by considering the combined capabilities of the aircraft and available ground facilities.

The definition of 'landing system assessment area' considered the CS-ADR-DSN definitions and CS-AWO. According to CS-AWO, the 'touchdown zone' is a fixed distance of 900 metres, while according to CS-ADR-DSN (CS-ADR-DSN.L.545), the length of the touchdown zone (TDZ) is variable. These variations are related to the runway markings according to Figure L-4. For a runway length of 2 400 metres or more, the aiming point and TDZ markings are illustrated in the mentioned Figure L-4 and it should be 900 metres.

'Satellite-based augmentation system (SBAS)' This definition is a transposition from ICAO Annex 10 Aeronautical Telecommunications.

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GM32 to Annex I: EFVSs — differences with enhanced vision systems (EVSs)

This GM contains some content transferred from GM1 SPA.LVO.100(f) and has been further developed to explain the distinction between EVS and EFVS, especially since the AWO Regulation introduced a new definition of EVS, and to provide guidance for the use of EVS, for which there are no requirements in the Air OPS Regulation.

The GM details the technologies that are currently available for EVS sensors. These are not included in the definition as future technological developments could result in the use of other technologies. The GM also includes a limited explanation of the functionality required for an EFVS, based on CS-AWO, and some information about the limitations of such systems. To a certain extent, it is based on information published by the Federal Aviation Administration (FAA)[8].

The GM also clarifies that an EVS may not be used for operations with operational credits unless it is certified as an EFVS.

GM33 to Annex I: instrument approach operations

This new GM clarifies the criteria for an operation to be considered a 3D approach operation. It reflects the notes to the definitions of 'instrument approach operations' and 'instrument approach procedures' in ICAO Annex 6.

ICAO Annex 6 uses the term 'advisory VNAV'. The experts consulted during the development of this Decision considered this terminology unhelpful since it is not defined. The need for cross-checking or for alternate sources of information to use vertical guidance will depend on the technology and equipment in use, and operators should decide themselves on the need for this based on the aircraft flight manual (AFM) and other considerations.

The GM emphasises the importance of compliance with specified minimum altitudes/heights during the approach, as obstacle clearance is based on the assumption that such restrictions will be respected and clarifies that continuous descent final approaches (CDFAs) where the vertical path is calculated by the pilot are not considered to be 3D approach operations (see ICAO Doc 8168 (PANS-OPS) Vol 1 Part I Section 4, Chapter 1.7.2.2).

GM34 to Annex I: decision altitude or decision height

This GM has been added to clarify the relationship between DA and DH. It also expands on the use of DH based on the use of a radio altimeter.

GM35 to Annex I: Minimum descent altitude (MDA) or minimum descent height (MDH)

This new GM reproduces the notes to the definitions of 'minimum descent altitude (MDA) or minimum descent height (MDH)' in ICAO Annex 6.

2.3.2 AMC & GM to Annex II 'Authority requirements for air operations' (Part-ARO)

GM4 ARO.OPS.200 'SPA.PinS-VFR approval procedure'

This GM has been introduced pending an amendment to Appendix II to Part-ARO (EASA Form 139).

8 FAA Advisory Circular 90-106A: 'Enhanced Flight Vision Systems'.

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2.3.3 AMC & GM to Annex III 'Organisation requirements for air operations' (Part-ORO)

GM1 ORO.GEN.130(b) 'Changes requiring prior approval'

In *GM1 ORO.GEN.130(b) 'Changes requiring prior approval',* the method used to establish aerodrome operating minima, which will need to be approved in accordance with the revised CAT.OP.MPA.110, is added to the non-exhaustive list of changes requiring prior approval.

AMC3 ORO.GEN.160 'Reportable events of LVOs'

This AMC has been developed considering the following principles:

(a) Not all unsuccessful landings need to be reported.

(b) Unsuccessful approaches may be consulted with the manufacturer:

(1) unless such deviations can be explained. In such case, the operator needs to determine whether the issue should be reported;

(2) if the aircraft did not behave as expected; in terms of safety, this information should be provided to other users.

AMC1 ORO.DEC.100(a);(d) 'Relevant information prior to commencing operation, and notification of changes to declaration — EFVS 200 operations'

It should be noted that other time frames apply to certain changes of the organisation. See, for example, AMC1 ORO.GEN.130 for the application for the amendment of the AOC (30 days).

Given that ARO.GEN.345 requires the authority to check the compliance of the declaration, and as EFVS 200 is a new operational concept involving operations below obstacle clearance heights under IMC, documentation should be reviewed before the start of operations.

GM1 ORO.DEC.100(a);(d) 'Relevant information prior to commencing operation, and notification of changes to declaration — EFVS 200 operations'

This GM focuses on information that should be provided to the competent authority prior to commencing EFVS 200 operations. Points (b)(2) to (b)(5) of the GM refer to NCC.OP.235 point (a)(8), AMC1 NCC.OP.235(a)(4), NCC.OP.235 point (a)(3) and NCC.OP.235 point (a)(5) respectively.

2.4. How we want to achieve it — detailed explanation for aeroplanes

2.4.1 AMC & GM to Annex IV 'Commercial air transport operations' (Part-CAT)

GM1 CAT.OP.MPA.101(b) 'Altimeter setting procedures'

GM1 CAT.OP.MPA.101(b) 'Altimeter setting procedures' provides technical operational instructions referring to the applicable ICAO material (ICAO Doc 8168 (PANS-OPS), Volume I).

AMC and GM to CAT.OP.MPA.110 — Aerodrome operating minima

The amendments to the AMC and GM to CAT.OP.MPA.110 on aerodrome operating minima address common elements and include provisions for standard take-off and standard approach operations for which no specific approval is required. Operations which require a specific approval — LVOs as well as operations with operational credits — are addressed in the AMC to SPA.LVO.105. In addition, consistency between the AMC and GM to CAT.OP.MPA.110 and SPA.LVO.105 is ensured.

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All the table references have been updated in the AMC and GM to CAT.OP.MPA.110.

AMC1 CAT.OP.MPA.110 'Take-off operations – aeroplanes' has been amended to remove the take-off minima for LVTO; these are now in Part-SPA; the references to converted meteorological visibility (CMV) have been removed as these duplicated the provision in AMC9 CAT.OP.MPA.110 (i.e. that CMV is not to be used for take-off). Some editorial changes have been made.

AMC3 CAT.OP.MPA.110 'NPA, APV, CAT I operations' has a new title: '*Determination of DH/MDH for instrument approach operations — aeroplanes'*. The new title reflects the new terminology for approach operations. The reference to 'the minimum height to which the approach aid can be used without the required visual reference' has been removed as this is superfluous since system minima are specified in the tables. The explanations of the abbreviations for different facilities in the system minima table have been deleted as these are already presented in GM1 to Annex I. An additional provision has been added to take account of the possibility to conduct instrument approach operations on non-instrument runways, or to conduct 3D operations on non-precision runways. Table 5 shows the applicable runway type minima; the lowest DH to be used will be the higher of the minima for the approach type or for the runway; the lowest DH to be used on a non-precision runway will be 250 ft and the lowest DH for a non-instrument runway will be the same as the lowest circling minima for the aeroplane category. An additional provision is added in point (c) to ensure that the DA/H or MDA/H is corrected for low temperatures in accordance with ICAO PANS-OPS. Guidance on the correction to be applied is provided in the new GM8 CAT.OP.MPA.110.

The notes containing the spelled-out abbreviations have been removed throughout the revised AMC and GM where these are duplicated in Annex I.

AMC5 CAT.OP.MPA.110 'Determination of RVR or VIS for instrument approach operations — aeroplanes': this fully revised AMC combines and amends the content of the former AMC4 CAT.OP.MPA.110 'Criteria for establishing RVR/CMV' and AMC5 CAT.OP.MPA.110 'Determination of RVR/CMV/VIS minima for NPA, APV, CAT I — aeroplanes'. Parts of the old content of AMC4 and AMC5 have been moved to GM level.

Stakeholder feedback indicated that the former AMC was not easy to interpret. To simplify the presentation, the description of how the values of RVR are determined is provided in the tables. The formula from which these values are derived has been moved to the new GM4 CAT.OP.MPA.110, and the presentation of the tables has been changed to remove the maximum and minimum values and to adopt the new terminology for approach operations (2D or 3D).

The description of how the missed approach should be flown following a CDFA has been removed from this AMC (this appears in AMC1 CAT.OP.MPA.115).

The new AMC5 now provides for the applicable RVR to be determined depending on the type of runway used, i.e. where a precision approach is flown to a non-precision runway or an instrument approach to a non-instrument runway. The lowest applicable RVR may be limited by either the type of runway, the DH/MDH and the class of lighting or the ground facilities and the type of approach, so the AMC specifies that the RVR to be used should be not less than the greatest of these three as determined by the applicable tables.

An upper cut-off value of 1 500 m RVR (category A, B) and 2 400 m RVR (category C, D) is applied. Bearing in mind the definition of RVR, an 'RVR' requirement was not meaningful where the value was

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likely to be longer than a typical runway and that no additional safety benefit is achieved by requiring higher values of CMV in order to continue an approach.

Point (a)(6) of the former AMC5 has not been transposed into the new provisions. In situations where this would be needed, the operator could apply for an AltMoC.

The provision for lower values of RVR to be applied for autoland operations and use of HUDLS have been removed as these are not relevant to Part-CAT; the criteria for LVOs and operations with operational credits now appear in Part-SPA.

The former AMC4 CAT.OP.MPA.110 contained a provision for approaches where the final approach fix is not defined or where the missed approach point is defined by timing; this has been deleted. In the new AMC5 CAT.OP.MPA.110, if such approaches are flown using the CDFA technique, then the normal minima may be applied; if they are flown non-CDFA (with the appropriate approval), then the increment for non-CDFAs applies (see point (c) of the new AMC5 CAT.OP.MPA.110). Note that such operations (non-CDFA) would require an approval in accordance with the amended CAT.OP.MPA.115(b).

AMC7 CAT.OP.MPA.110 'Circling operations — aeroplanes' differs slightly from the former AMC related to circling operations. The main difference is in the determination of the minimum visibility for circling operations; the minimum RVR for the preceding approach procedure is now removed, as this will always be less than the visibility prescribed for circling.

AMC10 CAT.OP.MPA.110 'Conversion of reported meteorological visibility (CMV)' has a new title *'Conversion of visibility to CMV – aeroplanes'* and has been amended to clarify the circumstances in which CMV can be substituted for RVR or VIS. References to CMV have been removed elsewhere as these could have led to an interpretation that pilots or operators could select the most favourable of CMV or RVR. For flight planning purposes, the forecast visibility should not be factored to allow dispatch to a destination (or use of an alternate) where the forecast visibility was below the minimum required RVR or visibility for an approach. Although there was extensive discussion about the scientific basis for the conversion factors presented in Table 16, these factors were retained for the purpose of continuation of an approach as there was no evidence of any resulting safety issue. CMV is used to satisfy operating minima, not to determine operating minima and the wording has been amended accordingly.

AMC11 CAT.OP.MPA.110 'Effect on landing minima of temporarily failed or downgraded ground equipment'. Some stakeholders reported that the restrictions on night operations with runway lighting inoperative were unclear and could be unduly restrictive in the case where some elements of a lighting group were inoperative (just a limited number of lights).

With regard to the downgraded equipment for EFVS operation, EASA has introduced a harmonised approach with the FAA and therefore the downgraded equipment depends primarily on the instrument approach procedure flown in the instrument segment.

Stakeholders requested to clarify when the lighting group is considered operative and when not. EASA decided to not clarify it at the level of the Regulation for the following reasons:

(a) It is for the aerodrome operator to decide whether a light system or part of a system is to be considered serviceable. The tables for downgraded equipment contained in the Regulation

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should be sufficient for this decision, based on the information received by NOTAM or other sources.

(b) It is difficult for an aircraft operator to get information at the level of detail required in the table below.

However, the table is provided here in order to help stakeholders in the understanding of the tables related to 'downgraded equipment' located in the several parts of the Air OPS Regulation (e.g. Part-CAT, Part-SPA).

Minimum serviceability for a lighting group to be considered operative

Lighting group	Minimum specification to be considered operative
Runway edge lights	— Minimum runway edge light spacing for an instrument runway is a maximum of 60 m. — Minimum runway edge light spacing for a non-instrument runway is 100 m. — Lights should be uniformly spaced in rows; however, at intersections to runways or due to temporary unserviceability, lights may be spaced irregularly or omitted, provided that adequate guidance remains available to the pilot.
Runway threshold lights	— A minimum of six threshold lights is required for a non-instrument runway. — On a precision approach runway CAT I, at least the number of lights that would be required if the lights were uniformly spaced at intervals of 3 m between the rows of runway edge lights, is required. — On a non-instrument or non-precision approach runway which has a displaced threshold, the runway threshold lights may be replaced by runway wing bar lights.
Runway wing bar lights	— Each wing bar should be formed by at least five lights extending at least 10 m outward from the runway edge lights.
Runway end lights	— A minimum of six runway end lights is required.
Runway centre line lights	— Minimum runway centre line light spacing is as a minimum 15 m

In *GM2 CAT.OP.MPA.110 'Approach lighting systems — ICAO, FAA',* the high-intensity approach lighting system (HIALS) value for CAT I lighting system provided by ICAO has been corrected. In addition, the abbreviations, which can be found in GM2 Annex I 'Definitions | Abbreviations and acronyms', have been removed.

GM3 CAT.OP.MPA.110 'SBAS operations' has been amended to reflect the new terminology for space-based navigation systems in ICAO.

The new *GM4 CAT.OP.MPA.110 'Means to determine the required RVR based on DH and lighting facilities'* has been added. Its content originates from the former AMC5 CAT.OP.MPA.110 'Determination of RVR/CMV/VIS minima for NPA, APV, CAT I — aeroplanes'.

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The new *GM5 CAT.OP.MPA.110 'Use of DH for NPAs flown using the CDFA technique'* has been added. This clarifies that it is not usually necessary to add an increment to the MDA/H for an NPA procedure to derive a DA/H for a CDFA operation. In some circumstances (e.g. descent path steeper than 3.5 degrees), the operator may need to make a specific safety assessment.

GM6 CAT.OP.MPA.110 'Increments specified by the competent authority' is the former GM1 CAT.OP.MPA.110(a) and has been modified to include the approaches flown without the use of CDFA among those operations to which the competent authority may specify additional increments to the published minima.

The new *GM7 CAT.OP.MPA.110 'Use of commercially available information'* has been added to clarify the operator's responsibility for determination of aerodrome operating minima.

The new *GM8 CAT.OP.MPA.110 'Low temperature correction'* provides guidance to support operators, further to point (c) of AMC3 CAT.OP.MPA.110, in applying a temperature correction when altimeters can be expected to over-read due to low ambient temperatures. The table originates from ICAO Doc 8168 (PANS-OPS) Chapter 4 (altimeter corrections).

The new *GM1 CAT.OP.MPA.110(b)(6) 'Visual and non-visual aids and infrastructure'* has been introduced to clarify the intention of the requirement in CAT.OP.MPA.110(b)(5).

AMC and GM to CAT.OP.MPA.115 'Approach flight technique — aeroplanes'

AMC1 CAT.OP.MPA.115 'Continuous descent final approach (CDFA)', containing information about SAp and CDFA, has been fully replaced with new text containing criteria applicable to CDFA. Only a part of the provisions of the former AMC1 relating to CDFA has been retained; the wording has been changed to make it clear that certain provisions are only applicable to multi-pilot operations. The listing of the types of approach suitable for CDFA has been removed. The provision that the operator should use an 'add-on' to the published minima when using CDFA (see GM5 CAT.OP.MPA.110 for an explanation) has been also removed. The provision describing the missed approach (point (g)) has been amended to clarify that the need to route via the MAPt does not apply in the case of a balked landing when the missed approach is initiated after passing the MAPt.

The title of *AMC2 CAT.OP.MPA.115 'NPA operations without applying the CDFA technique'* has been changed to *'Approach operational using NPA procedures flown with a flight technique other than the CDFA'.* Besides this, only a few editorial changes have been made.

The text of *AMC3 CAT.OP.MPA.115 'Operational procedures and instructions and training'* provides criteria for operational procedures and instructions and training. The whole AMC text has been simplified to avoid duplication of provisions in AMC2 CAT.OP.MPA.115 or elsewhere in Part-CAT (e.g. rate of descent and visual reference). Whereas it may have been necessary to provide detailed AMC for CDFA training when it was first introduced, CDFA is now a normal part of initial and recurrent pilot training and operators need to ensure that their training programmes reflect their operational requirements.

The new *AMC1 CAT.OP.MPA.115(a) 'SAp operations — aeroplanes'* describes the means to comply with the definition of a stabilised approach (SAp) operation for all approach procedures and aircraft types. As the entire approach operation should be 'stabilised', the AMC introduces the new term 'stabilised for landing' to clarify the conditions that should be achieved before reaching the runway threshold in order to mitigate the risk of excess energy on landing (and possible consequence of

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runway overrun). The provision to be 'stabilised for landing' by either 1 000 ft or 500 ft above runway threshold elevation, depending on whether the pilot has visual reference with the ground, has been retained from the former text of AMC1 CAT.OP.MPA.115 point (b). The criteria for being 'stabilised for landing' do not include being on the extended runway centre line as this may not be the case for all approaches, particularly for circling approach operations or offset approaches from the runway centre line. In the new provisions, the aircraft should be tracking with an acceptable tolerance of the required lateral and vertical path. The maximum acceptable rate of descent (i.e. 1 000 fpm) has been moved to GM as it is not applicable to all types of aircraft and operation.

There is a provision to allow a later stabilisation if a higher approach speed is needed for operational reasons. In order to ensure that such operational reasons are considered by the operator and subject to an appropriate risk assessment in accordance with ORO.GEN.200(a)(3) rather than being left to the discretion of the commander, the reasons should be specified in the operations manual (OM) (see points (f) and (g)); similarly, the operator needs to specify in the OM the acceptable tolerances for energy and path control and the point on the approach from which the SAp criteria should apply.

This ensures that the criteria can be applied to different aircraft types and different types of operation and that the commander has clear criteria to determine whether the aircraft is stabilised for landing.

The new *GM1 CAT.OP.MPA.115(a) 'Acceptable tolerances for stabilised approach operations'* clarifies that being aligned with the runway is not one of the criteria to determine whether the aircraft is stabilised for landing.

The former AMC1 CAT.OP.MPA.115 referred to air traffic control (ATC) speed restriction as a reason to use a higher-than-normal approach speed below 1 000 ft. This has been moved into GM1 CAT.OP.MPA.115(a) to emphasise that each operator must establish the circumstances when a higher approach speed would be acceptable. As these circumstances must be included in the OM, they will be subject to the operator's risk assessment processes (required by ORO.GEN.200(a)(3)) and to the oversight of the competent authority.

