European Aviation Safety Agency

# Comment-Response Document 2013-25

# Revision of operational approval criteria for Performance-Based Navigation (PBN)

CRD TO NPA 2013-25 — RMT.0256 & RMT.0257 (MDM.062(A) & (B)) — 31.3.2015

Related Opinion No 03/2015


**EXECUTIVE SUMMARY**

This Comment-Response Document (CRD) contains the comments received on NPA 2013-25 and the responses provided thereto by the Agency.

The NPA took into account the ICAO Doc 9613 Fourth Edition 2013 — Performance-Based Navigation (PBN) Manual to pursue the following specific objectives:

(a) propose rules on pilot training, which are an essential prerequisite for removing SPA for some PBN operations;

(b) eliminate the specific operational approval for most PBN operations for CAT, SPO, NCC and NCO operators;

(c) take into account the latest developments (e.g. RNP 2, Advanced-RNP and RNP 0.3 in ICAO Doc 9613 Fourth Edition); and

(d) take the opportunity to introduce necessary urgent changes also for matters other than PBN (e.g. dangerous goods, cockpit security and upper torso restraints).

Said NPA proposed amendments to Commission Regulations (EU) Nos 1178/2011 (Part-FCL, Part-ARA and Part-ORA) and 965/2012 (hereinafter referred to as the Air OPS Regulation), to the related AMC/GM, as well as amendments to CS-FSTD(A) and (H) and to a number of AMC 20-XX related to PBN. The proposed changes are expected to maintain safety while reducing the regulatory burden, as well as the burden of oversight by competent authorities. The proposals were substantially supported by 25 commentators who submitted 200 unique comments.

Based on the comments and the responses thereto, Opinion No 03/2015 was developed and it is published concurrently with this CRD.


| **Applicability** | | **Process map** | |
|---|---|---|---|
| Affected regulations and decisions: | Commission Regulations Nos 1178/2011 (Part-FCL, Part-ARA and Part-ORA) and 965/2012 (Part Definitions, Part-ARO, Part-ORO, Part-CAT, Part-SPA, Part-NCC, Part-NCO and Part-SPO) and the related AMC/GM.<br>CS-FSTD(A) and (H)<br>AMC 20-4, -5, -12, -26, -27 and -28 | Terms of Reference:<br>Concept Paper:<br>Rulemaking group:<br>RIA type:<br>Technical consultation during NPA drafting:<br>Publication date of the NPA:<br>Duration of NPA consultation:<br>Review group:<br>Focussed consultation:<br>Publication date of the Decisions: | 8.7.2013<br>No<br>Yes<br>Light<br>No<br>20.12.2013<br>3 months<br>Yes<br>No<br>2016/Q2 |
| Affected stakeholders: | Commercial and non-commercial aircraft operators, pilots, Approved Training Organisations (ATOs),<br>Original Equipment Manufacturers (OEM) and Flight Synthetic Training Devices (FSTDs) | | |
| Driver/origin: | Level playing field | | |
| Reference: | Annex V (Part-SPA) to the Air OPS Regulation | | |

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# 1. Procedural information

## 1.1. The rule development procedure

The European Aviation Safety Agency (hereinafter referred to as the 'Agency') developed this CRD in line with Regulation (EC) No 216/2008[1] (hereinafter referred to as the 'Basic Regulation') and the Rulemaking Procedure[2].

This rulemaking activity is included in the Agency's 4-year Rulemaking Programme, under RMT.0256 & RMT.0257 (MDM.062 (a) & (b)). The scope and timescale of the task were defined in the related Terms of Reference (Issue 2)[3].

The *draft* text of the proposed Implementing Rules (IRs) has been developed by the Agency based on the input of the RMT.0256 & RMT.0257 (MDM.062 (a) & (b)) Rulemaking Group. All interested parties were consulted through NPA 2013-25[4]. 200 unique comments were received from 25 interested parties, including industry, national aviation authorities and social partners.

The Agency has addressed and individually responded to the comments submitted on the NPA. The comments received and the Agency's responses thereto are presented in this CRD 2013-25, published concurrently with the related Opinion No 03/2015.

The *final* text of said Opinion has been developed by the Agency, based on the input of the RMT.0256 & RMT.0257 (MDM.062 (a) & (b) Review Group.

The process map on the title page contains the major milestones of this rulemaking activity.

## 1.2. The structure of this CRD and related documents

This CRD provides a summary of comments and responses as well as the full set of individual comments (and responses thereto) received on NPA 2013-25. An overview of the resulting rule text is provided in Chapter 3 of this CRD.

## 1.3. The next steps in the procedure

Opinion No 03/2015, published concurrently with this CRD, contains proposed changes to European Union regulations. It is addressed to the European Commission, which shall use it as a technical basis in order to prepare a legislative proposal.

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1 Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC (OJ L 79, 19.3.2008, p. 1).

2 The Agency is bound to follow a structured rulemaking process as required by Article 52(1) of the Basic Regulation. Such process has been adopted by the Agency's Management Board and is referred to as the 'Rulemaking Procedure'. See Management Board Decision concerning the procedure to be applied by the Agency for the issuing of opinions, certification specifications and guidance material (Rulemaking Procedure), EASA MB Decision No 01-2012 of 13 March 2013.

3 http://easa.europa.eu/system/files/dfu/ToR%20MDM.062%28a%29%26%28b%29%20%28RMT.0256-0257%29%20Issue%202.pdf

4 In accordance with Article 52 of the Basic Regulation and Articles 5(3) and 6 of the Rulemaking Procedure: http://easa.europa.eu/system/files/dfu/NPA%202013-25.pdf

The Decisions containing the related Certification Specifications (CS)/Acceptable Means of Compliance (AMC)/Guidance Material (GM) will be published by the Agency when the related IRs are adopted by the Commission.

# 2. Summary of comments and responses

200 unique comments have been submitted by 25 commentators, including five EU competent aviation authorities, the USA Federal Aviation Administration (FAA), aircraft and equipment manufacturers, air operators, service providers and international organisations.