The specific maximum rate of descent that should be acceptable for an SAp (i.e. 1 000 fpm) has been moved from AMC to GM as it is not applicable to all types of operation. A category D aircraft flying a steeper-than-normal approach might have a rate of descent higher than 1 000 fpm while still being stabilised; conversely, a category A aircraft on a three-degree slope would not be stabilised with a rate of descent of 1 000 fpm.

The former GM1 CAT.OP.MPA.115 has been renamed *GM1 CAT.OP.MPA.115(b) 'Continuous descent final approach (CDFA)'.* Changes for consistency with the rest of the text have been made. In the context of straight-in approaches using CDFA, MDA/H is not used.

AMC and GM to CAT.OP.MPA.305 'Commencement and continuation of approach'

The new *GM1 CAT.OP.MPA.305 'Application of RVR or VIS reports'* has been introduced.

Point (a) clarifies that there is no prohibition on the commencement of an approach based on reported visibility and that in the event that there is no report of RVR or VIS, then there is no restriction on the continuation of the approach. This is considered a useful addition following the deletion of former point (a) of CAT.OP.MPA.305, which stated that a pilot may commence an approach regardless of the reported RVR or visibility. It is considered not appropriate to maintain this text in the rule, since pilots do not require a specific enabling rule to transition from one phase of flight to the next.

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Point (b) has been also transferred from the implementing rule level (former point (d) of CAT.OP.MPA.305). It is considered that this provides useful clarification of the action to be taken in the event of a deterioration in visibility when an aircraft has already descended below 1 000 ft or into the FAS. Moreover, this is an alignment with the FAA - AC 120-28D requirements (paragraph 6.2.7), according to which 'operations based on an Alert Height (AH) may continue to the AH and then land, if weather is reported to be at or above minima before passing the AH, or if suitable visual reference has been established by the pilot. Operations based on an AH may continue to land regardless of reported weather conditions if equipped with a fail operational rollout system which did not indicate a malfunction prior to passing alert height, and the pilot considers continuation a safe course of action.'.

However, one element that should be highlighted is that in Europe firefighting services do not guarantee the required services in visibility less than 75 m.

According to AMC1 CAT.OP.MPA.305(a), only the touchdown RVR is controlling (see below). Point (e) of GM1 CAT.OP.MPA.305 clarifies that the midpoint and stop-end RVRs may nonetheless be useful to the pilot, and provides a reference to AMC1 SPA.LVO.100(a). This information could be useful to operators that determine that there could be an operational or safety benefit from imposing their own limits on minimum or stop-end RVR.

The new *AMC1 CAT.OP.MPA.305(a) 'Minimum RVR for continuation of approach — aeroplanes'* simplifies the criteria for the 'controlling' RVR. The objectives of the 'approach ban' are to prevent the situation where a pilot arrives at a DH with insufficient visibility to adequately control the aircraft for landing and to reduce the rate of missed approaches from DH. The RVR relevant to the approach ban should therefore be the TDZ. Where this is not available, the midpoint (MID) may be used as this is the value most likely to be representative of the TDZ. Amending this provision has the benefit of simplifying a previously complex text, the result of which will be its clear understanding and, consequently, a consistent application. The provision to allow for substitution of CMV for RVR now appears in AMC10 CAT.OP.MPA.110 and was therefore redundant here and has been removed.

AMC1 CAT.OP.MPA.305(c) 'Visual references for instrument approach operations' has been based on the former AMC1 CAT.OP.MPA.305(e). The visual reference requirements at DH are unchanged, but the provisions relating to low-visibility approach operations requiring a specific approval have been moved to the AMC & GM to Part-SPA.

AMC and GM to CAT.OP.MPA.312 and to NCC.OP.235 'EFVS 200 operations'

GM1 CAT.OP.MPA.312 and *GM1 NCC.OP.235 'EFVS operations'* provide a logical description of the different elements of the system that the operator needs to put in place, and which are described in different AMC.

AMC1 CAT.OP.MPA.312(a)(1) and *AMC1 NCC.OP.235(a)(1) 'Equipment certification'* describe the equipment needed for EFVS 200 operations. Under CS-AWO Issue 2, EFVSs are certified as either EFVS-Approach (EFVS-A) or EFVS-Landing (EFVS-L). Either system will be suitable for EFVS 200 operations as the pilot will not be relying on EFVS below a height of 200 ft (natural visual reference is required below 200 ft).

AMC1 CAT.OP.MPA.312(c) 'EFVS 200 with EVSs meeting the minimum criteria' and *AMC1 NCC.OP.235(c) 'EVFS 200 with legacy systems under an approval'* complement the above. Many existing systems or systems certified under the previous requirements are neither EFVS-A nor EFVS-L.

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Some will remain suitable for EFVS 200 operations. These AMC confirm that systems approved for 'EVS with an operational credit' under previous requirements will be acceptable for EFVS 200.

AMC1 CAT.OP.MPA.312(a)(2) and AMC1 NCC.OP.235(a)(2) 'Aerodromes and instrument procedures suitable for EFVS 200 operations': the responsibility for determining the suitability of aerodromes and approach procedures for EFVS 200 operations will rest with the aircraft operator, so these AMC describe the provisions for aerodromes and approach procedures to be used for EFVS 200 operations. To ensure that the pilot will have path information from the EFVS image and from internal cues, the decision is that EFVS 200 operations should only be available for 3D operations.

The EFVS will include path information (e.g. a flight path vector). For this flight path information to correlate with the EFVS or natural visual image, the decision is that EFVS 200 operations should only be flown where the final approach track is aligned with the runway centre line (+/- 3 degrees). This will ensure that the pilot can 'place' the flight path vector over the runway threshold when flying the approach. Further explanation is provided in GM1 CAT.OP.MPA.312(b) and in GM1 NCC.OP.235(b).

AMC2 CAT.OP.MPA.312(a)(2) and AMC2 NCC.OP.235(a)(2) 'Verification of the suitability of runways for EFVS 200 operations' explain the steps that an operator could take to establish whether a runway is suitable for EFVS 200 operations. If the runway has been promulgated as suitable by the State of the aerodrome (i.e. in the aeronautical information publication (AIP)), then no further investigation is needed. It has been assumed that, at least in the short term, there will be a few runways so promulgated. Recommendations are therefore provided to describe how an operator could ensure that obstacle clearance would be maintained during the 'visual' part of the approach, bearing in mind that the pilot may be relying on the enhanced image rather than natural vision and that visual avoidance of obstacles may not be practical.

Points (b)(1) of *AMC2 CAT.OP.MPA.312(a)(2) and AMC2 NCC.OP.235(a)(2), '*US Standard for Terminal Instrument Procedures (TERPS)'. For more information, please refer to:

https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1038173.

AMC1 CAT.OP.MPA.312(a)(3) and *AMC1 NCC.OP.235(a)(3) 'Initial training for EFVS 200 operations':* the training for EFVS 200 operations is the same as that for the conduct of EFVS operations requiring an approval in accordance with Annex V (see the amended AMC3 SPA.LVO.120(b)) and are based on former provisions for operations with EVS. This training programme will not need to be approved by the competent authority. It is assumed that most operators will use third-party training providers and that this will be a subcontracted activity in accordance with ORO.GEN.205; nevertheless, the training syllabus will have to appear in the OM (ORO.FC.145(a)).

AMC2 CAT.OP.MPA.312(a)(3) and *AMC2 NCC.OP.235(a)(3) 'Recurrent training and checking for EFVS 200 operations':* the recurrent training and checking provisions for EFVS 200 operations ensure that pilots will need to demonstrate continued competence.

AMC3 CAT.OP.MPA.312(a)(3) and *AMC3 NCC.OP.235(a)(3) 'Recent experience requirements for EFVS 200 operations':* the need for recent experience has also been added to ensure that pilots will complete at least four EFVS approaches annually (two for recency and two during the demonstration of competence). This is based on the former provisions for recurrent training and checking for operations using a HUD. The recent experience and checking provisions are different from the FAA

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requirements. The FAA requires a larger number of EFVS approaches to maintain recency, but no demonstration of competence.

AMC4 CAT.OP.MPA.312(a)(3) and *AMC4 NCC.OP.235(a)(3) 'Differences training for EFVS 200 operations'* focuses on differences training for EFVS 200 operations in the event of a change of equipment or operating procedures.

In terms of recurrent training/checking for EFVS 200 operations, flight crew need to demonstrate proficiency by conducting a minimum of two EFVS 200 approaches at each demonstration of competence.

AMC5 CAT.OP.MPA.312(a)(3) 'Training for EFVS 200 operations' has been introduced to ensure that the monitoring function, which is essential in EFVS operations, is adequately trained.

GM1 CAT.OP.MPA.312(a)(3) and *GM1 NCC.OP.235(a)(3) 'Recurrent checking for EFVS 200 operations'* have been added to highlight the need to vary the scenarios used for this check so that pilots are able to demonstrate proficiency in dealing with different technical failures and weather conditions and, in particular, to practise decision-making.

The provisions for operating procedures for EFVS 200 operations appear in *AMC1 CAT.OP.MPA.312(a)(4)* and *AMC1 NCC.OP.235(a)(4) 'Operating procedures for EFVS 200 operations'*. Many operators will adopt procedures developed by aircraft manufacturers; nevertheless, these procedures will have to be published in each operator's OM. This could be done by including the 'pilot operating handbook' or an equivalent document into the OM in accordance with point (g) of AMC1 ORO.MLR.100. The provisions for operating procedures are closely based on those for EFVS operations requiring a specific approval in the amended AMC2 SPA.LVO.105(c) and AMC7 SPA.LVO.105(c). The crucial difference is that, for EFVS 200 operations, pilots must have natural visual reference by a height of 200 ft above the runway or else execute a go-around. As is the case with AMC7 SPA.LVO.105(c), the visual reference requirements at the DA/H have been transposed from the former AMC1 CAT.OP.MPA.305, but the wording has been amended to be more closely aligned with that of the FAA.

AMC1 CAT.OP.MPA.312(a)(8) and *AMC1 NCC.OP.235(a)(8) 'Aerodrome operating minima — EFVS 200 operations'* detail the operating minima for EFVS 200 operations. EFVSs allow an operational credit to the visual segment of the approach so the DA/H is always unchanged. The credits for RVR or VIS have been transposed from the former provisions for operations with EVS (AMC6 SPA.LVO.100) but with a lower 'cut-off' at 550 m. Operations in RVRs of less than 550 m are 'low-visibility operations' and so will require specific approval in accordance with Annex V.

It is expected that new technologies may offer performance in excess of the credits allowed for EFVS 200. To take advantage of such performance, operators would need to apply for approval for EFVS operations in accordance with Annex V (Part-SPA). The credits allowed for EFVS 200 are intentionally conservative and based on proven standards.

AMC and GM to CAT.POL.230 'Landing – dry runways'

AMC2 CAT.POL.A.230 and *GM1 CAT.POL.A.230* address the landing distance provision for landing operations with EFVS. These provisions follow the existing concept of the automatic landing system applicable for ILS autoland operations. This model is based on increased certification criteria where

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the operative landing distance of the system and the necessary safety margins for operations are certified at type certificate level allowing a direct application of the data.

AMC2 and AMC3 CAT.IDE.A.190 — Flight data recorder

The AMC have been amended to acknowledge the use of GBAS (GLS) operations as a flight data recorder parameters.

2.4.2 AMC & GM to Annex V 'Specific approvals' (Part-SPA)

AMC and GM to SPA.LVO.100 'Low-visibility operations and operations with operational credits'

The former AMC1, AMC3, AMC4, and AMC6 to SPA.LVO.100 have been deleted, and new AMC have been developed, partly using the text of the former rules in Subpart SPA.LVO that was deleted by the AWO Regulation.

AMC and GM provide further details on how standard LVOs and operations with operational credits can be approved.

GM1 SPA.LVO.100 'Documents containing information related to LVOs and operations with operational credits' contains editorial changes.

GM2 SPA.LVO.100 has an amended title *(ILS and GLS classification)* and no longer applies only to ILS. It has been extended to GLS.

The new *AMC1 SPA.LVO.100(a) 'Low-visibility take-off (LVTO) operations — aeroplanes in an RVR of less than 400 m'* transposes the provisions for LVTO down to 125 m from the former AMC1 SPA.LVO.110, and incorporates the provisions for LVTO in multi-engined aeroplanes without the performance to stop or continue a take-off in the event of an engine failure. These have been transposed from AMC1 CAT.OP.MPA.110, as a specific approval is required in Part-SPA. Table 1 is presented in inverted order to ensure clarity for pilots.

To ensure consistency with the provisions for approach operation, the provision for LVPs to be established has been included in *AMC1 SPA.LVO.105(c) Specific approval criteria operating procedures for LVOs*.

Point (c) of AMC1 SPA.LVO.100(a) clarifies that the specified RVR is required for the reporting points on the parts of the runway that will be used for the take-off roll or in the event of a rejected take-off. The intent of the provision is not changed.

The new points (e) to (h) in *AMC1 SPA.LVO.100(a) 'LVTO operations — aeroplanes in an RVR of less than 125 m'* transpose the provisions for LVTO in an RVR of less than 125 m but also allow for the situation where equipment is certified for take-off in specific values of RVR. This is to facilitate the future implementation of new technologies that could have different capabilities.

Note that SPA.LVO.105 and AMC1 SPA.LVO.105(a) detail the equipment for LVTO below 125 m.

The new *GM1 SPA.LVO.100(a) 'Classification of LVTO operations'* has been introduced to clarify that not all LVTOs require a specific approval, only operations below an RVR of 400 m.

In the new *GM2 SPA.LVO.100(a) 'Visual segment for take-off',* the provision to have a 90-m visual segment has been removed from the criteria for LVTO (AMC1 SPA.LVO.100(a)), because this is the intention of requiring an RVR of 125 m, it is not an additional requirement or provision. Additionally, this GM could be useful to operators wishing to implement an alternative means of compliance

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(AltMoC) to AMC2 SPA.LVO.100(a) because the flight deck geometry of their aircraft would allow a 90-m visual segment in different RVR conditions.

The new AMC1 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions — CAT II operations' transposes the provisions for CAT II operations from the former AMC4 SPA.LVO.100 but removes the criteria for other-than-standard category II (OTS CAT II) operations (operations with operational credits are dealt with in separate AMC, see AMC2 SPA.LVO.100(c) for the provisions for SA CAT II). The equipment requirements and operating procedures have been moved to SPA.LVO.105 and the aerodrome requirements to SPA.LVO.110.

The provision for the DH to be not lower than 'the minimum height to which the precision approach (PA) aid can be used without the specified visual reference' has been removed as this is a duplication of the minimum DH for the approach category.

The wording in AMC1 SPA.LVO.120(b) Table 4 'Auto-coupled or HUD to below DH*' and the footnote have been amended after the Opinion was published for the following reasons:

(a) A change to 'CAT II flight director operation' has not been addressed in another RMT;

(b) There are no training requirements in SPA.LVO.120 for CAT II flight director approach;

(c) CAT II operations are restricted by standard OpSpec C060 authorisations to be flown using a HUD, an autopilot coupled to DH, or an autoland system. However, if an operator of aircraft with advanced approach and landing systems desires the option of flying a manual approach using head-down guidance (e.g. flight director (F/D)), non-standard OpSpec language authorising a manual approach using head-down guidance with F/D would be needed, and additional operating restrictions and pilot training may be required.

(d) To consider the criteria established in AC-120-118 3-3:

1.7.2 Promulgation of OCA/H values

1.7.2.1 *Promulgation of OCA/H for Cat I and II approach procedures*

1.7.2.1.1 The OCA or OCH values, as appropriate, shall be promulgated for those categories of aircraft for which the procedure is designed. The values shall be based on the following standard conditions:

a) Cat I flown with pressure altimeter;

b) Cat II flown autocoupled with radio altimeter;

c) standard aircraft dimensions (see 1.1.3, "Standard conditions"); and

d) 2.5 per cent missed approach climb gradient.

1.7.2.1.2 Additional values of OCA/H may be agreed upon between operators and the appropriate authority and be promulgated, provided that modifications have been carried out using the guidelines and algorithms defined in 1.4.8.7, "Adjustment of OAS constants".

(e) PANS-OPS promulgates CAT II OCH assuming that CAT II is flown with auto-coupled autopilot.

(f) The use of HUDLS to touchdown provides equivalent level of safety to that of autoland operation in CAT II.

The new *AMC2 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions — CAT III operations'* transposes the provisions for CAT III operations from the former AMC5 SPA.LVO.100. The equipment requirements and operating procedures have been moved to SPA.LVO.105 and the aerodrome requirements to SPA.LVO.110.

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The subdivisions of category III have been removed. The lowest DH values to be used for particular aircraft installations will be described in the AFM. The reference to the type of roll-out systems used is included to allow determination of the appropriate RVR value based on the pilot's need to be able to control the roll-out (the certification standards are described in CS-AWO). GM2 SPA.LVO.100(b) offers additional information about which systems are needed for certain DHs.

The lowest RVR for a DH between 50 and 100 ft (previously CAT IIIA) will be 175 m (previously 200 m), to be aligned with the new ICAO standard for CAT IIIA. The provision for an RVR of 150 m for aircraft certified as 'super fail-passive' has been removed. 175 m will now be needed for DHs down to 50 ft. It is understood that this provision was applicable to a single aircraft type that is no longer in production. As the equipment of super fail-passive has been demonstrated as suitable for use down to 150 m, operators with such aircraft could consider applying for an AltMoC.

The minimum RVR for DH below 50 is 125 m in the current rules, based on a fail-passive roll-out system; this has been retained, but, based on input from an aircraft manufacturer, a provision has been inserted to allow a minimum RVR of 75 m where this has been demonstrated during the equipment certification process.

The minimum RVR for no DH operations is currently 75 m, based on the assumption that the roll-out system is fail-operational. However, it is possible to get a no DH certification for a fail-passive roll-out system; this is now reflected in a range of RVRs, 75-125 m, which has been added to this AMC and will be subject to the same considerations and approval as described for DHs below 50 ft.

The provision for the DH to be not lower than 'the minimum height to which the precision approach aid can be used without the specified visual reference' has been removed as this is a duplication of the minimum DH for the approach category.

Table 5 and its footnote have been amended for alignment with CS-AWO.

AMC3 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions — effect on CAT II/CAT III landing minima of temporarily failed or downgraded equipment for approach operations with a DH below 200 ft' replaces the former AMC7 SPA.LVO.100. The instructions on when the values in the table should be applied has been moved to GM4 SPA.LVO.100(b). The only change to the table is that the row for 'edge lights, threshold lights and runway end lights' has been replaced with separate rows for each item.