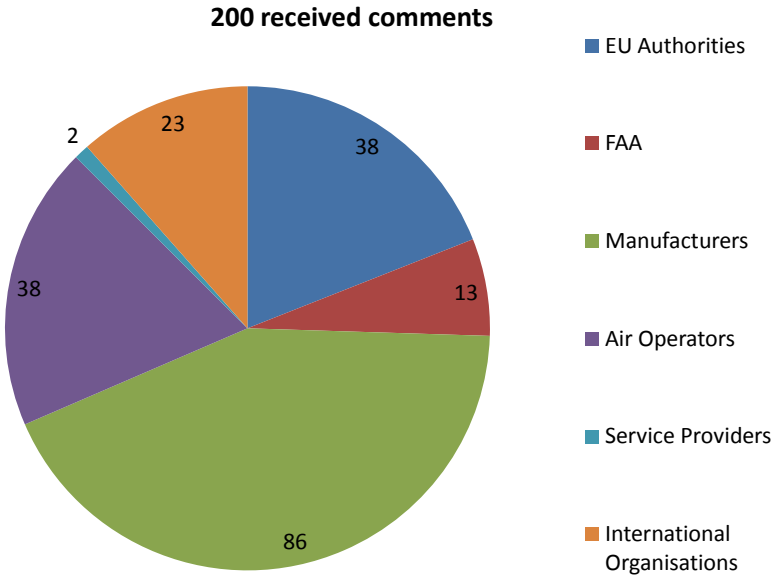


**Figure 1: Comments received on NPA 2013-25**

The vast majority of the respondents, including the totality of EU authorities, supported the approach proposed by the NPA. More in particular, the major raised concerns regarded the need to:

— remain harmonised at worldwide scale, starting from ICAO Annex 6, which in fact is now expected to be amended, to reduce the number of operational approvals for PBN, following corresponding amendments proposed by the Flight Operations (FLTOPS) Panel (1st meeting) in October 2014;

— reduce the number of the applicable different AMC 20-xx, by migrating significant part of that material into AMC/GM to the Air OPS Regulation;

— offer clear guidance to pilots and operators, in order to assess aircraft eligibility for PBN, including legacy general aviation aircraft, which is implemented in the resulting text of AMC/GM to Part-CAT, Part-NCC, Part-NCO and Part-SPO.

In summary, 125 comments (i.e. 62.5 %) were accepted or partially accepted. 53 comments (i.e. 26.5 %), the majority of which contained suggestions for the planned transition of the airworthiness-related provisions for PBN from AMC 20-xx to Subpart C (i.e. NAV) of CS-ACNS, were noted.

Only 11 % of the received comments were not accepted:

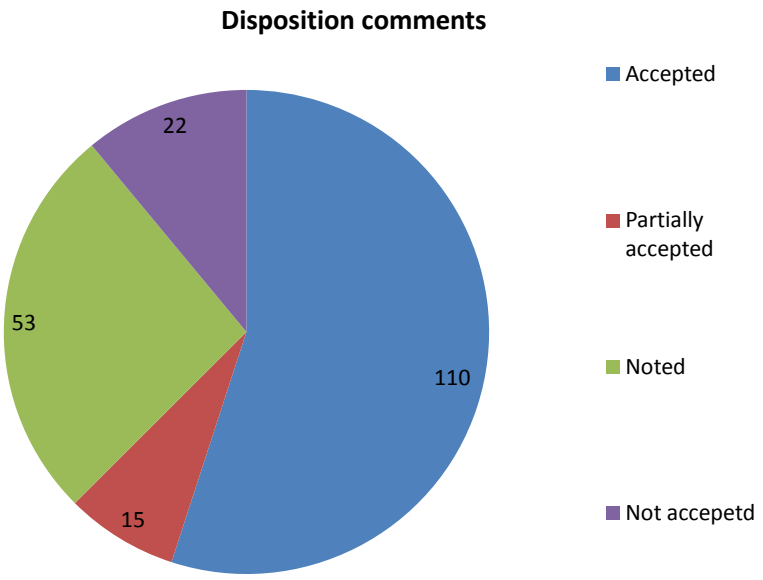


**Figure 2: Disposition of the responses to the comments on NPA 2013-25**

Individual responses to each of the 200 received comments are contained in Chapter 4 of this CRD.

# 3. Draft CS, AMC, GM

## 3.1. Certification Specifications — CS-FSTD(A) and CS-FSTD(H)

NPA 2013-25 proposed amendments to CS-FSTD(A) and CS-FSTD(H), which have been supported during the consultation.

The related Decisions will be adopted once the IRs proposed by this Opinion have been adopted by the Commission.

## 3.2. AMC and GM to Part-FCL, Part-ARA and various Parts of the Air OPS Regulation

In addition, NPA 2013-25 proposed amendments to a number of AMC and GM, mainly to Part-FCL, Part-ARA and various Parts of the Air OPS Regulation. These proposals have been substantially supported during the consultation.

The related Decisions will be adopted once the IRs proposed by this Opinion have been adopted by the Commission.

## 3.3. AMC 20

In addition to the rules on Part-FCL, Part-ARA, Air OPS and FSTDs, it was necessary to review AMC 20 material relevant for PBN.

In fact, the Agency has initiated a progressive migration of all the OPS-related material from AMC 20-xx into AMC/GM to the Air OPS Regulation, while leaving in AMC 20, for the time being, only provisions related to airworthiness. In other words, AMC 20-xx would become a 'horizontal' certification specification applicable to different aircraft categories (e.g. navigation systems on board large and CS-23 aeroplanes).

NPA 2013-25 hence proposed to transpose material from the following AMC 20s to the Air OPS AMC and GM:

— AMC 20-4 — Airworthiness Approval and Operational Criteria for the use of navigation systems in European airspace designated for Basic RNAV operations;

— AMC 20-12 — Recognition of FAA Order 8400.12a for RNP 10 Operations;

— AMC 20-26 — Airworthiness Approval for RNP Authorisation Required (RNP AR) operations;

— AMC 20-27 — Airworthiness Approval and Operational Criteria for RNP Approach (RNP APCH) Operations including APV Baro VNAV Operations; and

— AMC 20-28 — Airworthiness Approval and Operational Criteria for Localiser Performance and Vertical Guidance (LPV) Approach Operations (NPA 2009-04).

In addition, NPA 2013-25 proposed the deletion of AMC 20-5 on Airworthiness Approval and Operational Criteria for the use of the NavStar Global Positioning System (GPS). Said proposal was supported during the consultation.