The new *GM1 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions — classification of standard approach operations'* explains the revised categorisation of approach operations and the relationship with the ICAO standard.

The new *GM2 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions— equipment certification for low-visibility approach operations other than EFVS'* rephrases the information available in CS-AWO in simpler terms, for the easy understanding of operational personnel.

GM3 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions — establishment of minimum RVR for approach operations with a DH below 200 ft' (previously GM1 SPA.LVO.100(c),(e)) has been updated with the addition of new text in point (c)(2). This is to clarify that it is not necessary for the visual reference on a 'CAT III with no DH' approach to include a lateral element of the approach lighting system.

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The new *GM4 SPA.LVO.100(b) 'Instrument approach operations in low-visibility conditions — effect on landing minima of temporarily failed or downgraded equipment for approach operations with a DH below 200 ft'* provides more guidance on the use of the table of temporarily failed or downgraded equipment (previously AMC7 SPA.LVO.100 item (a)).

The new *AMC1 SPA.LVO.100(c) 'Operations with operational credits — special authorisation category I (SA CAT I)'* introduces special authorisation category I as an operational credit allowing operation to a DH of 150 ft subject to holding specific approval from the competent authority. SA CAT I has been developed using a cross-domain approach and evaluating all the elements of the 'total system' for approach operations. There are, therefore, specific provisions for airborne equipment (see AMC1 SPA.LVO.105(a)), approach procedures (see AMC1 SPA.LVO.110(a)), and operating procedures (AMC5 SPA.LVO.105(c)). Complementary rules have been developed for the aerodrome and airworthiness domains to ensure that all these elements can be used together to extend the instrument segment of a CAT I approach. SA CAT I will provide a significant operational benefit compared with LTS CAT I as it allows operation to a lower DH as well as reduced RVR. GM2 SPA.LVO.100(c) provides a description of SA CAT I.

The new *AMC2 SPA.LVO.100(c) 'Operations with operational credits — special authorisation category II (SA CAT II)'* introduces SA CAT II as an operational credit. SA CAT II incorporates the previous provision for OTS CAT II but is more closely aligned with the FAA standards. SA CAT II allows a CAT II operation without meeting all the lighting provisions for CAT II and therefore requires increased RVR to mitigate the less detailed visual reference. The RVR provisions for SA CAT II based on the DH are transposed from the former AMC4 SPA.LVO.100 except that there are no increased minima for category D aircraft.

The new *AMC3 SPA.LVO.100(c) 'Operations with operational credits — EFVS operations to a runway'* allows approach EFVS operations, including in low-visibility conditions (RVR less than 550 m), and landing EFVS operations considering them operations with operational credits. Such operations will require the operator to hold a specific approval from the competent authority. ICAO standards require that operational credits are specifically approved by the competent authority, hence this provision is in Part-SPA. The term 'EFVS' is introduced to describe a system that can be used for operational credits as opposed to 'EVS', which refers to a system to be used only for improved situational awareness (see definitions in Annex I).

NOTE: EASA and the Commission decided to allow EFVS operations without specific approval where the equipment is not used below 200 ft and where the RVR is more than 550 m; see CAT.OP.MPA.312 and NCC.OP.235.

CS-AWO Issue 2 allows equipment manufacturers to specify the performance of a particular EFVS in different weather conditions and this information will be presented in the AFM in the form of a table of visibility credits in different weather conditions. To allow operators to take advantage of the performance of the particular EFVS being used, this AMC allows the RVR to be determined in accordance with the demonstrated performance as shown in the AFM. For 'legacy' systems and other systems where the AFM does not include such information, the new Table 11 has been transposed from Table 6 in the former AMC6 SPA.LVO.100.

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If EFVS operations are to be conducted in visibilities of less than 550 m, then such operations would be LVOs. Point (c) ensures that LVOs are conducted only if LVPs are established at the aerodrome of intended landing.

The new *GM1 SPA.LVO.100(c) 'The concept of operations with operational credits'* explains the concept of operations with operational credits, which has been introduced in accordance with ICAO standards.

The new *GM2 SPA.LVO.100(c) 'Operations with operations credits — special authorisation category I (SA CAT I) operations'* explains SA CAT I operations.

The new *GM3 SPA.LVO.100(c) 'Operations with operations credits — special authorisation category II (SA CAT II) operations'* explains SA CAT II operations.

Note: The term 'other than-standard category II (OTS CAT II)' has been removed from SPA.LVO as special authorisation category II (SA CAT II) has been introduced.

The new *GM4 SPA.LVO.100(c) 'Operations with operations credits — EFVS operations'* provides an overview of EFVS operations to collate the requirements for EFVS operations into one place and will help operators to identify where specific elements can be found in AMC and to understand EFVS operations. This replaces GM1 SPA.LVO.100(f) 'Operations utilising EVS'.

The new *GM5 SPA.LVO.100(c) 'Operations with operations credits — combined vision* systems' clarifies that, at the implementing rule level, there is no operational credit in the visual segment for combined vision systems (CVSs) other than that available for EFVSs. A CVS consisting of an EFVS and an SVS could be approved for EFVS operations if it meets all the certification requirements for an EFVS.

It is anticipated that, in the future, synthetic vision guidance systems (SVGSs) and CVSs may be used for LVOs and other operations with operational credits. When such systems are available and certified, then operators could apply for an AltMoC to allow operations with operational credits and EASA could develop additional AMC.

With regard to the *new GM5 SPA.LVO.100(c)*, it should be noted that AMC1 SPA.LVO.105(a) provides that the aircraft needs be certified CAT II in order to fly CAT II instrument approach operations. However, an aircraft can be certified CAT II with flight directors only.

AMC and GM to SPA.LVO.105 'Specific approval criteria'

Following the principle of stating the safety objective and relevant criteria in the implementing rules and providing technical means of meeting those objectives and criteria at AMC level, the following former requirements that were deleted through the AWO Regulation have been moved to AMC level (AMC to SPA.LVO.105):

— SPA.LVO.110 'General operating requirements';

— SPA.LVO.125 'Operating procedures'; and

— SPA.LVO.130 'Minimum equipment'.

The following AMC have been deleted:

— AMC1 SPA.LVO.105 'LVO approval' — Operational demonstration — aeroplanes;

— AMC2 SPA.LVO.105 'LVO approval' — Operational demonstration — helicopters;

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— AMC3 SPA.LVO.105 'LVO approval' — Continuous monitoring — all aircraft;

— AMC4 SPA.LVO.105 'LVO approval' — Transitional periods for CAT II and CAT III operations;

— AMC5 SPA.LVO.105 'LVO approval' — Maintenance of CAT II, CAT III and LVTO equipment; and

— AMC6 SPA.LVO.105 'LVO approval' — Eligible aerodromes and runways.

The content of the former AMC1, AMC2 and AMC3 to SPA.LVO.105 has replaced by the new *AMC2 SPA.LVO.105(g) 'Safety assessment prior to obtaining an approval*'.

The former AMC4 SPA.LVO.105 has been deleted as it is considered that there is no clear safety benefit from imposing an elapsed time limit on the granting of CAT II/III approvals to new operators. It could be argued that the increased probability of go-arounds and diversion resulting from higher operating minima during such a transitional period could result in a lower level of safety. Operators should gather data to carry out a safety assessment prior to obtaining an approval. *GM2 SPA.LVO.05(g)* contains guidance on the extent of operational experience to gather sufficient data.

The former AMC5 SPA.LVO.105 'Maintenance of CAT II, CAT III and LVTO equipment' has been deleted because maintenance of equipment is not an operational matter. Maintenance requirements are stipulated in the applicable airworthiness regulations.

The former AMC6 SPA.LVO.105 'Eligible aerodromes and runways' has been replaced by the new *AMC3 SPA.LVO.110 'Suitable aerodromes — runway and runway environment — navigation facilities — approach operations other than EFVS operations*'.

The former GM1 SPA.LVO.105 'Criteria for a successful CAT II, OTS CAT II, CAT III approach and automatic landing' has been renumbered and given a new title. It is now *GM3 SPA.LVO.105(g) 'Specific approval criteria — successful approach and landing'*. This GM provides operators with supplemental information for a successful approach and automatic landing.

The values in point (c)(4) have been amended from 60 m in the former provisions to 150 m in the new GM3 SPA.LVO.105(g) and from 900 m in the former provisions to 750 m in the new GM3. This change has been based on a study performed by the review group of RMT.0379.

The study made the following assumptions to provide order of magnitudes of 'risk' as per CS-AWO:

— that landing is aiming at 400 m;

— that is taken as the mean value; and

— that standard distribution is 70 m and symmetrical.

With these assumptions, the study computed the probability to land prior to minimum value or beyond the maximum value as follows:

Probability		**Min value (m)**	**Max Value (m)**
0,5		330	470
1,00E-03		183	617
1,00E-04		141	659
1,00E-05		106	694
1,00E-06		71	729

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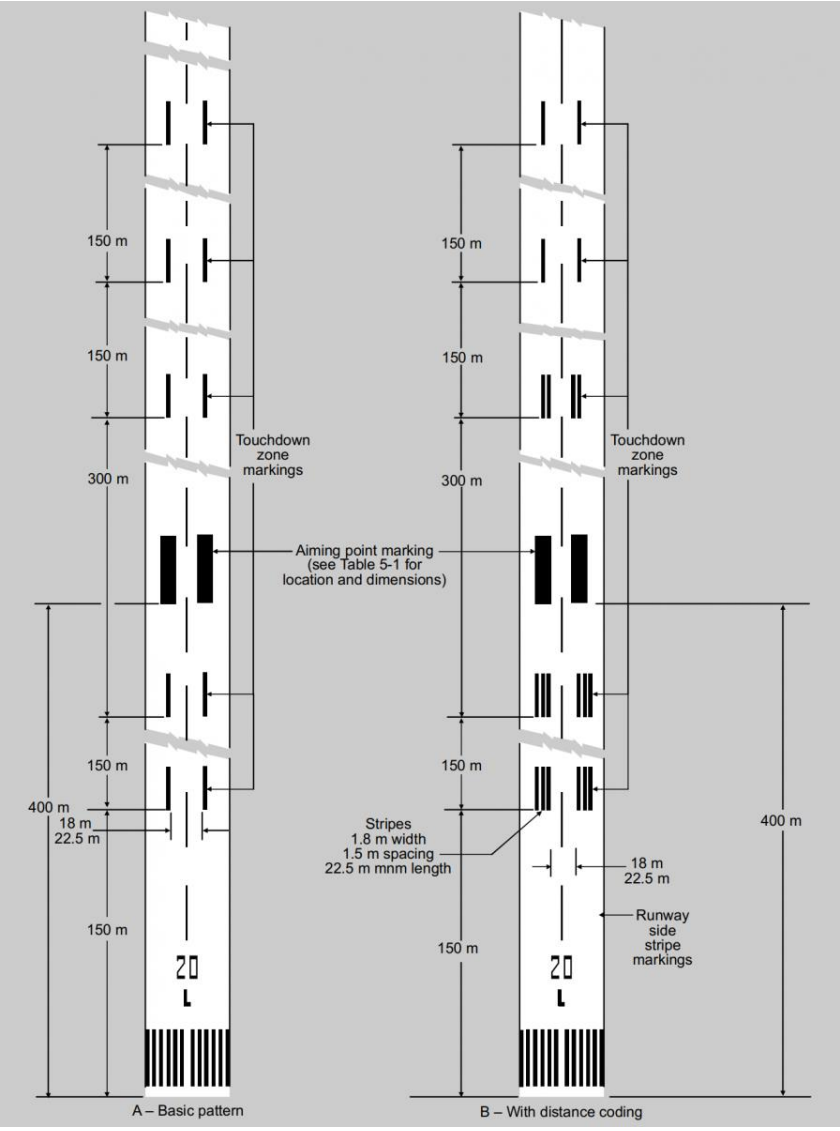
The threshold set as certification criterion is 10-6.



Based on standard marking:

With a range [150 m – 750 m] (within the 2nd mark prior to the aiming point and the 1st mark after the aiming point), we would be in the 1E-4 probability range.

With a range [300 m – 600 m] (within the 1st mark prior to the aiming point and the 1st mark after the aiming point), we would be in the 0.5 probability range.

Therefore, the following are adopted:

(a) A landing within the [300 m – 600 m] range is a perfect landing with margins.

(b) A landing within the [150 m – 300 m] or [600 m – 750 m] range is an acceptable landing.

(c) A landing within the [60 m – 150 m] or [750 m – 900 m] range would be a ‘safe landing’ as per CS-AWO criteria. However, this landing would not be acceptable to verify the suitability of the landing. Additional flights would be required to confirm that the landings are not steadily in this range.

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Therefore, in line operation, a landing within the [60 m – 150 m] or [750 m – 900 m] range would not count as 'successful' and should be counted in the 5 % unsuccessful ones.

The new *AMC1 SPA.LVO.105(a): 'Aircraft certification for the intended operations '* details the equipment needed for certain types of LVOs and operations with operational credits. The provisions have been transposed from the former SPA.LVO.110 with the following differences:

— For LVTO in an RVR of less than 125 m, a system certified for the purpose is stipulated. GM1 SPA.LVO.105(a) provides information about the types of system that could be certified for the purpose;

— A specific certification for SA CAT I operations (aligned with CS-AWO issue 2). Equipment certified for CAT II/III operations will not automatically be certified for SA CAT I as the quality of the ILS/GLS signal to be used may not be the same (this differs from the regulations applicable in some other States, e.g. the USA and Australia);

— SA CAT II operations will need a CAT II certified aircraft (this will supersede OTS CAT II); and

— Details of the specific aircraft systems suitable for CAT II/III operations (e.g. autoland/HUD) have been removed from the AMC as this is determined by the certification of the aircraft and equipment.

The new *GM1 SPA.LVO.105(a) 'Aircraft certification — equipment eligible for LVTO in an RVR less than 125 m':* the new AMC1 SPA.LVO.105(a) specifies that LVTO requires a system certified for the purpose. To provide for the development of new technologies, the AMC does not specify a particular type of system. This GM provides information about technologies certified on current aircraft types.

New *AMC1 SPA.LVO.105(c) 'Operating procedures for LVOs':* these provisions for LVOs have been transposed from the former SPA.LVO.125.

New *AMC2 SPA.LVO.105(c) 'Operating procedures — general':* these provisions on operating procedures have been transposed from the former AMC1 SPA.LVO.125. The content of the AMC has been reworded and reordered to aid understanding. References to specific types of operation and technologies (e.g. ILS) have been removed to ensure that the provisions are applicable to all types of LVOs and operations with operational credits, including the use of technologies that may not be available at the time of writing.

An additional provision has been added that procedures should deviate to the minimum extent practicable from normal procedures used for routine operations as this is a useful mechanism to reduce the probability of errors. This is a policy that is already widely adopted for LVOs.

New *AMC3 SPA.LVO.105(c) 'Operating procedures — CAT II':* these provisions for CAT II operations have been transposed from the former SPA.LVO.110 and the former AMC4 SPA.LVO.100. The visual reference requirements have been transposed from AMC1 CAT.OP.MPA.305 as they are only applicable to operations requiring a specific approval.

The former AMC4 SPA.LVO.100 stated that the minima for CAT II are contingent on operation 'auto-coupled or approved HUDLS' down to 80 % of the DH. The intention of this provision was to ensure that, in limiting conditions, the HUDLS/autopilot is used down to the DH and that the pilot does not disconnect the autopilot instantly once visual reference is acquired. It was not intended to prevent disconnection of the autopilot once satisfactory visual reference is acquired and maintained. Point (c)

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of the new AMC3 SPA.LVO.105(c) has been added to clarify the intent of this provision while allowing greater operational flexibility.

The provision for the DH to be determined using a radio altimeter has been modified to allow the adoption of future technologies that could achieve an equivalent level of accuracy (point (d)).

New *AMC4 SPA.LVO.105(c) 'Operating procedures — CAT III':* these provisions for CAT III operations have been transposed from the former SPA.LVO.110 and AMC5 SPA.LVO.100. The visual reference requirements have been transposed from the former AMC1 CAT.OP.MPA.305 as they are only applicable to operations requiring a specific approval.

The provision that the DH should be determined using a radio altimeter has been modified to allow the adoption of future technologies that could achieve at least an equivalent level of accuracy.

The new *AMC5 SPA.LVO.105(c) 'Operating procedures — SA CAT I'* details the provisions for SA CAT I operations. The provisions are based on regulations adopted in other States, specifically the USA and Australia. Unlike other low-visibility approach operations, there is no specific provision for SA CAT I operations to be flown with a crew of two pilots. The visual reference requirements have been adopted from the requirements for CAT II as these are known to provide sufficient visual reference for a continued approach from a DH as low as 150 ft.

The provision that the DH should be determined using a radio altimeter has been modified to allow the adoption of future technologies that could achieve at least an equivalent level of accuracy.

New *AMC6 SPA.LVO.105(c) 'Operating procedures — SA CAT II':* the operating provisions for SA CAT II are identical to those for 'standard' CAT II operations. AMC6 is added to ensure a consistent layout of AMC for LVOs and operations with operational credits.

New *AMC7 SPA.LVO.105(c) 'Operating procedures — EFVS operations to a runway':* the operating provisions for EFVS operations have been adapted from the former AMC6 SPA.LVO.100 and updated to allow 'EVFS-L' operations and to be aligned with recently published FAA regulations.

The former provision required natural visual reference of the runway by 200 ft for NPA or APV operations. This provision is removed, as CS-AWO now requires system performance to be demonstrated down to 100 ft for 'EVFS-L'. 'EVFS-L' may require this natural visual reference by a certain height, in which case the height will be indicated in the AFM. The new CS.AWO.A.EFVS has been developed following a performance-based philosophy. This allows flexibility in the minimum height for which natural vision reference is needed. Therefore, point (f) allows two cases: when the manufacturer is following the new CS-AWO, the height is specified in the AFM allowing thus EFVS-A operations and EFVS-L operations; when the equipment has been certified before the new CS-AWO, then the height should be 100 ft as previously stipulated in the regulation.

The visual reference provisions have been transposed from the former AMC1 CAT.OP.MPA.305, but the wording has been amended to be more closely aligned with that used by the FAA.

GM1 SPA.LVO.105(c) 'Flight crew actions in case of autopilot failure at or below DH in fail-passive CAT III operations' has been transposed from the former GM1 SPA.LVO.100(e).

New *AMC1 SPA.LVO.105(g) 'Safety assessment and performance indicators':* ICAO standards require a safety assessment prior to conducting LVOs. The former AMC1 SPA.LVO.105 stated that operators should gather and analyse data prior to obtaining a specific approval, and AMC3 SPA.LVO.105 stated that operators should gather data about LVOs and monitor the performance of individual aircraft. This

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new AMC describes some of the data that should be collected and performance indicators that should be monitored. These data and performance indicators will also be useful for hazard identification and safety performance monitoring in accordance with ORO.GEN.200(a)(3).