The situation for the six mentioned AMC 20-xx, can be summarised in the table below:

| No. | Title | Decision | | Applicable | | |
|---|---|---|---|---|---|---|
| | | Number | Date | from | until | Plan |
| **AMC 20-4** | Airworthiness Approval and Operational Criteria For the Use of Navigation Systems in European Airspace Designated For Basic RNAV Operations | ED Decision 2003/12/RM | 05.11.2003 | 05.11.2003 | 11.9.2013 | Replaced by AMC 20-4A |
| **AMC 20-4A** | | ED Decision 2013/026/R | 12.9.2013 | 12.9.2013 | Valid until the related Decision is adopted | Operational material to be removed from AMC 20-4A and incorporated into AMC to the Air OPS Regulation (RMT.0256 & RMT.0257).<br><br>Airworthiness material to remain in AMC 20-4B. |
| **AMC 20-4B** | | N.A. | N.A. | As from the adoption of the related Decision | Indefinite | Later, airworthiness material to be removed from AMC 20-4B and incorporated into CS ACNS (RMT.0519 & RMT.0520); NPA planned in 2015. |
| **AMC 20-5** | Airworthiness Approval and Operational Criteria for the use of the Navstar Global Positioning System (GPS) | ED Decision 2003/12/RM | 5.11.2003 | 5.11.2003 | Still valid | Since it is outdated, it was proposed to be deleted in the context of RMT.0256 & RMT.0257 (i.e. NPA 2013-25 and this CRD). |
| **AMC 20-12** | Recognition Of FAA Order 8400.12a For RNP-10 Operations. | ED Decision 2006/12/R | 22.12.2006 | 22.12.2006 | Valid until the related Decision is adopted | Operational material to be removed from AMC 20-12 and incorporated into AMC to the Air OPS Regulation (RMT.0256 & RMT.0257). |
| **AMC 20-12A** | Recognition Of FAA Order 8400.12a For RNP-10 Operations. | N.A. | N.A. | As from the adoption of the related Decision | Indefinite | Airworthiness material to remain in AMC 20-12A.<br><br>Airworthiness material to be later removed from AMC 20-12A and incorporated into CS-ACNS (RMT.0519 & RMT.0520). |
| **AMC 20-26** | Airworthiness Approval and Operational Criteria for RNP Authorisation Required (RNP AR) Operations | ED Decision 2009/019/R | 16.12.2009 | 23.12.2009 | Valid until the related Decision is adopted | Operational material to be removed from AMC 20-26 and incorporated into AMC to the Air OPS Regulation (RMT.0256 & RMT.0257). |

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| **AMC 20-26A** | **Airworthiness Approval and Operational Criteria for RNP Authorisation Required (RNP AR) Operations** | **N.A.** | **N.A.** | **As from the adoption of the related Decision** | **Indefinite** | **Airworthiness material to remain in AMC 20-26A.**<br><br>**Airworthiness material to be later removed from AMC 20-26A and incorporated into CS-ACNS (RMT.0519 & RMT.0520).** |
| **AMC 20-27** | Airworthiness Approval and Operational Criteria for RNP APPROACH (RNP APCH) Operations Including APV BAROVNAV Operations | ED Decision 2009/019/R | 16.12.2009 | 23.12.2009 | 11.9.2013 | |
| **AMC 20-27A** | | ED Decision 2013/026/R | 12.9.2013 | 12.9.2013 | Valid until the related Decision is adopted | Operational material to be removed from AMC 20-27A and incorporated into AMC to the Air OPS Regulation (RMT.0256 & RMT.0257). |
| **AMC 20-27B** | | N.A. | N.A. | As from the adoption of the related Decision | Indefinite | Airworthiness material to remain in AMC 20-27B.<br><br>Airworthiness material to be later removed from AMC 20-27B and incorporated into CS-ACNS (RMT.0519 & RMT.0520). |
| **AMC 20-28** | Airworthiness Approval and Operational Criteria related to Area Navigation for Global Navigation Satellite System approach operation to Localiser Performance with Vertical guidance minima using Satellite Based Augmentation System | ED Decision 2012/014/R | 17.9.2012 | 24.9.2012 | Valid until the related Decision is adopted | Operational material to be removed from AMC 20-28 and incorporated into AMC to the Air OPS Regulation (RMT.0256 & RMT.0257). |
| **AMC 20-28A** | | N.A. | N.A. | As from the adoption of the related Decision | Indefinite | Airworthiness material to remain in AMC 20-28A.<br><br>Airworthiness material to be later removed from AMC 20-27B and incorporated into CS-ACNS (RMT.0519 & RMT.0520) |

# 4. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest the Agency's position. This terminology is as follows:

(a) **Accepted** — The Agency agrees with the comment and any proposed amendment is wholly transferred to the revised text.

(b) **Partially accepted** — The Agency either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.

(c) **Noted** — The Agency acknowledges the comment but no change to the existing text is considered necessary.

(d) **Not accepted** — The comment or proposed amendment is not shared by the Agency.

## (General Comments)

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| comment | *2* comment by: *AEA*<br>The AEA strongly supports the proposals to reduce the number of cases where a specific PBN OPS approval is required |
| response | *Noted*<br>Noted with pleasure. |

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| comment | *3* comment by: *AEA*<br>It is understanding that in such case that foreign Authorities would require specific ops approval for PBN in their airspace, the approval would be inherent to the EU airline AOC in those cases where EASA does not require a specific OPS approval from the NAA. This issue should also be raised with ICAO. |
| response | *Accepted*<br>Indeed the concern of AEA is substantiated.<br>In the proposed format of the OPS SPECS for the community operators, there is a specific note to inform non-EU authorities that for some PBN operations there is no specific entry in said OPS-SPECS.<br>The Agency has furthermore promoted the discussion in the ICAO FLTOPS Panel, to which the Agency participates, where consensus on alleviation of operational approval for PBN was reached in October 2014.<br>New ICAO SARPs on the matter are therefore expected in 2016. The resulting text of the proposed rules is aligned as much as possible with the foreseen future ICAO SARPs, bearing in mind that the latter are not yet finally adopted. In principle ICAO, though, the Agency and other major CAAs worldwide, are harmonised on the way forward. |

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| comment | *9* comment by: *EUROCONTROL* |

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| | There is a numbering inconsistency, which is repeated consistently, between the IR requirements called Performance-based navigation and the corresponding AMC/GM (numbered XY6 in the IR and numbered XY7 in AMC/GM). |
| response | *Accepted*<br><br>The numbering of AMC/GM to CAT.OP.MPA.126 (not 127), NCC.OP.116, NCO.OP.116 and SPO.OP.116 has been reviewed. |

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| comment | *10* comment by: *Avaition South West Ltd*<br><br>This seems to be a well thought out and constructive NPA which we welcome and fully support. We do, however, see one potential issue concerning how to examine an LNAV approach given that LPV equipped aircraft usually display an LNAV+V glide path when flying an LNAV approach. We would not advocate suppressing EGNOS as that reduces the safety of the system and would prefer that the use of a single needle display such as the VOR RMI needle for such approaches be authorised. |
| response | *Noted*<br><br>Indeed, it could be appropriate to present to the pilot only horizontal guidance information during LNAV approaches. However, this is an airworthiness aspect to be assessed during individual type certification projects, which is out of the scope of RMT.0256 & RMT.0257.<br><br>The airworthiness aspects of PBN are in the scope of RMT.0519 & RMT.0520, the ToR for which were published on 17 September 2013. The NPA stemming from this task is expected to be published in the course of 2015. |

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| comment | *13* comment by: *Swiss International Airlines / Bruno Pfister*<br><br>Swiss Intl air Lines, together with AEA, strongly supports the proposals within NPA 2013-25 to reduce the number of cases where a specific PBN OPS approval is required. |
| response | *Noted*<br><br>The support of Swiss International Airlines and of AEA is appreciated. |