The new *AMC2 SPA.LVO.105(g) 'Safety assessment prior to obtaining an approval'* states that the data and performance indicators in accordance with the new AMC1 SPA.LVO.105(g) should be used by the operator for conducting a safety assessment prior to obtaining a specific approval. This safety assessment is proposed to replace the 'operational demonstration' in the former AMC1 SPA.LVO.105 and AMC2 SPA.LVO.105. The AMC clarifies that the intent of this data gathering is to demonstrate that the operation will achieve an acceptable level of safety.

In the former AMC1 SPA.LVO.105, the operational demonstration required a fixed number of approaches. As this number may not be appropriate for all types of operation, the provisions have been moved to the new GM2 SPA.LVO.105(g) to allow more flexibility for operators and competent authorities to determine the number of approaches needed to demonstrate that operations will achieve an acceptable level of safety. It must be emphasised that these demonstration approaches do not replace the demonstration for equipment certification which necessitates substantially more data than that which could be gathered in the context of an 'operational demonstration'.

The former AMC1 SPA.LVO.105 provided that if the number of approaches is difficult to achieve, this number may be reduced in certain conditions. This provision is no longer needed because the number of approaches is not specified in the AMC (it has been moved to GM level). The operator is responsible for determining the number of approaches needed to demonstrate the level of safety and to satisfy the competent authority that sufficient data will be available to demonstrate an acceptable level of safety. The new GM2 SPA.LVO.105(g) provides guidance on how relevant data could be gathered.

Points (c) and (d) of the new AMC2 SPA.LVO.105(g) clarify that data for the safety assessment could come from similar operations with the same aircraft or with a different aircraft type provided that the data is relevant to the approval being sought. It is thought that this might be the case where different aircraft types from the same manufacturer and with similar characteristics and equipment were being used. The former AMC1 SPA.LVO.105 only allowed this for variants within a single aircraft type, which is unnecessarily restrictive.

The new *GM1 SPA.LVO.105(g) 'Safety performance monitoring'* provides more details and explains the provisions for safety performance monitoring referred to in AMC1 SPA.LVO.105(g). It ensures the link to the hazard identification and safety performance monitoring requirements of ORO.GEN.200(a)(3).

The data collection provisions derive from the former text in AMC1 SPA.LVO.105, AMC2 SPA.LVO.105, and AMC3 SPA.LVO.105. The list of potential unacceptable safety outcomes to be considered has been developed in the context of the hazard analysis conducted as part of this RMT.

The new *GM2 SPA.LVO.105(g) 'Data gathering for safety assessment prior to obtaining an approval'* details and explains the objective of the safety assessment prior to obtaining an approval as per the new AMC2 SPA.LVO.105(g). The method of conducting the risk assessment is not specified, as this should be in accordance with the risk assessment methodology adopted by the operator in accordance with ORO.GEN.200(a)(3).

The data collection provisions derive from the former text of AMC1 SPA.LVO.105, AMC2 SPA.LVO.105, and AMC3 SPA.LVO.105. The number of approaches has been transposed from the former AMC1 SPA.LVO.105. This number of approaches is unlikely to be sufficient to conduct a statistical analysis of

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the data, but has been used for many years as a means of providing confidence in an operator's equipment, procedures, training, and maintenance systems. The GM highlights that some elements of this confidence could be developed from operations conducted in a flight simulation training device (FSTD). This would especially be the case where the intention was to validate novel operating procedures or training programmes.

The GM highlights the potential risks of conducting LVOs without all the necessary elements in place. An example of this would be conducting autoland operations without the protection of the ILS signal.

Many operators adopt operating procedures and training programmes developed by, or in conjunction with, an aircraft manufacturer. In such cases, useful data may be available from that manufacturer or from other operators using similar procedures; this data would contribute to the safety assessment. The GM suggests that such data could be shared, when appropriate.

As the AMC on 'transitional periods for CAT II and CAT III operations' has been deleted (AMC4 SPA.LVO.105), guidance has been provided in point (f) about the amount of operational experience for an operator applying for LVO approval. These figures derive from expert opinion.

AMC and GM to SPA.LVO.110 — aerodrome-related requirements, including instrument flight procedures

The new AMC and GM to SPA.LVO.110 are built around AMC1 SPA.LVO.110. The following general principles were applied when developing the new provisions:

(a) The highest threats may be in new technologies and new runways.

(b) Provisions should be structured appropriately to ensure the use of future combined systems or hybrid systems.

(c) When possible, the new provisions should use already existing concepts from the former rules. Thus, when possible, the new AMC and GM to SPA.LVO.100 should use the content of the former SPA.LVO rule and/or AMC and GM.

(d) The new provisions should take full account of the ICAO PBAOM to allow maximum use of capabilities of advanced aircraft. There are some limits to this principle; for example, when aerodromes are unable to provide the necessary level of safety to carry out certain operations (e.g. lack of low-visibility procedures, etc.).

(e) When the aerodrome information is not sufficient (e.g. third-country aerodromes): the new provisions should allow operations to the aerodrome by:

  (1) performing an operational assessment; or

  (2) using grandfathering rights; or

  (3) on the basis of cooperation between operators, when option (a) or (b) is not possible; or

  (4) when the airport authority already provides that information (e.g. the FAA already make the assessment of the safe aerodromes).

(f) Ensure that the provisions can be applied by a regular operator.

(g) The operator is not responsible for verifying the accuracy of the airport data. If the data is published in the AIP, then it should be considered valid and no further verification is necessary.

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AMC1 SPA.LVO.110 points (c) to (e), related to the *use of previous operational data.* In principle, previous operational data can be used between aircraft types only under certain conditions:

— When the runway characteristics meet the certification criteria and this is allowed by the manufacturer, then the previous operational data may be used between aircraft types.

— Otherwise, the use of previous operational data is limited to the same aircraft model.

AMC1 SPA.LVO.110 points (f) to (i), related to the *desktop assessment*. With the publication of CS-AWO Issue 2 and this ED Decision, the AFM and/or the data provided by the OEM will contain the following information:

— the assumptions for the certification; and

— the limitation of the aircraft (this information is provided in the AFM).

This information, in combination with the airport data (AIP), should provide the necessary data to assess whether the intended operations will be outside or inside those certification assumptions and/or limitations. In other words, each item listed in the AFM should be cross-checked with the AIP to determine the safety of the operations: if the airport data is within all items covered in the AFM (CS-AWO Issue 2) or equivalent data provided by the OEM (e.g. runway elevation, approach path slope, landing area slope, ground profile under the approach path, etc.), then the operator can operate to that airport without further need to perform an operational demonstration. More information can be found in CS AWO.A.ALS.113, amongst others points (f) & (g):

'CS AWO.A.ALS.113 General

(…)

(f) the type of xLS navigation means (facilities external to the aircraft) and associated limitations (if any) which have been used as the basis for certification.

(g) runway or airport conditions, including:

(1) runway elevation;

(2) approach path slope;

(3) landing area slope;

(4) ground profile under the approach path.'

Note: CS-AWO Issue 2 also considers the assumptions and/or limitations of the operations with operational credits, e.g. EFVS include assumptions and/or limitations for the landing lights.

AMC1 SPA.LVO.110 point (f), wording 'The desktop assessment should correspond the nature and complexity of the operation intended to be carried out and should take into account the hazards and associated risks inherent in these operations'. The wording reflects ORO.GEN.200 point (b) ('The management system shall correspond to the size of the operator and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in these activities.')

AMC1 SPA.LVO.110 point (g), wording 'landing system'. EASA has decided to use this wording instead of 'automatic landing system', in order to increase the scope of the AMC to any landing system.

AMC1 SPA.LVO.110 point (g)(2) refers to the facilities external to the aircraft and associated limitations (if any) which have been used as the basis for certification.

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AMC1 SPA.LVO.110 point (g)(3), wording '*type of xLS'*. This provision includes the study of the xLS navigations means, since a safe landing depends on the crossing height at the threshold (called TCH (threshold crossing height)). The TCH is one of the assumptions at certification level (usually at 50 to 60 ft). In some specific aerodromes and xLS approaches this height may or may not as per the certification assumptions. Therefore, it requires an assessment to determine the safety of the operations.

AMC1 SPA.LVO.110 point (g)(4) has been drafted with the following principle in mind: when the AFM does not provide any limitation for the landing system assessment area (e.g. touch zone area), it is assumed that the aircraft is capable of flying 0.8 %. If there is any limitation applicable to this value, it should be stated in the AFM for CS-AWO Issue 2 aircraft. For CS-AWO Issue 1, this may not be the case, as the aircraft is assumed to be able to fly 0.8 % in order to certify the equipment; however, in this case, the aircraft manufacturer can provide further details on the behaviour of the aircraft landing system.

As the landing system assessment area (LSAA) has a distance of 600 metres, the reader should take into account that the necessary information for the assessment of those 600 metres can be found in the AIP under the TDZ slope. However, the TDZ is the first 900 metres of the runway for runways of 2 400 m or above (for shorter runways, the length will be less). The slope of the LSAA may be calculated using the highest point of the TDZ which is included in the AIP. This point and the threshold data can provide a good, approximated indication of slope of these 600 metres.

AMC1 SPA.LVO.110 point (g)(5)

The wording 'the distance should be calculated from the published threshold' has been introduced to clarify how to calculate the distance. The wording 'published threshold' takes into account runways with display thresholds where the operative threshold is not located at the beginning of the runway. This situation is reflected in the airport information distances publication (e.g. RESA, TORA/TODA).

The wording 'the State of the aerodrome or AIP data, or the competent authority issuing the operator's LVO approval' in point (g)(5) comes from AMC1 SPA.LVO.110 point (c)(2)(i) .

The variation of the slope has not been included as that information is captured through occurrence reporting; if an operator identifies that a runway has operational issues due to variation in the landing zone, it will be reported and therefore the provisions do not require that the operator checks *a priori* the variation of this zone.

The wording 'unless otherwise stated by the (…)' in point (g)(5) has been introduced to prepare for future technologies that do not require radio altimeters. Therefore, the assessment of the ground profile under the approach path may not be relevant; therefore, the manufacturer may publish this information but the operators may not need to assess this point.

AMC1 SPA.LVO.110, points (h)(2) and (h)(3). Point (h) of AMC1 SPA.LVO.110 gives the possibility to introduce additional elements in the assessment. The reason for this is that there may specific aerodromes or old certified aircraft that may not provide all the necessary elements to properly assess the safety of operations via a desktop exercise. For example, this could be the case with some assumptions or limitations regarding the runway slope variations, including the TDZ area, or the ground slope variation under the approach path, since CS-AWO does not require considering the variations in slope of the TDZ.

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AMC2 SPA.LVO.110 'Suitable instrument flight approach procedures': the provision for operations with operational credits are stablished as 3 degrees maximum offset in accordance with the certification requirements in AMC AWO.A.EFVS.109 'EFVS performance'. Note: where a particular system is certified to allow a greater offset, this will be stated in the AFM, and the AMC allows for a different offset in this case.

AMC3 SPA.LVO.110 'Suitable aerodromes —runway and runway environment — navigation facilities — approach operations other than EFVS operations': the provisions have been transposed from the former AMC3 SPA.LVO.100, AMC4 SPA.LVO.100, AMC5 SPA.LVO.100, AMC6 SPA.LVO.100, and AMC4 SPA.LVO.105. The revised runway classifications have also been implemented.

The glide path angle should be 3.0 °. Steeper glide path, not exceeding 3.5 ° and not exceeding the limits stated in the AFM may be used subject to an approval based on an equivalent level of safety.

For SA CAT I operations, a radionavigation system (e.g. ILS, GLS) performing to the standards of CAT I (except for the extended coverage to the lower DH) is needed. It is considered that the new CS-AWO requires aircraft equipment to perform to an acceptable standard using such a radionavigation system.

LTS and OTS CAT II have been removed from the new rules. However, the new provisions introduce a similar concept, SA CAT I and SA CAT II. Point (d) of AMC3 SPA.LVO.110 has been transposed from the former AMC4 SPA.LVO.100 (point (a)(1)).

Finally, point (d)(2)(ii)(B) of AMC3 SPA.LVO.110 states: 'where an ILS is used, it should be certified to at least class II/D/2; or'. The reason for having this provision is that for SA CAT II there are no AFM criteria, and therefore some prescription is necessary. Currently, the FAA also requires II/D/2.

GM3 SPA.LVO.110 'Suitable aerodromes — assessment — suitable runway and runway environment characteristics' details the provisions for instrument approach operations using operational credits.

One important element to have safe LVO operations is the environment of the runway, and especially the radio altimeter operating area for landing systems based on radio altimeter. To this end, PANS-OPS, Volume II, contains material about the use of a radio altimeter. For instance, paragraph 1.4.8.8.3.3 reads: 'If the radio altimeter OCA/H is promulgated, operational checks shall have confirmed the repeatability of radio altimeter information.' GM3 provides guidance on what conditions in the runway environment are acceptable depending on the approach category flown.

The different points of point (g) of GM3 SPA.LVO.110 correspond to requirements in the aerodrome regulatory framework, as follows:

— Point (g)(1) is included in an AMC to the ADR rules.

— Point (g)(2) 'runway dimensions': this information is included in the AIP for any type of runway.

— Point (g)(3): this information is included in the AIP and in the Type A chart.

— Point (g)(4): this information is included in the AIP. This information includes the existence of LED lights.

— Point (g)(6) 'VSS': this information is included in the ADR rules.

GM5 SPA.LVO.110 'Suitable aerodromes — assessment – previous operational data – terminology: make, model series and variant' provides information on the use of previous operational data to

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support desktop assessment. In the case there is no data available from the OEM or the AFM, the operator could use in-service aircraft types and series experience to support the desktop analysis.

Point (b)(4) description of 'Very complex runway' and point (c) 'Operational assessment successful criteria' of *GM8 SPA.LVO.110 'Suitable aerodromes — desktop assessment – data not provided in the AFM'* are both derived from AC 120-118 Appendix 4.

GM7 SPA.LVO.110 'Suitable aerodromes — desktop assessment – aerodrome data sources' describes where information about elevation and slopes can be found. This information has mainly derived from ICAO Annex 4 Chapter 3 Aerodrome obstacles chart Type A, and Chapter 3.8.4.2 where it is describes the profile view of the runway.

The new *GM8 SPA.LVO.110 'Suitable aerodromes — operational assessment — process to determine the number of approaches and landings – aeroplanes'*, has been added to detail the provisions for verification of the suitability of approach procedures for EFVS operations using operational credits.

AMC and GM to SPA.LVO.120 'Flight crew competence'

The former *AMC1 SPA.LVO.120 'General provisions'* has been deleted so that the training and checking provisions for LVOs can be presented more clearly in a number of AMC. The new structure follows the principle of one AMC for each kind of training, instead of having a single AMC with all training provisions together.

AMC1 SPA.LVO.120(a) 'Competence of the flight crew for the intended operations — experience in type or class, or as pilot-in-command/commander': The former AMC determines a minimum time/sectors on type before commencing CAT II/CAT III operations. The provision has been amended to make the operator responsible for determining the minimum level of experience and establish the appropriate mitigation measures. The figures have been transposed to GM1 SPA.LVO.120(a).

AMC2 SPA.LVO.120(a) 'Competence of the flight crew for the intended operations — recent experience for EFVS operations' and *AMC3 SPA.LVO.120(a) 'Competence of the flight crew for the intended operations — recent experience for SA CAT I, CAT II, SA CAT II and CAT III approach operations'* have been developed to clarify that the approaches do not need to be conducted under training with a qualified instructor; they may be conducted in 'line operations'. This is a different approach to the former AMC1 SPA.LVO.120. For clarity, these approaches are to be referred to as 'recent experience'. Approaches conducted in an FSTD and/or during a proficiency check will count towards this recent experience requirement.

The current recurrent training needed for pilots using autoland for LVOs is a minimum of two approaches, one of which may be substituted by an approach and landing in the aircraft.

GM1 SPA.LVO.120(a) 'Competence of the flight crew for the intended operations — experience in type or class, or as pilot-in-command/commander' has been transposed from previous AMC material. See the explanatory note regarding AMC1 SPA.LVO.120(a).

AMC1 SPA.LVO.120(b) 'Initial training for LVTO in an RVR less than 400 m'. Prior to being authorised to conduct take-offs in RVRs below 400 m, the flight crew should complete training to cover system failures and engine failures resulting in continued as well as rejected take-offs. This AMC transposes the initial training provisions for LVTO operations from AMC1 SPA.LVO.120. The ground training course provisions have been amended to include only those parts relevant to LVTO. Pilots who have not previously been authorised to conduct LVTO with an EU operator need to complete a check. This

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transposes the requirements of Section 6 of the licence proficiency check (LPC) detailed in Appendix 9 to Part-FCL.

AMC2 SPA.LVO.120(b) 'Initial training and checking for SA CAT I, CAT II, SA CAT II and CAT III approach operations' transposes the initial training provisions for SA CAT I, CAT II, SA CAT II and CAT III operations from the former AMC1 SPA.LVO.120. Pilots who have not previously been authorised to conduct low-visibility approach operations with an EU operator need to complete a check. This transposes the requirements of Section 6 of the LPC detailed in Appendix 9 to Part-FCL.

The number of approaches needed during the abbreviated FSTD training for pilots previously authorised for AWOs has not been changed, but the actual number has been included in this AMC for clarity.

The former provisions stated that pilots previously qualified for LVOs may complete an abbreviated ground school programme depending on their previous training and experience. This has been now amended to clarify that it is the flight crew members' existing knowledge that should determine the content of the ground training.

The former provisions stated that flight crew should complete a check before conducting CAT II/III operations but allowed that the check could be replaced by successful completion of training. FCL.605(b)) required completion of training at an approved training organisation (ATO) and a check before being authorised for DHs below 60 m. As this requirement has been removed from the Aircrew Regulation[9], the proposed AMC2 SPA.LVO.120(b) states that pilots who have not previously been qualified for low-visibility approach operations with an EU operator need to complete the check.

AMC3 SPA.LVO.120(b) 'Initial training and checking for EFVS operations'. Operators should ensure that flight crew members complete the conversion training mentioned in this AMC before being authorised to conduct EFVS operations. There are prescribed elements of the ground training, as well as a course of FSTD training and/or flight training in two phases. This AMC transposes the initial training provisions for EFVS operations from the former AMC1 SPA.LVO.120. As EFVS operations under Part-SPA may include LVOs, the ground training includes the provisions for LVOs.