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| comment | *14* comment by: *AIRBUS*<br><br>The changes proposed by the NPA 2013-25 are in line with the operational needs for PBN development. Therefore AIRBUS supports this NPA. |
| response | *Noted*<br><br>The support of Airbus is appreciated. |

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| comment | comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br>*19*<br><br>**General:** Swedish Transport Agency supports the initiative to move in the proposed direction where theoretical and practical knowledge about PBN operations will be required for pilots with an Instrument Rating (IR).<br>**Timelines:** However we do not believe that the proposed timelines for the implementation of this major change is realistic due to the need to adapt to the new proposed rules and the foreseen costs for investments in new equipment. There must be a realistic transition period for the implementation of the proposed rules.<br>**RIA:** The proposed rules constitute a major change for many stake holders and the economical impact of the proposal needs to be assessed thoroughly. The RIA does not show any figures or estimated costs for various stakeholders e.g. investments costs on necessary upgrades of aircrafts and simulators that is used by ATO´s. Furthermore the RIA does not present any detailed information about the impact of the administrative burden that is transferred from operators to ATO´s and pilots with an instrument rating.<br>The present Part SPA PBN rules require an approval when operating in an airspace requiring a PBN specification (except for B-RNAV/RNAV5). If you operate in airspace not requiring a PBN specification you do not need a SPA PBN approval. The set of proposed rules transfers the “optional application” of PBN rules (airspace related) into general requirements for pilots with an IR. Eventually this transfer has to be made at some point, but the impact has to be assessed and described in more detail.<br>**Approvals:** According to ICAO Annex 6, Part I-III, PBN approvals (authorizations) are mandatory for operations in airspace where a navigation specification for performance-based navigation has been prescribed.<br>The proposed rules are not fully in compliance with the present standard as specified in ICAO Annex 6. This might cause problems for EU operators operating to a third country.<br>Even though there will be an explanation in a note to the OPS SPEC for CAT operators there is no guarantee for acceptance by a third country. This concern is particularly relevant for non commercial operators as there is no equivalent documentation, as the OPS SPEC, on the ICAO level.<br>On the EU level a list of specific approvals shall specify Part SPA approvals. However if a non commercial operator does not have any specific approvals there will not be any list issued by the competent authority, hence there will be no formal indication that the European rules does not require a specific approval for certain PBN operations, but yet fulfills an equivalent level of safety compared to the ICAO standard.<br>In order to mitigate potential effects of the above, EU needs, pending changes in relevant ICAO Annexes and guidance material, to harmonize the European approach on this topic with the ICAO states.<br>Furthermore it is essential that applicability of the proposed EU rules is synchronized with necessary changes in relevant ICAO Annexes and associated guidance material. |
| response | *Partially accepted*<br><br>**General:**<br><br>The support in principle is noted with appreciation.<br><br>**Timelines:**<br><br>Noted. The transition timelines will be set by the European Commission following a discussion with the Member States. However, there is neither an obligation for forward nor |

for a retrofit on aircraft. The evolution is left to market forces.

**RIA:**

Noted. However, the RIA would not be republished.

Incentive schemes for transition to PBN are not in the remit of the Agency, but the Agency is aware that they are being explored by the GNSS Supervisory Agency (GSA): http://www.gsa.europa.eu/gnss-enabled-services-convergence-0.

Furthermore, Approved Training Organisations (ATOs) would be driven by market forces to adapt to the new rules, including competition among them.

**Approvals:**

Partially accepted.

SPA is required, in addition to CAT operators, also for NCC, NCO and SPO operators from August 2016 onwards (end of derogation period for application of the Air OPS Regulation). Delaying the entry into force of the proposed rules could imply the establishment for the obligation for SPA for PBN for these operators, which is not only contrary to the purpose of NPA 2013-25, but also to the views expressed by the vast majority of the respondents to said NPA.

In any case, the Agency is committed by Article 2.2(d) of the Basic Regulation, to duly take into account ICAO provisions, when developing EU common rules. In this case, the resulting rules are aligned with WP/13 of 16 Oct 2014, endorsed by ICAO FLTOPS Panel (1st meeting) under the proposal by its PBN SG. Therefore, the last draft of the possible future amendment to ICAO Annex 6 in relation to PBN operational approval, and of course applicable only to international civil aviation according to the Chicago Convention, has been taken into account, modifying the resulting text of the proposed rule CAT.OP.MPA.126 and NCC.OP.116 (mainly business jets, often used in international operations) applicable when no operational approval is required for PBN.

Furthermore, SPA.PBN.105 (on the cases where a specific approval is required) has been amended, to be harmonised with the mentioned draft text for Annex 6, now being processed by ICAO.

On the contrary, NCO.OP.116 and SPO.OP.116, have not been substantially modified since non-complex motor-powered aircraft are seldom used for international air navigation, while aerial work is completely outside of the scope of Annex 6 to the Chicago Convention.

comment *83* comment by: *Boeing*

GENERAL COMMENT

Boeing appreciates the opportunity to review and provide comments on the proposed rule. We have no substantive comments and generally support the proposal. We have identified 2 small typographical errors that should be addressed before finalizing in the rule. We have noted these at the places that they appear in the NPA document.

response *Noted*

The support of Boeing is appreciated.

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| comment | *97* comment by: *LVNL Pro (ATC the Netherlands)*<br>We would like to make compliments to EASA for this proposal and will support its earliest implementation. |
| response | *Noted*<br>The support of LVNL is appreciated. |

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| comment | *98* comment by: *EUROCONTROL*<br>EUROCONTROL is aware of the fact that it is generally agreed that simplifying PBN implementation, wherever it is possible, is appropriate. With this NPA, the proposed simplification consists of shifting PBN operations and knowledge requirements for flight crews to the General IFR rating.<br>In context, we propose that operational approvals continue being required for more PBN applications than those proposed by this NPA, i.e. for RNP 0.3 (fixed wings), RNP AR APCH and also for the following operations:<br>• any RNP implementation requiring use of Radius to Fix (RF) or Fixed Radius Transition (FRT) functionality, as both these functions require special pilot training to control FTE;<br>• Advanced RNP operations since Advanced RNP includes a requirement for RF.<br>Including in the document the definitions for CAT, NCC, NCO and SPO is essential.<br>OOverlaps between requirements for the different operations (CAT, NCC, NCO, SPO) are frequent in the document and should be removed. Moreover, depending on the definitions that will be given, some procedures may typically never be flown by a certain category, as is the case with simple motor powered single engine aircraft since these do not have baro-VNAV capability. This should be avoided.<br>Including in the document a list of acronyms is essential. |
| response | *Not accepted*<br>The pilot training is indeed required, but it is implemented by putting more emphasis on the Learning Objectives in relation to RF and FRT and not by reintroducing the obligation for SPA for this type of operations.<br>The taxonomy of different groups of operators (i.e. CAT, NCC, NCO and SPO) is already defined in the Air OPS Regulation, where these acronyms are spelled out (Annex I).<br>Operators asked for separate sets of rules for different kind of operations; therefore, an overlap of provisions for CAT, NCC, NCO and SPO is unavoidable. |