There is no additional credit against line flying under supervision (LIFUS) for training conducted in a level 'D' full flight simulator (FFS), as there is no enhanced fidelity provisions for EFVSs in level 'D' simulators.

Flight crew members should complete FSTD training in each operating capacity in which they will be authorised to operate, e.g. completing FSTD training as pilot monitoring will not qualify the pilot to act as pilot flying.

A reference to operational suitability data (OSD) has been added to ensure that operators can take advantage of any available credits.

AMC4 SPA.LVO.120(b) 'Recurrent checking for LVTO, SA CAT I, CAT II, SA CAT II AND CAT III approach operations': the recurrent training provisions for SA CAT I, CAT II, SA CAT II and CAT III approach

[9] Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council Text with EEA relevance (OJ L 311, 25.11.2011, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R1178&qid=1655893376895).

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operations have been transposed from the former AMC1 SPA.LVO.120. This AMC does not include recurrent training provisions for EFVS operations.

The former recurrent training provisions for pilots using autoland for LVOs determined a minimum of two approaches, one of which may be substituted by an approach and landing in the aircraft. A missed approach was also determined. The revised provisions requires at least one approach to be completed during the proficiency check, but the recent experience requirement (two approaches) must also be satisfied.

AMC5 SPA.LVO.120(b) 'Differences training for LVTO, SA CAT I, CAT II, SA CAT II and CAT III approach operations'. The differences training provisions for SA CAT I, CAT II, SA CAT II AND CAT III approach operations have been transposed from the former AMC1 SPA.LVO.120.

AMC6 SPA.LVO.120(b) 'Recurrent checking for EFVS operations' describes the recurrent checking provisions for EFVS operations. These have been transposed from the former AMC1 SPA.LVO.120.

It should be noted that the recent experience and checking provisions are not the same as those adopted by the FAA. The FAA mandates a recent experience of six approaches using EFVS every 6 months. It is considered to be valuable to have exposure to EFVS operations in a training environment, ideally in an FSTD, in order to be able to practise go-around procedures and use of the EFVS in restricted visibility. The intention is that the completion of a 'check' will mitigate any skill fade resulting from the lower rate of exposure compared to the FAA system, because pilots should demonstrate their competence to perform EFVS operations.

Pilots should meet the recent experience and recurrent checking provisions in each operating capacity that they are authorised to operate (pilot flying or pilot monitoring).

AMC7 SPA.LVO.120(b) 'Differences training for EFVS operations'. The differences training provisions for EFVS operations have been transposed from the former AMC1 SPA.LVO.120. A reference to OSD has been included to ensure that operators can take advantage of available credits.

GM1 SPA.LVO.120(b) 'Flight crew training' clarifies that the number of approaches in initial and recurrent training are not cumulative, but where techniques are the same, the training may cover all classifications of operations and operations with operational credits using those techniques. It also specifies that the recent experience provisions may be substituted by approaches flown in an FSTD. This GM also includes a summary table with the number of approaches and landings to be completed in various conditions — described in the preceding AMC.

GM3 SPA.LVO.120(b) 'Initial training and checking for SA CAT I, CAT II, SA CAT II AND CAT III approach operations' provides further details about the ground training course in AMC2 SPA.LVO.120(b) points (a)(1)(i) and (iv). This GM was transposed from AMC1 FCL.725 point (f) that is now deleted from Part-FCL of the Aircrew Regulation.

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2.5. How we want to achieve it — detailed explanation for helicopters

2.5.1 AMC & GM to Annex IV 'Commercial air transport' (Part-CAT)

2.5.1.1 Detailed explanations regarding CAT operating minima

AMC2 CAT.OP.MPA.110 'Take-off operations — helicopters'

The AMC includes changes due to new definitions as well as some minor changes to reflect the operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

There are also several editorial corrections. These corrections standardise the wording of the helicopter regulatory material following the changes to ICAO and to the aeroplane regulations.

Point (b)(3) and footnote (**) to Table 3. By procedure design, the aircraft should maintain the capability to manoeuvre and land in case of any unforeseen event during the visual segment to the initial departure fix (IDF). The operating minima of the helicopter manoeuvre to return to the take-off point have been defined.

AMC4 CAT.OP.MPA.110 'Determination of DH/MDH for instrument approach operations — helicopters'

The AMC relates to the new definitions and the new operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

Point (a) of AMC4 CAT.OP.MPA.110. For helicopters, a specific point has been developed to introduce the calculation of the DHs and MDHs because of the following:

— Helicopter operators need to refer to separate calculation tables. Table 6 happens to be the same as Table 4, but Table 7 is not. See explanatory note to Tables 6, 7 and 12.

— Helicopter operating minima need not distinguish between Type A approaches using CDFA, Type A approaches not using CDFA, and Type B approaches: see below.

— The CDFA technique, together with the concept of SAps, has substantially improved the safety performance of commercial air transport with large and turbine-powered aircraft. Helicopters are lighter and more manoeuvrable and the concept of SAps is slightly different. There may sometimes be advantages to a step-down technique. Helicopters are also capable of shorter and steeper visual approaches, and helicopter PinS approaches may require the descent angle on the visual segment to be different from the descent angle on the final approach segment.

— Helicopter operating minima should not be increased when not using the CDFA technique.

— Conversely, if a helicopter operator uses the CDFA technique, a DH will be used instead of an MDH. The approach may be continued to DH or the MAPt (whichever earlier), at which point a missed approach must be initiated if visual reference is not acquired. The helicopter may descend briefly below the DH on a type A approach flown using CDFA, in the same way as it may do on a precision approach or APV. With a helicopter, the height loss at DH is negligible compared to that of an aeroplane, because of the lower speeds involved, the lower inertia, the higher manoeuvrability and vertical acceleration.

— With helicopters, there is no need to add an increment to the MDH when converting it into a DH for the purpose of using the CDFA technique.

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— In addition, the calculation of the minimum DH or MDH is different from that for aeroplanes. See explanatory note to Tables 7 and 12.

Table 6

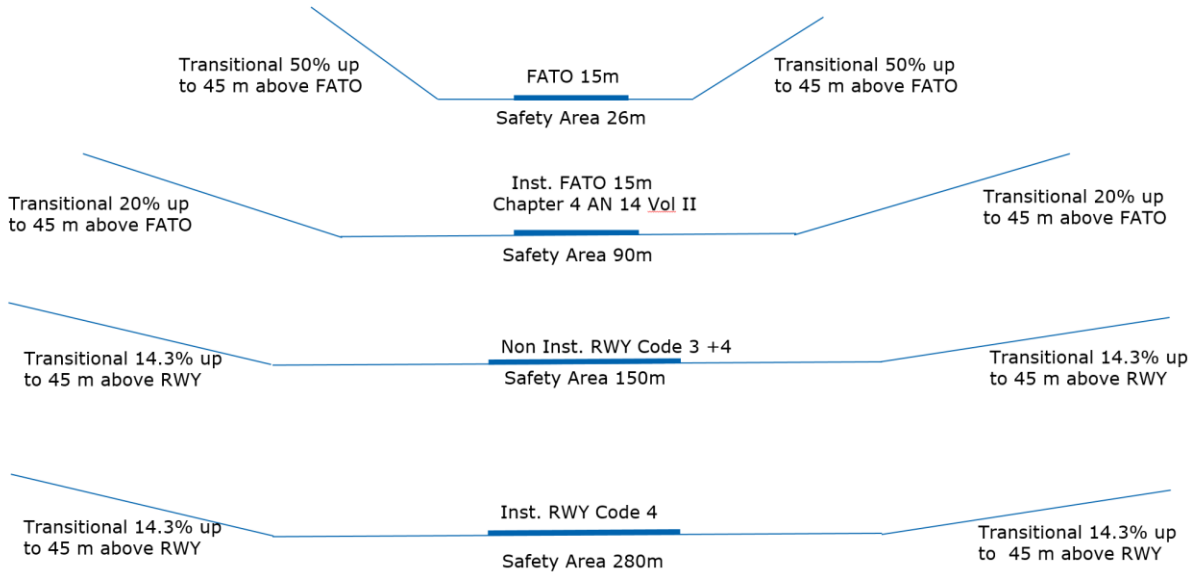
Table 6 is based on Table 4 with the addition of 'helicopter PinS procedures'.

The system minima are not aircraft-related. PinS approach is a separate kind of approach in PANS-OPS, so it needs to be introduced in the list of approach types.

PinS approaches with instructions to 'proceed VFR' are cloud-breaking procedures that may be used to continue flight under VFR to an unspecified destination. As opposed to other IFR procedures, it may not be possible to determine the DH/MDH with reference to a given heliport or runway threshold. An alternative solution has been introduced in a footnote.

Table 7

Runways: The obstacle protection of a non-instrument runway is far greater than the obstacle protection of an instrument FATO. There should therefore be no increase in the minima based on the type of runway. Any runway is also much bigger than an instrument FATO. No increase in the operating minima should apply.



Instrument FATO: The obstacle protection, lighting and minimum dimensions of an instrument heliport should be sufficient to avoid any increase in the operating minima. No increase in the operating minima should apply.

Non-instrument FATO: A helicopter PinS approach can be designed to a non-instrument FATO with instructions to 'proceed visually'. Table 7 sets a minimum DH no lower than that of a PinS approach for non-instrument FATOs.

The minimum distance from the MAPt to the heliport is 1 000 m, in order to provide enough distance for the helicopter to decelerate from the IFR speed and land, under the current procedure design provisions of helicopter PinS approaches with instructions to 'proceed visually'.

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Point (h)(1) of AMC4 CAT.OP.MPA.110 ensures the minimum RVR is 1 000 m. The RVR or VIS should be no lower than 800 m as per Table 12 to cover any deficiency in lighting or heliport dimensions and any possible changes in the procedure design provisions.

Tables 4, 7 and 12 of AMC4 CAT.OP.MPA.110 and AMC6 CAT.OP.MPA.110

The minimum RVR for helicopters is changed from 500 m to 550 m to align with aerodrome regulations and with the amended Air OPS Regulation.

GNSS/SBAS (LP) is introduced in Table 4. The wording of point (a)(4) has been improved, considering that Table 7 is not always applicable, as explained in the footnote to that table.

AMC6 CAT.OP.MPA.110 'Determination of RVR or VIS for instruments approach operations — helicopters'

The AMC includes changes due to new definitions as well as some minor changes to reflect the operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

Points (a) to (g). The aim is to:

— explain Type A and Type B approaches. ICAO does not use any longer the term 'non-precision approaches' and CAT I; therefore, the AMC uses the same table for the determination of RVR/CMV minima in both cases;

— delete the reference to performance classes because they do not influence the operating minima defined in this AMC;

— simplify the structure of the text;

— delete any restrictions for multi-pilot operations: the previous increments to operating minima for single-pilot operations are understood to be not relevant to helicopters; moreover, if the aircraft is certified for single-pilot operations under IFR and the single pilot is capable and trained, then the minima should be the same in accordance with the performance-based principles. This approach is being transposed from the aeroplane operations. See Section 2.4.

Table 12

See explanatory note to Table 7 under AMC4 CAT.OP.MPA.110.

Table 13

Table 13 is a combination of the previous Tables 6.1.H and 6.2.H. For DH/MDH of 250 ft or above, the lowest minima have been kept in the table, but minima no lower than 800 m for 2D operations have been introduced in a footnote. Minima are also no lower than 800 m on helicopter PinS approaches.

Table 13 provides simplicity and compatibility with the new definitions of Type A and Type B approaches, and 3D and 2D operations.

The combination process has marginally lowered the operating minima on 2D operations. The resulting minima remain within 800–1 000-m RVR, which is not very different from the 800-m VIS under VFR by day and is therefore safe.

A footnote restricting the descent angle to 4 degrees unless visual aids were available in the visual segment has been deleted, taking into account a helicopter's ability to fly steeper descent angles with and without visual aids.

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A footnote providing guidance on rounding the DA/MDA to the nearest 10 ft has been deleted from this AMC on DH/MDH calculations.

Initially, an additional restriction to 800-m VIS or RVR was considered for PinS approaches. It was not introduced in the AMC because the intended safety feature has been already embedded in other provisions:

— The lowest RVR is 800 m unless the PinS is flown to an instrument FATO or a runway as per Table 12.

— The lowest RVR is 800 m unless the PinS is a 3D approach operation and a full or intermediate approach light system is available, considering Table 6 (minimum DH for PinS is 250 ft) and Table 13.

— The lowest RVR, if a 'circling for helicopters' manoeuvre is needed, is 800 m under AMC8 CAT.OP.MPA.110 below.

— In the unlikely case where the PinS is a straight-in 3D approach operation to a runway or instrument FATO, using a full or intermediate approach light system, then the operating minima need not be restricted to 800 m.

The resulting minima are the same as for CAT and NCO, except that CMV is not used for NCO.

Table 14

In Table 14, an editorial change has been introduced to standardise the wording of the helicopter regulatory material following the changes to the aeroplane regulations described in Section 2.4.

Explanatory note — RVR/VIS

The RVR/VIS calculations are intended to achieve the following:

— PinS approaches with instructions to 'proceed VFR' do not need RVR/VIS calculations. They require VFR minima. The term 'VMC' is not used to avoid unnecessary restrictions in classes of airspace where special VFR is available.

— Only approaches that remain IFR at the DH/MDH and onwards require calculations.

The new structure enables the restriction of the use of tables defining 'Type of runway/FATO versus minimum RVR', and the deletion of the footnote to Table 12 addressing 'PinS with instructions to proceed VFR'.

Note regarding PinS approaches with instructions to 'proceed VFR': It is foreseen that such approaches are designed within control zones of large airports, where special VFR could apply. This could happen for the purpose of flying to a nearby hospital.

Note regarding PinS approaches with instructions to 'proceed visually': The distance between the MAPt and the destination is 1 000 m or more in accordance with the current version of PANS-OPS. The RVR/VIS minima on such an approach are likely to be the distance between the MAPt and the destination, except in the unlikely case of an approach light system, or in the case of future amendments to PANS-OPS.

Finally, CMV has been deleted from AMC6 CAT.OP.MPA.110 as explained in the section on 'approach bans'.

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The case where the MAPt is within ½ NM of the landing threshold, and the approach minima specified for FALS are used is expected to be limited to runways and runway-shaped final approach and take-off areas (FATOs) allowing sufficient deceleration distance or landing distance.

AMC11 CAT.OP.MPA.110 'Effect on landing minima of temporarily failed or downgraded ground equipment' and Table 17

For helicopters, different provisions are introduced in case the centre line lights or TDZ lights are inoperative, in alignment with the changes introduced in Part-SPA.

GM9 CAT.OP.MPA.110 'Aerodrome operating minima – Helicopters'

The GM relates to the new definitions and minor changes to reflect the operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

Helicopter PinS approaches can be designed with steep descent angles, in accordance with ICAO Doc 8168 (PANS-OPS). Maximum descent angles are 7.5° on the final approach segment and up to 8.3° on the visual segments. The maximum descent angles tend to increase with time. The high descent angles, associated with potential tailwinds during the instrument segment of the approach, result in high vertical speeds.

Initially, the concern regarding steep approach angles was the height loss at the DH. This concern was inherited from aeroplanes using the CDFA technique that do have this problem when converting an MDH into a DH for the purpose of implementing the CDFA technique, because of high inertia.

The wording of the GM provides some information on helicopter-relevant issues when flying an approach with high vertical speeds.

GM1 CAT.OP.MPA.305 'Application of RVR or VIS reports

This GM provides further guidance on the deletion of approach bans for helicopters, except in the following case:

An RVR is reported AND it is below the operating minima AND it is below 550 m. The approach is aligned with NCO.

AMC1 CAT.OP.MPA.305(a) and AMC1 CAT.OP.MPA.305(b) 'Minimum RVR for continuation of approach – helicopters'

AMC1 CAT.OP.MPA.305(a) has been restricted to aeroplanes, and a new AMC1 CAT. OP.MPA.305(b) has been inserted for helicopters.

For helicopters, there is no approach ban based on visibility. CMV is not needed.

AMC1 CAT.OP.MPA.305(c) 'Visual references for instrument approach operations'

The former AMC1 CAT.OP.MPA.305(e) has been renumbered and its text has been amended.

The visual references for helicopter PinS approaches have been amended to reflect the design of these procedures.

Helicopter PinS approaches with instructions to 'proceed VFR' are cloud-breaking procedures that may be used to continue flight under VFR to an unspecified destination. By design, a visual reference to thresholds or approach lights may never be available at the MAPt, even in good weather. As the flight should only continue under VFR, the pilot should first ensure that VMC are met.

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'VFR criteria' is used instead of 'VMC' in order to include special VFR.

Visual acquisition of the heliport identification beacon is not sufficient to maintain control of the helicopter in visual flight. The phrase 'and visual ground reference' has been added.

2.5.1.2 Detailed explanations regarding EFVS 200 operations

AMC and GM to CAT.OP.MPA.312(a)(8) 'EFVS 200 operations'

The scope of AMC1 CAT.OP.MPA.312(a)(8) has been amended to include helicopters flying to a runway.

The changes are useful for flight preparation minima.

For helicopters, they are unnecessary for the purpose of the commencement and continuation of the approach because helicopters will not have an approach ban.

For helicopters, they are also useful at DH/MDH where visual contact with EFVS is sufficient to continue the approach to the runway.

If EFVS technology evolves and operational credits can be granted for helicopters at certified heliports providing obstacle protection, the AMC and GM will have to be updated.

2.5.2 AMC & GM to Annex V 'Specific approvals' (Part-SPA)

2.5.2.1 Detailed explanations on operational credits when using CAT I ILS systems and CAT II landing systems

AMC4 SPA.LVO.100(c) 'Operations with operational credits — helicopter special authorisation category I (HELI SA CAT I) operations'

This new AMC has been introduced to increase the number of available and accessible alternates within the available fuel range.

Point (a) AMC4 SPA.LVO.100(c)

A modern helicopter should be able to fly lower than 200 ft if a CAT II landing system to a runway is available. Partial capability is ensured even without CAT II certification of the helicopter.

— CAT-II-certified helicopters would provide two independent navigation aids, radio altimeter support, and a compare function.

— The provision for two independent navigation aids and a radio altimeter is maintained at operational level.

— The lack of a compare function can be mitigated by low speed, a multi-crew environment, and some altitude margin.

— The automatic level-off function and the available runway distance provide an additional layer of safety.

— The slow airspeeds available to modern helicopters in IFR and the available runway distance ensure that no excessive pitch-up manoeuvre is needed to decelerate the helicopter and land within the runway distance.

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— The OCH provides obstacle protection, including provisions for any descent below the DH on initiation of the go-around.

— Considering that aeroplanes fly significantly below the DH when going around at the DH, whereas helicopters flying descent angles designed for aeroplanes at slower speeds barely do, some altitude margins remain available.