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| comment | *115* comment by: *Luftfahrt-Bundesamt*<br>The LBA has no comments on NPA 2013-25. |
| response | *Noted*<br>The Agency takes note of the LBA's comment and interprets it as support in principle. |

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| comment | *116* comment by: *Air France*<br>General comment : The rulemaking group has performed a great job. The PBN integration in |

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| | the European regulation was quite challenging. |
| response | *Noted*<br><br>The support of Air France is appreciated. |

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| comment | *118* comment by: *AEA*<br><br>Attachment #1<br><br>**ISSUE REGARDING QUALIFICATION AND RECURRENT TRAINING FOR RNP AR APCH**<br>REFERENCE<br>AMC1 SPA.PBN.105(b) PBN operational approval<br>TRAINING AND CREW QUALIFICATION for RNP AR APCH<br>(c) (3) (xii)<br>As a minimum, each flight crew member should complete **two** RNP approach procedures that employ the unique RNP AR APCH characteristics of the operator's approved procedures (i.e., RF legs, RNP missed). One procedure should culminate in a transition to landing and one procedure should culminate in execution of an RNP missed approach procedure.<br>(e) (2)<br>A minimum of **two** RNP AR APCH approaches should be flown by each flight crew member for **each duty position** (pilot flying and pilot monitoring), with one culminating in a landing and one culminating in a missed approach, and may be substituted for any required 3D approach operation.<br>Note that requirements for qualification and recurrent training appear to have been been copied to AMC.GM to Part SPA, from AMC 20-26.<br>OTHER REFERENCE<br>AC 90-101A Appendix 5 page6 item c. RNP AR Approach Requirements.<br>(1) RNP AR **Initial** Training. With no prior RNP AR approach experience, each pilot must complete at least **four** RNP AR approach procedures: two as pilot flying and two as pilot monitoring.<br>(2) RNP AR **Recurrent** Training. Each pilot must complete at least **two** RNP AR approach procedures: one as pilot flying and one as pilot monitoring.<br>ISSUES<br>For (initial) qualification as a minimum, each flight crew member should complete two RNP approach procedures. **So minimum a total of two.**<br>For recurrent training a minimum of two RNP AR APCH approaches should be flown by each flight crew member for each duty position (pilot flying and pilot monitoring) **So minimum a total of four.**<br>So for initial qualification minimum two and for recurrent training four? Does not seem logical...<br>Note that AC 90-101A make more sense.<br>In addition regulatory requirements do not consider the use of fixed pilot positions (Captain Pilot Flying en First Officer Pilot Monitoring) as KLM presently applies similar to CAT II/III operation.<br>Suggest to adjust qualification and recurrent training requirements in line with AC 90-101A and to add a note to pilot flying / pilot monitoring requirements saying: "except when fixed duty positions are applied", or other wording of similar meaning.<br>**ISSUE REGARDING EFFECT OF TEMPERATURE ON TERRAIN AND OBSTACLE CLEARANCE**<br>REFERENCES |

**NPA 2013-25**
AMC1 CAT.OP.MPA.127 Performance-based navigation – (d)
<...> Only the final approach segment is protected by the promulgated aerodrome temperature limits, and the flight crew should consider the effect of temperature on terrain and obstacle clearance in other phases of flight.
AMC2 SPA.PBN.105(d) PBN operational approval – (a) Modification of flight plan
<...> The only other acceptable modification to the loaded procedure is to change altitude and/or airspeed waypoint constraints on the initial, intermediate, or missed approach segments flight plan fixes (e.g. to apply cold temperature corrections or comply with an ATC clearance/instruction).
GM1 NCC.OP.117 Performance-based navigation — aeroplanes and helicopters – (d)
<...> Only the final approach segment is protected by the promulgated aerodrome temperature limits, and the flight crew should consider the effect of temperature on terrain and obstacle clearance in other phases of flight. Where BARO VNAV is used in other operations, the flight crew should consider the effect of temperature on terrain and obstacle clearance in all phases of flight, in particular on any step-down fix.
**EASA AMC 20-27** (2009) - Appendix 4-1.2 Prior to commencing the procedure (page 29/33)
For APV BAROVNAV operation, pilots are responsible for any necessary cold temperature compensations to all published minimum altitudes/heights. This includes:
a) the altitudes/heights for the initial and intermediate segment(s);
b) the DA/H; and
c) subsequent missed approach altitudes/heights.
**EASA AMC 20-26** (2009) - Appendix 3-3 Flight Considerations item a) (page 40/58)
<...> The only other acceptable modification to the loaded procedure is to change altitude and/or airspeed waypoint constraints on the initial, intermediate, or missed approach segments flight plan fixes (e.g. to apply cold temperature corrections or comply with an ATC clearance/instruction).
**AC No: 90-101A** (FAA) contains a similar description:
Since the charted temperature limits ensure obstacle clearance solely in the FAS <Final Approach Segment> and since temperature compensation only affects the vertical guidance, the pilot may need to manually adjust the minimum altitude on the initial and intermediate approach segments and the DA.
NOTE
Some regulatory publicatuions speak of segments, other (only) of segments.
ISSUE
As explained in the following practical case, allowing cold temperature corrections only on the initial, intermediate, or missed approach segments flight plan fixes results in a steep increase of the vertical (VNAV) path between the intermediate and final segment flight plan fixes, violating the Continuous Descent (CDA) principle, and violating obstacle clearance on the intermediate segment.
Therefore vertical modifications should be allowed up to and including the final approach fix for RNAV (GNSS) / RNAV (RNP) AR operation, except for the Final Approach Segment (FAS) for APV approaches, thus the segment *between* the FAF and DA.
RNP APCH PRACTICAL CASE
Consider the Burlington BTV-KBTV RNAV (GPS) Z 33 approach, as depicted on the approach plate below, at a temperature of -10°C.
Based on regulatory requirements, use of VNAV as described in the 777 FCTM and with reference to the KLM LOW TEMPERATURE ALTIMETER CORRECTION – TMA table below, KLM believes pilots should deal with cold temperature as follows:
With reference to the applicable approach plate below note:

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| | · Minimum Obstacle Clearance (MOC) altitudes for all segments of the approach provide an obstacle clearance of 75m/246ft with FAF.<br>· Terminal Arrival Altitude (TAA), which replaces the MSA for RNAV approaches, is 6000' in the approach sector.<br>Assume the RNAV(GPS) Z 33 approach from the IAF JANUD.<br>JANUD (IF at 20.1 RW33) MOC is 6000ft. Temperature correction 590ft (interpolated)<br>NIQUD (at 15.2 RW33) MOC is 5400ft. Temperature correction 530ft (interpolated)<br>HONIB (at 13 RW33) MOC is 4800ft. Temperature correction 470ft (interpolated)<br>EHIKO (FAF at 9.8 RW33) MOC is 3800ft. Temperature correction 370ft (interpolated)<br>Regulatory agencies hold pilots responsible for any necessary cold temperature compensations to all published minimum altitudes/heights on the initial and intermediate approach segments (fixes).<br>In this case:<br>· the initial approach segment is the holding pattern from the IAF JANUD until the IF JANUD, and<br>· the intermediate approach segment is from the IF JANUD until the F EHIKO.<br>Thus, in order to obtain sufficient obstacle clearance, the minimum altitudes on the initial and intermediate approach segments will have to be adjusted by the appropriate amount and the cold temperature correction will have to be applied to the waypoint altitude constraints in the FMC. (Refer to FCTM 5.27)<br>In this case, apply cold temperature correction to the (FMC) waypoint altitude constraints for both the APV (VNAV limits) and LPV (LNAV limits) approach as follows.<br>For the initial approach segment from the IAF JANUD to the IF JANUD:<br>· Adjust waypoint altitude constraint at JANUD to MOC 6000ft plus 590ft (interpolated) is 6590ft.<br>Adjust waypoint altitude constraint at JANUD from 6000A to 6590A.<br>For the intermediate approach segment from the IF JANUD to the FAF EHIKO via NIDUQ and HONIB:<br>· From JANUD to NIQUD MOC 5400ft plus 530ft (interpolated) is 5930ft.<br>Adjust waypoint altitude constraint at NIQUD from 5400A to 5930A.<br>· From NIQUD to HONIB MOC 4800ft plus 470ft (interpolated) is 5270ft.<br>Adjust waypoint altitude constraint at HONIB from 4800A to 5270A.<br>· From HONIB to FAF EHIKO MOC 3800ft plus 370ft (interpolated) is 4170ft.<br>Adjust waypoint altitude constraint at EHIKO from 3800A to 4170A.<br>I.a.w. KLM 777 FCTM 5.28 VNAV will follow the higher of the glide path angle associated with the approach or the geometric path defined by the waypoint altitude constraints.<br>Note: Due to the low temperature the higher glide path should not be much higher than the glide path angle associated with the approach in ISA conditions when referenced to earth.<br>Note that according NPA 2013-25 AMC2 SPA.PBN.105(d) modification of the final approach segment flight plan fix is not allowed. In this case EHIKO. This will result in a steep increase of the vertical path between HONIB and EHIKO, violating the Continuous Descent (CDA) principle, and violating obstacle clearance on the intermediate segment.<br>CONCLUSION<br>Based on the above vertical modifications should be allowed up to and including the final approach fix for RNAV (GNSS) / RNAV (RNP) AR operation, except for the Final Approach Segment (FAS) for APV approaches, thus the segment *between* the FAF and DA. |
| response | *Partially accepted*<br><br>The text of AMC2 SPA.PBN.105(d) is already explicit on the possibility of introducing cold |

temperature corrections down to the FAF, during LNAV (2D) RNP AR APCH operations.

Additional guidance has been included, for clarity purposes and for PBN OPS not requiring specific approval, in the resulting text of AMC1 CAT.OP.MPA.126, AMC1 NCC.OP.116, AMC1 NCO.OP.116 and AMC1 SPO.OP.116.

comment *119* comment by: *DGAC France*

DGAC France strongly supports the intents of this NPA.

The adoption of the changes this NPA foresees is of utmost importance both to improve safety, by introducing PBN concepts, training, tests etc... in all concerned regulations (Aircrew, AIR OPS...), and to allow a smoother transition to part NCO and NCC, by avoiding the useless burden of granting many SPA.PBN approvals to non commercial operators wishing to use PBN procedures.
A consequence of the proposed amendments is the removal of most PBN related approvals from part SPA and from the operations specifications for CAT operators. Even though note 15 associated to the operations specifications table (in appendix II to part ARO - see page 51 of the NPA) is perfectly clear on the reason why approval is removed for certain PBN applications, this should not be used as a pretext by third country authorities to deny European operators using PBN procedures.
This is why the efforts the Agency put on promoting these amendments at an international level, first of all at an ICAO level, should be continued and the orientations of this NPA explained.

response *Noted*

The support of DGAC is appreciated.

Indeed, the Agency has liaised with ICAO and some ICAO Contracting States (e.g. Australia) to explain the rationale and the possible outcome of NPA 2013-25, in preparation of FLTOPSP/1 held in October 2014, whose positive outcome was heavily influenced by the European collective thinking.

**Executive Summary** p. 1

comment *90* comment by: *IACA International Air Carrier Association*

IACA welcomes NPA 2013-25 to simplify PBN operational approval requirements. IACA supports EASA's preferred option, and in particular:
• the elimination of Specific Approval (SPA) for almost all PBN operations, except for the most complex RNP AR APCH (Required Navigation Performance Authorisation Required Approach) and function time of arrival control
• maintaining only reasonably required conventional navigation and adding PBN elements for initial qualification of pilots without extending training duration
• assessing PBN competence of current pilots at first periodic proficiency check
• rationalising AMC 20 material

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| | IACA congratulates EASA with NPA 2013-25 as a good example of Performance Based Rulemaking. |
| response | *Noted*<br>The support by IACA is appreciated. |

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| comment | *114* comment by: *René Meier, Europe Air Sports*<br>Europe Air Sports, the European Powered Flying Union and the Aero-Club of Switzerland thank the Agency for the preparation of NPA 2013-25.<br>Our communities welcome particularly<br>a) the modernisation of pilot training and checking requirements designed to enable PBN, and<br>b) the removal of the need for a specific operational approval for the PBN operations as proposed by the NPA. |
| response | *Noted*<br>The support from the general aviation community is appreciated. |

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| **Table of contents** | p. 2-4 |

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| comment | *1* comment by: *Josef Anschau*<br>Attachment #2<br>In general this proposed amendement is very smart and helpful since it incorporates PBN in the standard IR skills and eases the application of PBN for all stakeholders. It will help modernize pilot training and licensing in a way that PBN will become a central part of IFR knowledge.<br>Excellent work! |
| response | *Partially accepted*<br>The support in principle is noted with appreciation.<br>With respect to the detailed comments in attachment 2:<br>1. Noted: Indeed, no amendment to FCL.310, FCL.515(b) and FCL.615(b) is proposed. PBN or RNP types are inserted in the Learning Objectives as appropriate.<br>2. Not accepted: The Agency prefers to require, for safety purposes and to stabilise the approach, no more than 75 ft below the vertical path at any time during the 3D approach.<br>3. Not accepted: Current safety evidence does indicate that a total GNSS failure is extremely improbable. The situation will even improve in the future when multi-constellations would be available. The proposed CAT.OP.MPA.185(d) allows the use of regional aerodromes only equipped with an LPV procedure, providing that a conventional procedure at the destination alternate (when required) is available. Imposing to regional aerodromes the implementation of conventional beacons would pose significant economic obstacles to them, not justified by the currently available |

safety information.