The minimum DH could be as low as 100 ft on a CAT II landing system to a runway.

However, if a 100-ft DH was available for non-CAT-II-certified helicopters, no incentive would remain to equip and certify helicopters to CAT II. Also, it is wise to maintain some margins. This amendment introduces a minimum DH of 130 ft.

Point (b)of AMC4 SPA.LVO.100(c)

The modern helicopter should also be able to fly lower than 200 ft if a CAT I ILS to a runway is available.

— A CAT I ILS is certified and calibrated down to 100 ft.

— Category I/E/1 certification of an ILS ensures that the ICAO Annex 10 navigation performance is ensured down to 100 ft.

— The glideslope signal is not reliable at low heights, close to the ground, and autoland systems typically rely on the radio altimeter for the final 50 to 80 ft. However, this is not a problem at or above 100 ft.

— On a CAT I landing system, the OCH is usually lower than 200 ft and provides obstacle protection with some remaining margins. See CAT II landing systems above.

— A CAT I ILS localiser signal may be altered by aircraft, ground vehicles or objects that stand in the vicinity of any CAT I holding point. The protection of a CAT II holding point is lacking. However, the calibration of the ILS does take place down to 100 ft in real-life conditions. Additionally, the following mitigations exist:

  - Aeroplanes with Category D final approach speeds may use ILS CAT I signals down to 140 ft when going around at DH. No major alteration of the ILS signal should take place at 140 ft or higher.
  - Minor deviations from the flight path due to an altered signal should not result in an unsafe reduction of obstacle margins above 140 ft. Additionally, with slower speed and greater manoeuvrability, helicopters should be able to fly the visual segment successfully and land on the runway from a slightly offset position.
  - Following any strong alteration of the signal, the autopilot will attempt to follow the erroneous signal. This may result in a deviation visible on the landing system display and result in a go-around, or it may result in sufficient flight control input for the pilot to notice. This should also result in a go-around.

— In the go-around phase, helicopters have climb gradients that are much greater than aeroplanes. Any helicopter will catch up with the go-around obstacle protection surfaces designed for aeroplanes before the runway end.

— The radio altimeter should only be used to cross-check the baro-altitude at a given operator-defined location on the ILS, based on knowledge of the local geography, in order to avoid QNH

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errors. The radio altimeter cannot be used for height reference because the land located ahead of the runway on a CAT I ILS is not flat.

— Flying below 200 ft on a CAT I ILS requires closer monitoring by a well-coordinated crew. This amendment enables such operations with a multi-crew of two pilots, or one pilot and one well-trained technical crew member, as for a CAT II landing system.

Considering the above, the lowest DH on a CAT I ILS could be 150 ft. [*Optional:* The lowest DH could be lowered to 130 ft with a statement from the air navigation service provider in charge of the ILS signal, but such a DH is accessible only on a CAT II landing system to provide additional margins.]

Point (c) of AMC4 SPA.LVO.100(c)

In a runway environment, a clear area landing procedure can be used under performance class 1 and 2, or under Category A for non-CAT operations. The landing decision point (LDP) or decision point before landing (DPBL) is expected to be always compatible with the DHs defined in this AMC. It is reminded that Category A procedures for continued landing after the decision point were never flight tested under IMC. The operator should always select an LDP or DPBL within the visual segment of the instrument approach.

Point (e) 'Lowest RVR minima'

A pilot has a much better angle of vision below when flying a helicopter than when flying an aeroplane. Given a full approach light system and a sufficiently low DH, the minimum horizontal visibility to see a sufficient length of the approach lighting system is significantly reduced.

Under CAT II, the minimum RVR available to helicopters should not be below 300 m.

The minimum RVR should also be compatible with the distance from the decision point to the nearest approach lights/threshold lights, with a margin.

This is taken into account in a new 'DH v RVR' table.

Point (f) of AMC4 SPA.LVO.100(c)

The planning minima are based on the aeroplane 'basic fuel scheme with variations'. The table refers to CAT.OP.MPA.192(d) as published in Opinion No 02/2020[10] on 'Fuel/energy planning and management'. The same rationale as for the related Opinion applies.

In the event of an approach to a destination alternate aerodrome, a single failure on board the aircraft or a single failure of the approach facilities should not put the landing at this aerodrome at risk.

An operator that has decided to perform a HELI SA CAT I approach operation at a destination alternate aerodrome where two or more usable Type B operations are available, should also be able to perform the other Type B CAT I approach (DH > 200 ft and RVR > 500 m) on the same alternate aerodrome. In the event of only one usable Type B operation at the destination alternate aerodrome, the operator should be able to perform a Type A approach (DH > 250 ft and RVR > 600 m) at the destination alternate aerodrome.

The table below shows that the add-ons at planning stage ensure the ability to perform the immediately higher category precision approach:

[10] https://www.easa.europa.eu/document-library/opinions/opinion-022020

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Available approaches	Minima HELI SA CAT I	HELI SA CAT I planning minima (minima + add-ons)	Targeted category	Targeted category minima	Planning minima > Targeted category minima
2 Type Bs	DH > 130, RVR > 300	DH > 230, RVR > 600	Type B CAT I	DH > 200, RVR > 500	Ok
1 Type B	DH > 130, RVR > 300	DH > 280, RVR > 750	Type A	DH > 250, RVR > 600	Ok

RVR in metres (m)
DH in feet (ft)

Under CAT, the new regulatory framework on fuel/energy planning and management has defined cases where no Part-MET-certified weather information is available at destination, yet only one destination alternate is required. In this case, it is foreseen that the planning minima increment at the destination alternate should be doubled (+ 400 ft/+ 800 m RVR instead of + 200 ft/+ 400 m). This amendment doubles the planning minima increment at the destination alternate in that case, if a HELI SA CAT I approach operation is foreseen.

Point (g) Training

The reduced minima can only be implemented if the crews are trained accordingly. The training should take place at the lowest minima available to the crew, or the crew's operating minima should be increased accordingly. The use of an FSTD is essential.

Each crew member should conduct successfully an approach and landing and an approach and go-around every year.

Any aerodrome used for HELI SA CAT I approach operations should be considered Category C. This should ensure that the commander:

— has sufficient knowledge of the eligibility of the landing system;

— has sufficient knowledge of the HELI SA CAT I operating minima, including the planning minima;

— has sufficient knowledge of the radio altimeter cross-check procedure, considering the local geography on a given CAT I ILS procedure;

— is aware of any local considerations.

Point (g)

The FAA allows authorised helicopter operators to fly DHs of 100 ft on a CAT II landing system. The FAA also allows helicopters to use half the RVR available to Category A aeroplanes, but no less than 350 m on any given CAT I approach.

The FAA approach is described here.

Point (g)(6) Multi-crew operations with a technical crew member (TCM)

The TCM is expected to be either a HEMS TCM, a nNVIS TCM, or both.

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The training of the TCM is based on the proposed training programme of the HEMS TCM, 'Helicopter emergency medical services performance and public interest sites' (see RMT.0325 & RMT.0326 (OPS.057(a) & OPS.057(b))[11].

A HEMS TCM that is provided with training towards the monitoring and navigation functions under HEMS should not undergo additional training under the HELI SA CAT I specific approval.

Point (i) Single-pilot operations in AMC4 SPA.LVO.100(c)

Single-pilot operations are not eligible for HELI SA CAT I. However, helicopters operated with a singlepilot, including helicopters operated under NCO, may be operated under standard CAT II if the helicopter is certified for single-pilot CAT II.

Point (j) Rotorcraft flight manual limitations in AMC4 SPA.LVO.100(c)

— Many helicopters in the current fleet have a minimum DH of 200 ft in the limitations section of the flight manual. However, this is essentially because the manufacturers have not demonstrated lower DHs yet. The flight manuals of modern helicopters may be modified without changes to the helicopter itself.

— Until the helicopters have lower DHs, the lower RVRs for a given DH and the alternative planning minima at the destination alternate remain applicable under the specific approval.

GM6 SPA.LVO.100(c) 'Operations with operational credits — helicopter special authorisation category I (HELI SA CAT I) operations'

This new GM has been introduced to increase the number of available and accessible alternates within the available fuel range.

The use of operational credits under CAT I rather than the use of the CAT II definition is a pragmatic solution to avoid any ATM/ANS-related issues with CAT II operations on CAT I navigation aids, to aerodromes not designed for CAT II operations.

The use of CAT II was initially considered for alignment with the FAA COPTER CAT II approval concept, and was dismissed for the reason above.

This GM is a replication of GM2 SPA.LVO.100(c) applicable to aeroplanes. It provides further guidance on the extension of the HELI SA CAT I operations to helicopters equipped with 3-axis autopilots.

2.5.2.2 Detailed explanations on the specific approval enabling reduced VFR minima on mixed IFR/VFR flights

AMC1 SPA.PINS-VFR.100 'General'

AMC1 SPA.PINS-VFR.100 has been introduced following the introduction of a new specific approval at implementing rule level, to enable reduced minima on mixed IFR/VFR flights.

AMC1 SPA.PINS-VFR.100 is similar to the draft amendment to the HEMS operating minima, as proposed in NPA 2018-04 (see relevant extracts in Section 2.3.2.2 of that NPA). The operating minima are higher than the equivalent HEMS operating minima, and the training provisions are lower.

[11] https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2018-04

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The operating minima defined under the Annex (Rules of the air) to Regulation (EU) No 923/2012[12] are considered to be already very low by day:

— Class F and G airspace: visibility 1 500 m (which may be reduced to 800 m in some Member States), clear of cloud, and in sight of the surface.

— Class B–E airspace: visibility 5 000 m and distance from clouds 1 000 ft. Under special VFR: visibility 1 500 m (which may be reduced to 800 m for helicopters), and ceiling 600 ft.

By day, the visibility need not be reduced. In some cases, it may need to be increased above 800 m to increase the safety during the transition from IFR/IMC to VFR, which transition is considered to be very sensitive. The ceiling may need to be reduced by day as it is expected that a short cruise phase at MDH under VFR with marginal weather conditions will be necessary before the descent can take place.

By night, the operating minima defined under the Annex (Rules of the air) to Regulation (EU) No 923/2012 are as follows:

— 5 000 m visibility and ceiling 1 500 ft.

— Class B–E airspace under special VFR: ceiling and visibility may be reduced, but ceiling may not be reduced below 600 ft.

By night, there is a wide range of weather conditions where the VFR segment of the flight can take place safely and can be allowed to take place if the VFR operating minima are reduced.

It is also expected that a short cruise phase at MDH under VFR with marginal weather conditions will be necessary before the descent can take place. The VFR ceiling minima may need to be reduced for the duration of this very short cruise.

The transition from IFR to marginal VFR, and the short VFR cruise are operations that require standard operating procedures (SOPs), knowledge of environmental cues that are useful for VFR navigation, and most importantly, experience and training.

SOPs are expected to be described in the OM. An alternative to providing charts in the OM is provided for NCO operators.

If the distance from the heliport/operating site to either the MAPt or the IDF is greater than 3 000 m, the VFR operating minima published under the Annex (Rules of the air) to Regulation (EU) No 923/2012 should apply. This distance could be increased, but this would require a crew with much more experience and training.

The training and checking elements that are provided under Part-CAT, and which are considered essential for such operations, are extended to non-CAT operators that request this specific approval. Additional training elements have been added to cover the specific issues pertaining to operations. CAT operators need not duplicate the training and checking elements that are already in place.

The use of a suitable FSTD is considered to be needed for the training.

Finally, the reference to the minima in Annex (Rules of the air) to Regulation (EU) No 923/2012 in the new Subpart N HELICOPTER POINT-IN-SPACE APPROACHES AND DEPARTURES WITH REDUCED VFR

[12] Commission Implementing Regulation (EU) No 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Implementing Regulation (EU) No 1035/2011 and Regulations (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010 (OJ L 281, 13.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0923&qid=1655974940180).

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MINIMA has been introduced. The intent is to further reduce VFR operating minima after a PINS approach and on a PINS departure for HEMS operations as proposed in NPA 2018-04. When this happens, the SPA.PINS-VFR approval will no longer be compatible with the reduced VFR minima provided under SPA.HEMS.

The specific approval is accessible to CAT (other than HEMS), NCC, SPO and NCO operators, with access to a suitable FSTD for their helicopter type.

The VFR operating minima introduced in AMC1 SPA.PINS-VFR.100 are valid for all classes of airspace, and are based only on the capability of the pilots to fly and navigate visually, because they do not need to take into account traffic deconfliction.

— At altitudes close to the MDH and within a 3-km radius of the MAPt or IDF, there should be no conflicting IFR traffic, because any IFR traffic will be much higher, or the conflict will be worse under IFR:
  - once the departing VFR helicopter reaches the IDF, it transitions to IFR and climbs;
  - or if the approaching IFR helicopter goes around at or before the MAPt instead of flying the VFR segment.

— If in use, the weather conditions will be IMC except for helicopters that use this specific approval. No conflicting VFR traffic should exist.

— Only in case a helicopter transitions to VFR near the MAPt while another helicopter departs VFR to an IDF under the same specific approval, and the IDF is close to or co-located with the MAPt, can a traffic conflict exist. Considering the very short distances and durations of the VFR segments of flight, the traffic should already be deconflicted for the purpose of the IFR segments.

The AMC also covers hoist operations. Note: HESLO with an IFR segment of flight are not foreseen in the AMC.

The wording clarifies that the visual references to the surface available during the take/off or at the MAPt are maintained.

For approach/departure procedures where the MAPt/IDF is located within 3 to 5 km of the landing site/departure site, the AMC introduces a reduction in the ceiling but not in visibility.

The scope of the reduced VFR minima has been extended to the cancellation of IFR on other than PinS approaches. In this case, there are three safe options to choose from when reaching the planned point for cancellation of IFR:

(a) Cancel IFR and continue VFR to the planned destination

(b) Go around

(c) Continue the IFR approach and land on the aerodrome to which the instrument approach is attached.

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2.5.2.3 Detailed explanations regarding the use of NVIS on visual segments of IFR flights

AMC1 and GM1 SPA.NVIS.120 'NVIS operations under IFR'

AMC1 SPA.NVIS.120 is intended to allow the use of NVIS on the visual segment of an IFR flight. Additionally, it:

— provides means of compliance for the use of NVIS on the visual segment of IFR flights, and in the transition phase from instrument to visual flight and vice versa;

— maintains the principle that there will be no operational credit for NVISs, as defined in the implementing rules;

— makes use of former provisions under AMC1 SPA.NVIS.140 to ensure that SOPs will be defined for such operations;

— makes use of the new AMC1 SPA.NVIS.130 for the provision of training to the crew.

Points (c) and (d) of the AMC clearly make reference to 'unaided vision' as opposed to 'unaided flight'. GM1 SPA.NVIS.120 clarifies that 'unaided vision' can be used with night vision goggles (NVG) in a flipped-down position. The GM explains when and how an NVIS may be useful under IFR.

Some additional text (points (a), (b) and (c) of GM1 SPA.NVIS.120) as consulted in NPA 2019-09 has not been retained.

AMC1 SPA.NVIS.130(f) 'Checking of NVIS crew members'

This AMC introduces clarity regarding the validity of NVIS checking.

AMC2 SPA.NVIS.130(f) 'Crew training and checking — NVIS operations under IFR', AMC3 SPA.NVIS.130(f) 'Crew training and checking — technical crew member training for operations under IFR — initial and recurrent general training and checking' and GM1 SPA.NVIS.130(f) 'Crew training and checking — suitable FSTD — NVIS operations under IFR'

The content of *AMC2 SPA.NVIS.130(f)* appeared in NPA 2019-09 as AMC1 SPA.NVIS.130. The original proposed text has been renumbered and complemented with *AMC3 SPA.NVIS.130(f)* and *GM1 SPA.NVIS.130(f)*.

This new AMC is intended to allow the use of NVIS on the visual segment of an IFR flight. It also introduces provisions for crew composition and crew training for the use of NVIS under IFR.

Due to the workload and complexity of the transition phase from instrument to visual flight, and considering the additional task of scanning the environment unaided and with the use of NVGs, this kind of operation is assumed to require a minimum crew of two.

The crew training should include a variety of weather conditions, including conditions close to IFR minima, and a variety of lighting conditions. Considering the risk of mishandling of the helicopter at low height during training, a suitable FSTD should be used.

AMC2 SPA.NVIS.130(f) introduces provisions for training, not for checking, under the Rotorcraft Roadmap policy to provide pilots with more training and less checking.

The suitability of an FSTD for NVIS training is now defined.

NVIS under IFR is defined as a multi-crew operation.

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GM1 SPA.NVIS.140 Information and Documentation

This amendment to this GM is intended to clarify that the use of NVIS on the visual segment of an IFR flight is allowed.

The amended GM describes the use of NVIS on the visual segment of IFR flights. The paragraph on training remains unchanged because it refers to Section 3, and Section 3 is updated to cover operations under IFR.

The amended GM also incorporates the elements of SIB 2019-04 'Avoiding Obstacles Lighted with Light-Emitting Diode Obstacle Lights whilst Operating with Night Vision Goggles'[13] that are applicable to helicopter operators. The SIB will remain unchanged because it is also applicable to authorities and entities in charge of obstacle lighting.

2.5.2.4 Detailed explanations regarding the modernisation of airborne radar approaches

AMC1 SPA.HOFO.120 'Destination aerodrome – sufficient operational contingency'

This AMC includes the material that was transferred from implementing rule level. It corrects a translation mistake by changing 'cloud base' into 'ceiling'. It merges this material with the coastal aerodrome AMC and clarifies the operational conditions for the use of coastal aerodromes.

'Cloud base' remains in the definition of the 'coastal aerodrome' operating minima, because the 'coastal aerodrome' is based on VFR, or on VFR backup if an instrument approach is available.

In particular, it is clarified that operations to a coastal aerodrome are possible without an instrument approach, if VFR operating minima are used.

AMC1 SPA.HOFO.125 'Airborne radar approach (ARA)'

The title has been amended to reflect the change in the title of the associated IR. The note has been deleted and replaced by a new AMC for OEM approaches. The AMC discusses only ARA and is not extended to other offshore approaches, so the term 'AIRBORNE RADAR APPROACH (ARA)' has been introduced in the subtitle. The contents of the AMC remain unchanged.

With regard to the new definitions, an offshore standard approach procedure (OSAP) approach (or an ARA) approach should be considered to be a Type A approach (which requires an MDA/H ≥ 250 ft) with operational credit (as the actual MDA/H = 200 ft, but not less than 50 ft above the elevation of the helideck). The operational credit can be explained by the use of the radio altimeter.

AMC2 SPA.HOFO.125 'OSAP — original equipment manufacturer (OEM) — certified approach system'

This amended AMC modernises offshore radar approaches.

It introduces AMC on OEM-designed offshore approaches. The OEM-designed approaches are defined in the flight manuals, and cannot be changed. If meeting a certain standard and used in the proper way, they may achieve equivalent results to the ARA and even optimise the flight path. OEM-designed approaches may make better use of automation by providing automatic flight control system (AFCS) modes and flight management system (FMS) approach designs that are built for the purpose.

[13] https://ad.easa.europa.eu/ad/2019-04

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The aim of this new AMC is to provide OEMs and operators with means of compliance for the use of these new approaches including:

— speeds,

— minimum heights,

— descent angles,

— distance to obstacles,

— use of GNSS.

This new AMC introduces the use of SBAS, based on the limited research performed so far, including UK CAA Paper 2010/01[14]. In order to cross-check the SBAS altitude with the radio altimeter, geometric altitude display may be useful. Also, SBAS should be considered to be available only if within the SBAS coverage. Finally, the AMC may need to be updated if new data or research becomes available.

Minimum heights and decision ranges are currently the same as the radar approach because OEM designs are not considered to allow for lower minima. Also, in marginal weather conditions and at night, the visual segment of the flight is a limiting factor and does not need to be shortened.

The AMC allows for OEM designs that use a flight path with either a lateral offset, or an offset initiation point (OIP), or both.

It should be stressed that point (i) is a provision for the monitoring and alerting function, and does not require full RNP 0.3 capability.

GM1 SPA.HOFO.125 'Airborne radar approach (ARA)'

The GM discusses only the ARA and is not extended to other offshore approaches, so a reference to the ARA has been introduced in the subtitle.

GM2 SPA.HOFO.125 'Global navigations satellite system (GNSS)/area navigation system — airborne radar approach (ARA)'

The GM has been updated to match latest technologies and definitions.

AMC1 SPA.HOFO.125(g) 'Training and checking for OSAPs'

This intent is to modernise offshore radar approaches.

The airborne radar approach (ARA) was initially developed for CAT, based on the training and checking of pilots under Part-CAT. Provisions for training need to be included in order to extend this kind of approach to non-CAT operations.

AMC1 SPA.HOFO.125(g) is not intended to increase the training provisions applicable to CAT operators that hold a SPA.HOFO approval. It only introduces equivalent training for NCC and SPO operators that use the ARA.

[14] https://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=4096

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2.5.2.5 Detailed explanations regarding take-off minima

AMC2 SPA.LVO.100(a) 'LVTO operations — helicopters'

The AMC includes a note to ensure that the take-off minima for helicopter PinS departures remain at 800 m. The reason for including this note was ICAO Doc 8168 (PANS-OPS) which requires that helicopters:

— remain visual until the IDF;

— be capable of manoeuvring and returning to the take-off point at any time during the visual segment of the flight.

It is considered relevant to maintain a reference to VIS.

Note: ICAO Doc 8168 (PANS-OPS) is currently proposed to be amended to allow pilots to enter a cloud layer before the IDF under certain conditions. The transition would take place no lower than the minimum crossing altitude. In anticipation of these amendments, Doc 8168 still does not permit take-off minima below 800 m, even under a specific approval.

2.6. How we want to achieve it — detailed explanation for aeroplanes and helicopters

2.6.1 AMC & GM related to the use of a destination and a destination alternate that are served with GNSS-based approaches only

AMC1 CAT.OP.MPA.192(d), AMC1 NCC.OP.153 and AMC1 SPO.OP.152 'PBN operations'; GM2 CAT.OP.MPA.192(d), GM2 NCC.OP.153 and GM2 SPO.OP.152 'GNSS robustness against loss of capability — helicopters'

The new provisions increase the number of available and accessible alternates within the available fuel range.

Helicopter onshore IFR operations are expected to be mainly supported by GNSS-based PinS approaches to a non-aerodrome destination. The former AMC required an alternate with a conventional navigation aid, which can be a limiting factor when considering the fuel range of a helicopter, which is very low compared to that of an aeroplane. An alternate may or may not be available.

The former AMC led helicopter operators to fly VFR in marginal conditions and take unnecessary risks. This is now corrected.

Helicopter LLRs are PinS approaches which are currently based on RNP 0.3 and are below the minimum altitude to receive conventional navigation aids. Very few helicopters are certified for icing conditions. The go-around on a helicopter PinS approach may be based solely on GNSS. As a result, in case of a loss of GNSS navigation in the en-route phase or during the approach, the helicopter might collide with terrain or encounter icing conditions against which it is not protected before it can receive conventional navigation aids and be guided to the IAF of a conventional approach.

For these reasons, the former AMC set lower standards for helicopters than it did for aeroplanes.

The new AMC achieves both of the following goals:

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— to provide options for helicopters to rely solely on GNSS for the approach at destination and at the alternate, and increase the proportion of helicopter flights that can be planned under IFR; and

— to increase the reliability and integrity standards of GNSS for helicopters, with obvious safety benefits in the en-route phase and in the case of a go-around.

The increased reliability and integrity of GNSS should be the condition to obtain the desired operational credit under IFR.

The integrity and reliability criteria are considered to be sufficient, considering that the risk of losing the satellite segment of the GPS navigation is negligible compared to losing GNSS navigation due to the failure of an on-board system, and because the safety target set for helicopters is lower than for aeroplanes, as discussed above. The amendment will increase safety by offering incentives to fly IFR rather than marginal VFR.

Space weather predictions should be considered if a solar event is predicted to have sufficient strength to result in a loss of lock of one or more of the satellites of the GNSS or SBAS components. Not all such space weather events are predictable, but most should have limited duration. Space weather events that only reduce the navigation precision should be mitigated by the use of GBAS or SBAS.

Finally, multi-constellation multi-frequency GNSS will provide full redundancy within the space segment of the GNSS navigation system in the near future, as well as many other advantages. This technology will render obsolete the need for a conventional navigation backup and should be incentivised, even if conventional navigation should remain in use when available.

The ICAO PBN Manual is expected to be amended and new industry standards are expected to be developed to offer new capabilities to aircraft operators.

Future avionics systems are expected to take advantage of these new capabilities and to ensure the reliability and integrity of GNSS without relying on conventional navigation aids.

Helicopter operators that wish to rely only on GNSS for the approach at destination and at the alternate should upgrade to such navigation systems when available.

As it is impossible to mention future standards or to refer to unavailable systems in the AMC material, this incentive is only reflected in point (e) of the GM. The AMC should be revised in the future to ensure that multi-constellation multi-frequency GNSS is implemented when available, whenever operators rely on GNSS for the approach to both the destination and to the alternate.

The use of SBAS and the redundancy of on-board systems are expected to remain necessary to ensure that no single on-board equipment failure (e.g. antenna, GNSS receiver, FMS, or navigation display failure) can compromise safety.

Points (b)(2) of *AMC1 CAT.OP.MPA.192(d), AMC1 NCC.OP.153* and *AMC1 SPO.OP.152* are restricted in scope to the instrument approach to avoid duplication with CAT.IDE.H.345 and NCC.IDE.H 250, as relevant, which already require redundant systems for the navigation in accordance with the flight plan, which includes all the flight except the instrument approach.

Points (b)(3) of AMC1 CAT.OP.MPA.192(d), AMC1 NCC.OP.153 and AMC1 SPO.OP.152, as well as *points (b) of GM2 CAT.OP.MPA.192(d), GM1 NCC.OP.153 and GM1 SPO.OP.152* clarify that jamming should

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be considered in all phases of flights that rely on GNSS and extend jamming issues to all GNSS frequencies because a jamming event is most likely to affect all GNSS frequencies at the same time.

Points (b)(4) and (b)(5) of AMC1 CAT.OP.MPA.192(d), AMC1 NCC.OP.153 and AMC1 SPO.OP.152 have been added to introduce more precision regarding the expected resilience to a temporary loss of GNSS signal such as a jamming event. Reliance on air traffic services is expected to be a sufficient mitigation for the prevention of mid-air collisions, but not sufficient to avoid a collision with an obstacle in the immediate vicinity of a RNP 1 or RNP 0.3 low-level helicopter route.

2.6.2 AMC & GM to Annex VI 'Non-commercial operations with complex motor-powered aircraft' (Part-NCC)

AMC and GM to NCC.OP.110 'Aerodrome operating minima — general'

For all aeroplane-related AMC and GM, the text has been amended for consistency with the changes to the related AMC and GM to CAT.OP.MPA.110.

AMC3 NCC.OP.110 'Take-off operations' has editorial changes and a new provision for the calculation of the 'required RVR' for aeroplanes. The new provision provides clarity depending on the aeroplane used.

The content of the former AMC4 NCC.OP.110 'Criteria for establishing RVR/CMV' has been moved to the new *GM7 NCC.OP.110*.

The fully revised *AMC4 NCC.OP.110 'Determination of DH/MDH for instrument approach operations — aeroplanes'* combines and amends the content of the former AMC4 NCC.OP.110 'Criteria for establishing RVR/CMV' and AMC5 NCC.OP.110 'Determination of RVR/CMV/VIS minima for NPA, APV, CAT I — aeroplanes'. Parts of the old content of AMC4 and AMC5 have been moved to GM. The aeroplane part of this AMC4 NCC.OP.110 includes point (a), point (b), Table 4 and Table 5. The helicopter part is described in Section 2.5 and this section.

The fully revised *AMC5 NCC.OP.110 'Determination of RVR or VIS for instrument approach operations — aeroplanes'* combines and amends the content of the former AMC4 NCC.OP.110 'Criteria for establishing RVR/CMV' and AMC5 NCC.OP.110 'Determination of RVR/CMV/VIS minima for NPA, APV, CAT I — aeroplanes'. Parts of the old content of AMC4 and AMC5 have been moved to GM. The AMC also now provides for the applicable RVR to be determined depending on the type of runway used, i.e. where a precision approach is flown to a non-precision runway or an instrument approach to a non-instrument runway. The lowest applicable RVR may be limited by either the type of runway, the DH/MDH and the class of lighting or the ground facilities and the type of approach, so the AMC specifies that the RVR to be used should be not less than the greatest of these three as determined by the applicable tables. The content of the AMC is identical to that of the provisions for CAT operators (AMC5 CAT.OP.MPA.110).

AMC8 NCC.OP.110 '*Conversion of visibility to CMV – aeroplanes'* has been amended to align with the revised AMC10 CAT.OP.MPA.110. This explains the circumstances in which CMV may be used in place of RVR or VIS.

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AMC3 NCC.OP.110 'Take-off operations'

The AMC includes changes due to new definitions as well as some minor changes to reflect the operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

Point (c)(2)(iii) and new footnote (**) in Table 3

By procedure design, the take-off minima should ensure that the pilot has the capability to manoeuvre and land in case of any unforeseen event during the visual segment to the IDF. The operating minima of the helicopter manoeuvre to return to the take-off point have been defined.

The second footnote to Table 3 introduces VIS. The aim is to avoid the use of CMV for the take-off phase in cases where visibility is more relevant, especially if there is a need to return to the take-off point.

AMC4 NCC.OP.110 'Determination of DH/MDH or instrument approach operations – aeroplanes' and ***AMC6 NCC.OP.110 'Determination of RVR or VIS for type A instrument approach and type B CAT I instrument approach operations — helicopters'***

Explanations regarding terminology are available in Section 2.3. Table 4 is common to all aircraft and explanations to it can also be found in Section 2.4. The AMC includes changes due to new definitions as well as some minor changes to reflect the operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

Point (c)

Helicopters need a specific paragraph to introduce the calculation of the DHs and MDHs because of the following:

— Helicopters need to refer to separate calculation tables; see explanatory note to Tables 4, 6 and 11.

— Helicopter operating minima need not distinguish between Type A approaches using CDFA, Type A approaches not using CDFA, and Type B approaches.

— Helicopter operating minima should not be increased when not using the CDFA technique; see explanatory note to AMC4 CAT.OP.MPA.110.

— With helicopters, there is no need to add an increment to the MDH when converting it into a DH for the purpose of using the CDFA technique; see explanatory note to AMC4 CAT.OP.MPA.110.

Table 4

Table 4 is extended to helicopters because the system minima are not aircraft-related. Helicopter PinS approaches are a separate kind of approach in PANS-OPS, so they need to be introduced in the list of approach types.

Helicopter PinS approaches with instructions to 'proceed VFR' are cloud-breaking procedures that may be used to continue flight under VFR to an unspecified destination. As opposed to other IFR procedures, it may not be possible to determine the DH/MDH with reference to a given heliport or runway threshold. An alternative solution has been introduced in a footnote.

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Tables 6 and 11

Runways: The obstacle protection of a non-instrument runway is far greater than the obstacle protection of an instrument FATO. There should therefore be no increase in minima based on the type of runway. Any runway is also much bigger than an instrument FATO. No increase in the operating minima should apply. See figure in explanatory note to AMC4 CAT.OP.MPA.110 Table 7 and AMC6 CAT.OP.MPA.110 Table 12.

Instrument FATO: The obstacle protection, lighting and minimum dimensions of an instrument heliport should be sufficient to avoid any increase in the operating minima. No increase in the operating minima should apply.

Non-instrument FATO: A helicopter PinS approach can be designed to a non-instrument FATO with instructions to 'proceed visually'. The minimum distance from the MAPt to the heliport is 1 000 m, in order to provide enough distance for the helicopter to decelerate from IFR speed and land. The minimum RVR is therefore 1 000 m to cover any deficiency in lighting or heliport dimensions.

The minimum RVR for helicopters is changed from 500 m to 550 m to align with aerodrome regulations and the amended Air OPS Regulation.

GNSS/SBAS (LP) is introduced in Table 4. The wording of point (c)(4) considers that Table 6 is not always applicable, as explained in the footnote to that table.

AMC6 NCC.OP.110 'Determination of RVR or VIS for Type A instrument approach and Type B CAT I instrument approach operations — helicopters'

The AMC includes changes due to new definitions as well as some minor changes to reflect the operational capabilities of helicopters. It also introduces PinS approaches to reflect the recent evolution of ICAO Doc 8168 (PANS-OPS).

Points (a) to (f)

The aim is to:

— discuss Type A and Type B approaches and no longer non-precision approaches and CAT I, and use the same table for the determination of the RVR/CMV minima in both cases;

— simplify the structure of the text;

— delete any restrictions to multi-pilot operations. If the helicopter is certified for single-pilot operations under IFR and the single pilot is competent and trained, then the minima should be the same in accordance with performance-based principles. This approach is being transposed form the aeroplane operations. See Section 2.4.

Tables 6 and 11. See explanatory note to AMC4 NCC.OP.110, Tables 6 and 11.

Table 12. The same changes have been introduced to the CAT, NCC, and SPO operating minima. See explanatory note to Table 13 under AMC6 CAT.OP.MPA.110.

Table 13. Table 13 is an editorial change that has been introduced to standardise the wording of the helicopter regulatory material following the changes to the aeroplane regulations as explained in Section 2.4. This amendment does not change the content.

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Other general changes to AMC and GM to NCC.OP.110

— The amended elements for NCC in relation to helicopters mirror the amendments to the AMC and GM to CAT.OP.MPA.110: AMC3 NCC.OP.110 and its Table 3 have been amended as AMC2 CAT.OP.MPA.110 and its Table 3.

— AMC4 NCC.OP.110 and its Tables 4 and 6 have been amended as AMC4 CAT.OP.MPA.110 and its Tables 6 and 7.

— AMC6 NCC.OP.110 and its Table 11 have been amended as AMC6 CAT.OP.MPA.110 and its Table 12.

— AMC9 NCC.OP.110 and its Table 15 AMC6 CAT.OP.MPA.110 changed as AMC11 CAT.OP.MPA.110 and its Table 1.

As for CAT, the RVR/VIS calculations have been introduced in a different way in order to achieve the following:

— PinS approaches with instructions to 'proceed VFR' do not need RVR/VIS calculations. They require VFR minima. The term 'VMC' is not used to avoid unnecessary restrictions in classes of airspace where special VFR is available.

— Only approaches that remain IFR at the DH/MDH and onwards require calculations.

The footnote of Table 11 has been deleted because it is no longer needed.

GM to NCC.OP.112 'Aerodrome operating minima — circling operations with aeroplanes'

GM1 NCC.OP.112 'Supplemental information' has been updated to change 'visibility' with 'VIS' and to remove the references to the instrument approach track being determined by means of radio navigation aids (see also AMC7 CAT.OP.MPA.110).

AMC and GM to NCC.OP.115 'Departure and approach procedures'

The new *AMC1 NCC.OP.115(c) 'Approach flight technique — aeroplanes'* states that all approach operations should be flown as SAp operations and the CDFA technique should be used for NPA procedures. This AMC has been developed to highlight the importance of the SAp and the appropriate technique that should be used when flying a non-precision approach.

AMC and GM to NCC.OP.230 'Commencement and continuation of approach'

The former AMC1 NCC.OP.230 has been renumbered and its subtitle changed; it is now *AMC1 NCC.OP.230(a) 'Minimum RVR for continuation of approach — aeroplanes'*. The content has also been amended: the former point (a) has been transferred to the new AMC1 NCC.OP.230(c) and the former points (b), (c) and (d) have been transferred to the AMC to SPA.LVO.105(c).

With the criteria for the 'controlling' RVR being simplified, it was considered that the intention of the 'approach ban' is to prevent the situation where a pilot arrives at a DH with insufficient visibility to adequately control the aircraft for landing and thus to reduce the rate of missed approaches from the DH. The intention is not to mitigate the risk of loss of control during the roll-out after landing. The only RVR relevant to the 'approach ban' should therefore be the TDZ. Where this is not available, the MID may be used as this is the value most likely to be representative of the TDZ.

With this amendment, a previously complex provision is now simplified; this should increase the probability of it being clearly understood and applied consistently.

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The provision to substitute CMV for RVR is now in AMC8 NCC.OP.110 so it has been removed from here.

The new *GM1 NCC.OP.230 'Application of RVR or VIS reports'* has been introduced to clarify that there is no prohibition on the commencement of an approach based on the reported RVR or visibility. The text of this GM is aligned with CAT.OP.MPA.305, which states in point (a) that a pilot may commence an approach regardless of the reported RVR or visibility. The experts of RMT.0379 considered that the text was not appropriate at implementing rule level as pilots do not require a specific enabling rule to transition from one phase of flight to the next; nevertheless, it was considered important to clarify that in GM. Similar new GM has been also introduced to CAT.OP.MPA.305.

In the new *AMC1 NCC.OP.230(c) 'Visual references for instrument approach operations',* visual reference provisions at DH have been transferred from the former AMC1 NCC.OP.230 point (a), but remain unchanged.

The new *GM1 NCC.OP.230(f) 'Approaches with no intention to land'* clarifies that the prohibition on continuing into the final approach segment is not applicable in this case.