4. Accepted: Instead of 'precision' and 'non-precision' approaches, the terms '2D' and '3D' are now used, in line with the recent ICAO provisions on the matter, in AMC1 FSTD(A/H).300. Also, the detailed comments to Appendix 1.062 on AMC/GM to Part-FCL are accepted, as well as the suggestions for AMC4 to CAT.OP.MPA.126, to NCC.OP.116, to NCO.OP.116 and to SPO.OP.116.
5. Accepted: In AMC1 SPA.PBN.105(b), paragraph (b)(5)(ii) has been edited as proposed.
6. Not accepted: AMC1 NCC.GEN.106 mentions a time of 25 minutes as typically acceptable for RNP 4, with predicted unavailability of the Fault Detection and Exclusion (FDE) capability. No safety information is available to demonstrate that this is not sufficient. In any case; States may propose AltMOC when deemed appropriate.
7. Not accepted: It makes no damage to repeat the general principle of the procedures in case of loss of communication, in the PBN context.

**2 Explanatory Note — 2.3 Interfaces** p. 8

comment *30* comment by: *Airbus Helicopters*

**Major comment**
*Location*
Exclusion indicated in item (h)
*Comment*
"*any detailed rule related to RNP 0.3 (helicopters), not yet sufficiently mature when drafting this NPA, but possibly covered by a future RMT;*"
In § 2.5.19 of the explanatory note, page 26, the following is stated:
"*For RNP 0.3, the group was concerned that the immaturity of the PBN specification made it difficult to write generic operating procedures with confidence. Moreover, the nature of the flight training elements required was sufficiently unclear that the group was unable to determine with confidence that the criteria were met. It therefore recommended a further rulemaking task to consider the issue in more detail.*"
A specific RMT addressing helicopter RNP 0.3 operations is likely the best solution to solve the issues raised in section 4 (RIA) comments.
*Rationale for comment*
RNP 0.3 specification has been established especially for Low Level IFR helicopter operations. Consequently, it is relevant to launch a helicopter-specific RMT for RNP 0.3 operations.
*Recommendation*
Launch as soon as possible RMT addressing helicopter RNP 0.3 operations.

response *Noted*

The support for a new RMT especially concerning helicopter PBN operations is noted.

A possible future RMT will be launched by the Agency in due time, following the rulemaking procedure, taking into account the ICAO developments, the priorities suggested by the advisory bodies RAG and SSCC, as well as the concrete availability of low level RNP 0.3 routes for helicopters.

**2.5 Overview of the affected provisions and proposed amendments — 2.5.1 Commission Regulation (EU) No 1178/2011** p. 9-11

comment *99* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding " For the flight aspects of pilot competence, it is considered that RNP APCH operations are the most demanding aspects and incorporate the important aspects of manoeuvres conducted in other PBN operations, and therefore RNP APCH is used as the benchmark.", other PBN operations should be considered for performance benchmarking. | Operational experience in the United States (U.S.) has indicated considerable challenges concerning PBN departures and arrivals, more so than with approaches. Some of these issues are not specific to PBN operations but rather apply to the general use of area navigation (RNAV) systems and various avionics. However, while some pilot tasks are common across approach and terminal (departure and arrival) procedures, complexity of the latter, as well other issues have resulted in a focus on pilot knowledge and training for these operations (e.g., by Commercial Aviation Safety Team). FAA and the user community have devoted a significant amount of effort in this area over the past decade. | In addition to RNP APCH, consider inclusion of departure and arrival operations (e.g., RNAV 1) as part of "core" PBN with respect to pilot knowledge and training. | Absent changes, issues could increase as more procedures are implemented and operational use becomes more frequent, particularly for Commercial Air Transport (CAT) operators. |

response *Accepted*

An explicit reference to PBN instrument departure procedures is included in proposed amendment to Appendix 7 to Part-FCL.

comment *110* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding: "A new Article 4a containing a transition rule is hence needed in the cover Commission Regulation (EU) No 1178/2011. This transition, to be achieved in conjunction with the next proficiency check, could be based, for aeroplane and helicopter pilots" | For General Aviation (GA) instrument pilots there is no requirement for an annual proficiency check. If pilots in US comply with the instrument currency requirements of 14 Code of Federal Regulations (CFR) Part 61.57, no proficiency check is required. | Consider alternatives to an annual check. | Minimal |

response *Not accepted*

The Agency is well aware of the mentioned difference between the USA and the EU. The annual check is well implemented and accepted in Europe as it is considered to be a powerful instrument to enhance safety during IFR flights, considering that flying under IFR, general aviation aircraft are often mixed with CAT airliners. For the time being, no change is foreseen in respect of this established policy.

comment *142* comment by: *EUROCONTROL*

**PaPage 10 2.5.1 (b) and page 35 article 4a (2) (b) (iii):** what is the reasoning behind the requirement for 6 RNP APCHs? Why 6?

response *Noted*

The requirement of 6 RNP APCHs is based on the input of international experts who considered this to be best practice for the specific situation.

**2.5 Overview of the affected provisions and proposed amendments — 2.5.3 Annex I to Commission Regulation (EU) No 1178/2011 (Part FCL)** p. 12-15

comment *100* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding " For this reason, the pilot should also monitor +75ft at 700 ft above the aerodrome elevation (where the approach has to be definitely stabilized).", consider a different, higher altitude as the standard. | FAA guidance material and numerous aviation industry best-practice documents use 1000 ft as a standard altitude for checking approach stabilization, especially in instrument meteorological conditions (a lower altitude of 500 ft is often delineated for visual conditions). | Consider using 1000 ft as the standard in the interest of harmonization and to aid pilot calculations. | Minor but safety would likely be enhanced via use of a harmonized standard. |

response *Accepted*

The resulting text of Appendix 7 now includes the standard of 1 000 ft as the appropriate altitude to check whether the approach is definitely stabilised. The indicated limits will have to be corrected to make allowance for turbulent conditions and the handling qualities and performance of the aircraft used (see amendments to Annex I to Regulation (EU) No 1178/2011, Appendix 7).