AMC1 NCC.OP.230(b) 'Minimum RVR for continuation of approach — helicopters' and GM1 NCC.OP.230 'Application of RVR or VIS reports'

These amendments have been introduced for consistency with the new AMC1 CAT.OP.MPA.305(a) and AMC1 CAT.OP.MPA.305(b). See above.

AMC1 NCC.OP.230(c) 'Visual references for instrument approach operations'

Points (j), (k) and (l) have been introduced to reflect the design of helicopter PinS approaches.

Helicopter PinS approaches with instructions to 'proceed VFR' are cloud-breaking procedures that may be used to continue flight under VFR to an unspecified destination. By design, a visual reference to thresholds or approach lights may never be available at the MAPt, even in good weather. As the flight should only continue under VFR, the pilot should first ensure that VMC are met.

Visual acquisition of the heliport identification beacon is not sufficient to maintain control of the helicopter in visual flight, and a reference to 'visual ground reference' has been added to point (j).

VMC is replaced by 'VFR criteria' to include special VFR.

GM1 NCC.OP.230(f) 'Approaches with no intention to land'

Approaches with no intention to land might happen in the context of training, but also in the context of specialised operations, outside a training environment. In such case, there should not be an approach ban. Most of the AMC initially proposed in the NPA on this topic were upgraded to implementing rule level, and the remaining elements have become GM.

2.6.3 AMC & GM to Annex VII 'Non-commercial operations with other than complex motor-powered aircraft' (Part-NCO)

AMC1 NCO.OP.101(a) 'Pre-flight altimeter check'

The AMC text is a simplified version of the pre-flight procedures set out in ICAO Doc 8168 (PANS-OPS) Volume I, Part III, Section 1, Chapter 3.2.

The procedure when no altimeter setting is available has been relaxed since it is only necessary to verify the altimeter setting if it is to be used for ATM purposes.

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AMC1 NCO.OP.110 'Take-off operations'

Considering the input from the NPA consultation, EASA decided that LVTO should remain subject to a Part-SPA approval, and the provisions proposed for LVTO including point (c) were withdrawn. Points (a)(2) and (3), as proposed in the NPA, have been moved to AMC1 NCO.OP.175, consistent with the CAT division of moving pilot-in-command responsibilities to the equivalent rule. Points (b)(3) and (4) have been added for helicopters.

AMC2 NCO.OP.110 'RVR or VIS for instrument approach operations — determination of DH/MDH for instrument approach operations — aeroplanes'

The AMC contains parts of the former GM4 NCO.OP.110, which has been deleted.

The former AMC2 has been renumbered as 'AMC3'.

The former AMC3 has been deleted. Its content has been moved to GM5 and amended as explained below.

The determination of RVR is a simplified, for proportionality reasons, version of the corresponding AMC introduced into Part-CAT. A cut-off (maximum RVR) of 1 500/2 400 m (CAT AB/CD respectively) is applied regardless of the nature of the approach. This is particularly important for NCO, because in many cases there is a realistic choice for the pilot-in-command to choose to fly VFR or special visual flight rules (SVFR) when the flight visibility exceeds 1 500 m. Applying a higher minimum to an instrument approach procedure would create inconsistency.

For helicopters, text on PinS has been added.

GM5 NCO.OP.110 'Effect of temporarily failed or downgraded ground equipment on landing minima'

The former AMC3 has become GM and has been rewritten to be more useful for NCO. Following the NPA consultation, point (c) has been deleted as no longer relevant.

GM1 NCO.OP.110 'Aircraft categories'

The former GM6 has been renumbered as GM1. A note has been added to clarify that helicopters are also eligible for aircraft Category H.

GM3 NCO.OP.110 'Means to determine the required RVR based on DH and lighting facilities'

This new text of GM3 NCO.OP.110 explains the construction of Table 2 in AMC2 NCO.OP.110

GM4 NCO.OP.110 'Use of third-party information'

This new text of GM4 NCO.OP.110 replaces the former GM1 'Commercially available information', which has been considered to be of too little help.

The GM clarifies that the pilot-in-command should verify that the method for calculating minima is in accordance with this regulation, but is not expected to verify each and every calculation.

GM1 NCO.OP.111 'Approach operations — vertical path control for NPA'

This new GM has been written specifically for NCO, incorporating elements of the former material that was originally written for CAT.

It replaces the former GM2 NCO.OP.110, GM7 NCO.OP.110 and the former AMC1 NCO.OP.111.

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GM2 NCO.OP.111 and GM2 NCO.OP.112 'DH/MDH — calculation of DA/MDA'

New GM has been added to explain why NCO.OP.111 and NCO.OP.112 must refer to DH/MDH, even though MDA/DA will usually be used operationally.

AMC and GM to NCO.OP.142 'Destination alternate aerodromes — instrument approach operations'

In the NPA, proposals were made for certain GM with an alleviation allowing helicopters to select both destination and destination alternates with only GNSS approach procedures at both.

Comments were received suggesting that similar provisions should be made for aeroplanes. A change to the IR was adopted. This change is supported by AMC setting out the conditions in which aeroplanes and helicopters may select both destination and destination alternate with only GNSS approach procedures at both. The AMC, which have been completely redrafted, have been designed to help mitigate the risk of a GNSS failure affecting both destination and destination alternate.

GM1 NCO.OP.143 and GM1 NCO.OP.144 'Minimum safe IFR height'

The GM has been introduced to clarify the meaning of the amended implementing rules.

AMC1 NCO.OP.175 'Meteorological conditions for take-off — aeroplanes'

Procedures for comparing the observed conditions with aerodrome operating minima have been moved here from AMC1 NCO.OP.110 for consistency with the other Parts and to separate elements *establishing* aerodrome operating minima from elements supporting *compliance* with aerodrome operating minima during operations.

AMC1 NCO.OP.210

The acceptable visual references at DH or MDH have been amended to take into account the needs of helicopter approaches consistently with the other Parts. The reference to OMs has been deleted.

AMC1 NCO.IDE.A.195(a) and AMC1 NCO.IDE.H.195(a) 'Navigation equipment — RNAV substitution — scope of RNAV substitution'

These AMC provide means of compliance for the use of GNSS-based systems to substitute for conventional navigation aids in certain circumstances.

The text of the AMC relates to the GM1, GM2 and GM3 to NCO.IDE.A.195(a) and NCO.IDE.H.195(a) that have been added to provide further explanation. Substitution for distance measuring equipment (DME) is provided only where the ground-based DME transponder is unserviceable or the airborne DME transceiver is found to be unserviceable in flight. It is not intended to disincentivise equipage with a DME transceiver.

AMC1 NCO.IDE.A.195(b) and AMC1 NCO.IDE.H.195(b) 'Appropriate contingency action'

These AMC have been also introduced to help implement the appropriate contingency action required by the rule, similarly to AMC1 NCO.OP.142.

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2.6.4 AMC & GM to Annex VIII 'Specialised operations' (Part-SPO)

GM1 SPO.OP.101 'Altimeter-setting procedures'

The GM provides references to ICAO Doc 8168 (PANS-OPS) for guidance on altimeter-setting procedures. The content of the GM is aligned with that of GM1 NCC.OP.101 for Part-NCC.

AMC2 SPO.OP.110 'General'

AMC2 SPO.OP.110 is the former AMC3 SPO.OP.110 with editorial changes and updates of cross-references.

AMC3 SPO.OP.110 'Take-off operations'

AMC3 SPO.OP.110 is based on the former AMC4 and AMC5 SPO.OP.110. The intent is full alignment with Part-NCC.

Table 3 includes helicopter PinS departures. See explanatory note to AMC3 NCC.OP.110).

Point (c) and Table 3 are extended to SPO operations with non-complex helicopters because the conditions on a FATO, an operating site or an offshore helideck are the same as for operations with complex helicopters.

The former contents of AMC5 SPO.OP.110, which describes take-off operating minima for non-complex aeroplanes, have been moved to points (a) and (b) of AMC3 SPO.OP.110.

AMC4 SPO.OP.110 'Determination of the DH/MDH for instrument approach operations'

See explanatory note to AMC4 NCC.OP.110.

AMC5 SPO.OP.110 'Determination of RVR or VIS for instrument approach operations — aeroplanes'

The intent is full alignment with the Part-NCC wording. See Section 2.6.2.

This AMC is the former AMC7 SPO.OP.110 that has been renumbered. For explanations on the content, see AMC5 NCC.OP.110.

AMC6 SPO.OP.110 'Determination of RVR or VIS for Type A instrument approach and Type B CAT I instrument approach operations — helicopters'

This is the former AMC8 SPO.OP.110, amended for consistency with Part-NCC regarding both aeroplanes and helicopters. See Section 2.6.2 and the explanatory note to AMC5 and AMC6 NCC.OP.110 in Section 2.7.11.

The former AMC6 SPO.OP.110 has been deleted for consistency with Part-NCC.

AMC7 SPO.OP.110 'Visual approach operations'

This AMC is the former AMC2 SPO.OP.110, which has been renumbered for consistency with Part-NCC, without changing its content.

AMC8 SPO.OP.110 'Conversion of visibility to CMV — aeroplanes'

The former AMC9 SPO.OP.110 has been renumbered. The amendments to it have been introduced for consistency with Part-NCC. See Section 2.6.2.

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AMC9 SPO.OP.110 'Effect on landing minima of temporarily failed or downgraded ground equipment – CMPA'

The former AMC10 SPO.OP.110 has been renumbered. The amendments to it have been introduced for consistency with Part-NCC.

AMC10 SPO.OP.110 'Effect on landing minima of temporarily failed or downgraded ground equipment – other than CMPA'

The former AMC11 SPO.OP.110 has been renumbered. Point (b) has been deleted to align AMC10 SPO.OP.110 with AMC9 SPO.OP.110 for helicopters, and because it was not proportionate to maintain it for non-complex aeroplanes.

Explanatory note to GM5, GM6, GM7, GM8, GM9, and GM10 to SPO.OP.110 and GM1 SPO.OP.110(b)(5)

The above GM were originally developed for Part-NCC. The guidance is extended to Part-SPO.

AMC1 SPO.OP.215(a) 'Minimum RVR for continuation of approach — aeroplanes', AMC1 SPO.OP.215(b) 'Minimum RVR for continuation of approach — helicopters' and GM1 SPO.OP.215 'Application of RVR or VIS reports'

These amendments have been introduced for consistency with those in Part-CAT and Part-NCC (see above).

For aeroplanes, it remains forbidden to continue the approach below 1 000 ft, or to continue into the final segment if the (M)DH is higher than 1 000 ft, if an RVR or VIS is available and below the operating minima.

If no RVR or VIS is available, then it is not forbidden to continue to the (M)DA/H.

For helicopters operations, the approach ban remains only if all three conditions are met: a RVR is reported AND it is lower than 550 m AND it is lower than the operating minima.

AMC1 SPO.OP.215(c)

The intent is full alignment with Part-NCC. See AMC1 NCC.OP.230(c).

GM1 SPO.OP.215(f) 'Approaches with no intention to land'

Approaches with no intention to land might happen in the context of training, but also in the context of specialised operations, outside a training environment. In such case, there should not be an approach ban. Most of the AMC initially proposed in the NPA on this topic were upgraded to implementing rule level, and the remaining elements have become GM.

AMC and GM to SPO.OP.235 'EFVS 200 operations'

The operational credits available under Part-NCC have been extended to Part-SPO. AMC and GM to SPO.OP.235 have therefore been introduced, based on those developed for Part-NCC.

Point (b)(1) of *AMC2 SPO.OP.235(a)(2), '*US Standard for Terminal Instrument Procedures (TERPS)'. For more information, please refer to:

https://www.faa.gov/regulations_policies/orders_notices/index.cfm/go/document.information/documentID/1038173.

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2.7. What are the benefits and drawbacks of the amendments

Regarding the AMC and GM adopted with this Decision, the regulatory impact assessment (RIA) for all types of operations can be found in NPA 2018-06. This assessment has been reviewed. It is still valid and up to date.

For information, refer to the RIA included in NPA 2018-06.

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3. How we monitor and evaluate the amended AMC and GM

Monitoring is a continuous and systematic process of data collection and analysis with regard to the implementation/application of a rule/activity. It generates factual information for future possible evaluations and impact assessments and helps to identify actual implementation issues. The monitoring plan proposed by EASA in Opinion No 02/2021 applies to this Decision. For more information please refer to Sections 2.10 and 3.6 of EASA Opinion No 02/2021.

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4. References

4.1. Related EU regulations

— Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 96, 15.10.2012, p 1).

4.2. Related EASA decisions

— Decision N° 2012/015/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council — 'Guidance Material to Annex I — Definitions'

— Decision 2014/025/R of the Executive Director of the Agency of 28 July 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ARO of Regulation (EU) No 965/2012 and repealing Decision 2014/014/R of the Executive Director of the Agency of 24 April 2014 — 'AMC and GM to Part-ARO — Issue 3'

— Decision 2014/017/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-ORO of Regulation (EU) No 965/2012 and repealing Decision 2012/017/R of the Executive Director of the Agency of 24 October 2012 — 'AMC and GM to Part-ORO — Issue 2'

— Decision 2014/015/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-CAT of Regulation (EU) No 965/2012 and repealing Decision 2012/018/R of the Executive Director of the Agency of 24 October 2012 — 'AMC and GM to Part-CAT — Issue 2'

— Decision N° 2012/019/Directorate R of the Executive Director of the Agency of 24th October 2012 on Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council — 'Acceptable Means of Compliance and Guidance Material to Part-SPA'

— Decision N° 2013/021/Directorate R of the Executive Director of the Agency of 23 August 2013 on adopting Acceptable Means of Compliance and Guidance Material for Non-commercial operations with complex motor-powered aircraft (Part-NCC)

— Decision 2014/016/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-NCO of Regulation (EU) No 965/2012 and repealing Decision 2013/022/R of the Executive Director of the Agency of 23 August 2013 — 'AMC and GM to Part-NCO — Issue 2'

— Decision 2014/018/R of the Executive Director of the Agency of 24 April 2014 adopting Acceptable Means of Compliance and Guidance Material to Part-SPO of Regulation (EU) No 965/2012 — 'AMC and GM to Part-SPO'

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4.3. Other reference documents

— JAR-OPS1

— EU-OPS Regulation (EC) No 1899/2006

— RMT OPS 001 – Comment and respond document (CRD) 2009 02.c Organisation Requirements

— ICAO Annex 1 to the Convention on International Civil Aviation 'Personnel Licensing', 11th Edition, July 2011

— ICAO Annex 6 to the Convention on International Civil Aviation 'Operation of Aircraft', 10th Edition, July 2016

— ICAO Doc 9868 'Procedures for air navigation services Training', Second Edition, 2016

— EASA SIBs — Safety Recommendations — Helicopter type ratings list

— CS-AWO Issue 2

— SESAR project

— AAL EFVS operation with operational credit: impact on ATM-Aerodrome

— ICAO Annex 3 — Meteorological service for international air navigation: the definition of 'visibility' has been proposed for ensuring that the meaning of 'visibility' used by pilots is the same as that used by meteorological services, aerodromes and air traffic services.

— ICAO Annex 6 — Operation of Aircraft (Part I — International Commercial Air Transport — Aeroplanes: the relevant new definitions have been taken into account (e.g. aerodrome operating minima (Annex 6, 4.2.8.1) in case of 2D and 3D instrument approach operations, as well as certain principles such as operational credit(s) (for operations with aeroplanes equipped with automatic landing systems (ALSs), head-up displays (HUDs) or equivalent displays, an EFVS, synthetic vision systems (SVSs) or combined vision systems (CVSs)); the new classification of the instrument approach operations (as Type A and Type B from ICAO Annex 6, 4.2.8.3.) has been also included; finally, the definitions of 'decision altitude (DA) or decision height (DH)' as well as that of 'final approach segment (FAS)' have been transposed.

— ICAO Doc 9365 — Manual of All-Weather Operations: the criteria such as aerodrome operating minima, provision of facilities and services at aerodromes, basic requirements for the aeroplane and flight crew (operating procedures), surface movement guidance and control of aeroplanes and vehicles, minima for approach and landing operations, and the example of visibility credit for enhanced vision systems have been considered.

— ICAO Doc 4444 — Procedures For Air Navigation Services — Air Traffic Management, 6th Edition, 2016

— ICAO Annex 14 — Aerodromes (Volume I — Aerodrome Design and Operations), 7th Edition, 2016

— ICAO Annex 14 — Aerodromes (Volume II — Heliports), 4th Edition, 2013 ICAO

— Doc 9830 — Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual, 1st Edition, 2004 ICAO

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— ICAO Doc 8168 — Procedures For Air Navigation Services — Aircraft Operations (Volume I — Flight Procedures), Fifth edition, 2006: the definition of circling approach and a straight-in approach have been also transposed, 5th Edition, 2006

— ICAO Doc 8168 — Procedures For Air Navigation Services — Aircraft Operations (Volume II — Construction of Visual and Instrument Flight Procedures), 6th Edition, 2014

— ICAO EUR Doc 013 — European Guidance Material On Aerodrome Operations Under Limited Visibility Conditions, 5th Edition,2016

— ICAO Expert Group — Flight Operations Panel (FLTOPSP) / All Weather Operations Sub Group (AWOSG). The paper provides the concept of operations for PBAOM. The higher performance capabilities of new and improved avionics could mitigate some of the performance requirements of the ground-based navigation equipment. The underlying principle is that the minima will be predicated upon the combined capabilities of the ground and airborne facilities. This ICAO paper addresses also operational credits, which are already described in ICAO Annex 6, paragraph 4.2.8.1.1. As stipulated in the paper, operational credits can refer to lowering of the aerodrome operating minima (RVR and/or DH) for the purposes of an approach ban, reducing the visibility requirements, or requiring less demanding ground facilities as the overall performance can be achieved by enhanced airborne capabilities (one application of operational credits may be represented by the use of an EFVS). It is important to understand that when using the concept of PBAOM, a distinction should be made between a ‘basic aircraft’ (an aircraft with the minimum equipment for the type and/or category of approach and landing operation intended) and an ‘advanced aircraft’ (an aircraft with equipment in addition to the ‘basic aircraft’, as e.g. auto-flight systems capable of coupled approaches and/or autoland, HUD or equivalent displays, EFVS, CVS, and SVS).

— ICAO Annex 10 — Aeronautical Telecommunications (Volume I — Radio Navigation Aids): SARPs for the global navigation satellite system (GNSS).

— ICAO Paper GNSSP-WP-8, Validation of GBAS CAT I Accuracy: A GLS Model and Autoland Simulations for Boeing Airplanes, presented at the ICAO Global Navigation Satellite Systems Panel, Working Group B Meeting, Seattle, WA, May 29 - June 9, 2000.

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