comment *111* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding: " requirements for the theoretical knowledge (TK) to be demonstrated by applicants" | A rewrite of 14 Code of Federal Regulations (CFR) Part 61.65 Instrument rating requirements and other guidance would be needed to incorporate PBN terms, definitions, procedures, etc. Also, the impact to Part 141 Pilot schools and Part 142 Training Centers as far as PBN procedures would need to be studied. | Further Study. | Minimal |

response *Noted*

The Agency would like to thank the FAA for the comment, which is, however, a recommendation for the FAA. NPA 2013-25 showed the changes to all related EU regulatory material, which could possibly support the recommended FAA study.

comment *112* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding: " (a) fulfil 2 of the following 3" | Instrument Flight Instructors would have a difficult time staying current under these rules. Also, an assessment of competence within 12 months of expiration would likely not be popular. | Relax requirement for an assessment. | Minimal |

response

*Not Accepted*

The Agency considers instructors to be one of the main safety pillars for civil aviation and, therefore, does not intend to change the revalidation requirements for instructors which are very similar for all categories of instructors and already embedded in the existing Regulation (EU) No 1178/2011.

comment *145* comment by: *EUROCONTROL*

**Page 12 - Section 2.5.3.3 Privileges of IR pilots (FCL.605)**
Pa
It is stated that "IR pilots properly trained and checked for PBN, on board of airworthy aircraft, should have by law the privilege of flying PBN routes and PBN procedures down a minimum decision height of 200ft…".
I
EUROCONTROL recommends not to associate always PBN procedures with a 200ft DH as in many cases the DH for RNP APCH is above 200ft. The statement was right for ILS as 200ft is, in most cases, the default ILS DH. It was also meant to indicate that the pilot may not go below the 200ft ILS DH without SPA. Since for PBN the DH will often be above 200ft, EUROCONTROL recommends that for PBN approaches "down to a minimum decision height of 200ft" is changed into "down to the minimum decision height".

response

*Accepted*

The lowest DH of 200 ft is already in the existing rule FCL.605. A few more words have been added in the resulting text for clarity purposes.

comment *146* comment by: *EUROCONTROL*

**Page 14 - Section 2.5.3.6 IR Skill test**
**Page 37 - Table (11)**
EUROCONTROL does not understand where the 700ft value comes from. The industry standard is that the aircraft needs to be stable at 1000ft AGL. Moreover it is important to keep the vertical deviations within limits, at least until DH.
The proposed text needs therefore further explanation and adaptation.

response

*Accepted*

For more information, please refer to our response to comment No 100 from the FAA.

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| comment | *157* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 1 page # 12<br>**Extract:**<br>§ 2.5.3.1 New definitions (FCL.010)<br>The introduction of PBN leads to using new terms, most of which are listed in the fourth edition of ICAO PBN Manual (Doc 9613). Furthermore, amendment 37-B8 to Part I of Annex 6 to the Chicago Convention has drastically changed the taxonomy of instrument approaches now based on the distinction between 2D (i.e. instrument guidance only in the horizontal plane) and 3D (i.e. providing also vertical guidance) operations.<br>**Comment:**<br>The new taxonomy regarding the instrument approach operations in the ICAO PBN Manual Ed 4 has got two criteria: method (2D / 3D) and minimum operating minima (at or above 250ft, or below 250ft).<br>**Requested Change:**<br>The introduction of PBN leads to using new terms, most of which are listed in the fourth edition of ICAO PBN Manual (Doc 9613). Furthermore, amendment 37-B8 to Part I of Annex 6 to the Chicago Convention has drastically changed the taxonomy of instrument approaches now based on the distinction between 2D (i.e. instrument guidance only in the horizontal plane) and 3D (i.e. providing also vertical guidance) operations, and on the lowest operating minima. |
| response | *Accepted*<br><br>Thank you for your comment. Following an evaluation of your comment, the resulting text of the proposed rules now refers to 2D and 3D approaches. |

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| comment | *158* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 2 page # 12<br>**Extract:**<br>§ 2.5.3.1 New definitions<br>Article 2.2(d) of the Basic Regulation mandates to duly take into account ICAO provisions when establishing implementing rules. It is hence necessary to introduce new definitions in FCL.010 for:<br>· Two-dimensional (2D) instrument approach operation;<br>· Three-dimensional (3D) instrument approach operation;<br>· Localizer Performance with Vertical Guidance (LPV);<br>· Lateral Navigation (LNAV);<br>· Vertical Navigation (LNAV/VNAV);<br>· Performance-based Navigation (PBN);<br>· RNP approach (APCH);<br>· approach operations requiring specific approval (RNP AR APCH), which implies that a SPA is not always required prior to flying PBN approaches;<br>· Satellite Based Augmentation System (SBAS).<br>**Comment:**<br>Some terms used in the NPA are not defined.<br>**Requested Change:**<br>More definitions may need to be added to FCL.010 and related documentation: GBAS, ABAS, RNAV, RNP, Instrument Approach Operation, and Instrument Approach Procedure, linear and angular operations. |

response | *Partially accepted*

Additional definitions are not considered necessary in Part-FCL, since they can easily be found in the material related to operations. However, some additional acronyms have been listed in GM1 to FCL.010.

comment | *159* comment by: *Dassault Aviation*

Dassault-Aviation comment 3 page # 12
**Extract:**
§ 2.5.3.1 New definitions
· approach operations requiring specific approval (RNP AR APCH), which implies that a SPA is not always required prior to flying PBN approaches;
**Comment:**
Confusing sentence: it seems to mean that RNP AR approaches don't always request SPA approval.
**Requested Change:**
• approach operations requiring specific approval (RNP AR APCH). Eventually, only RNP AR, RNP 0,3 (helicopters only) and A-RNP operations will request a specific approval.

response | *Noted*

The Agency would like to apologise if the text of the Explanatory Note was not crystal clear. The Note will, however, not be republished.

comment | *160* comment by: *Dassault Aviation*

Dassault-Aviation comment 4 page # 14
**Extract:**
*2.5.3.6 IR Skill test (Appendix 7 to Part FCL)*
Finally, in compliance with the new ICAO taxonomy, approaches are no longer classified in terms of 'precision' and 'non-precision', but as '3D' and '2D'.
**Comment:**
The new ICAO taxonomy separates instrument approach **procedures** (IAP) from instrument approach **operations**. Instrument approach procedures are still classified in NPA, APV and precision approach; instrument approach operations are defined with two criteria: lowest operating minima (Type A ≥ 250ft, type B < 250ft) and flight method to operate on a procedure: 2D or 3D.
**Requested Change:**
Modify the text to be consistent with the new ICAO definitions/taxonomy of instrument approach procedures and approaches.

response | *Accepted*

See the response to comment No 157.

comment | *161* comment by: *Dassault Aviation*

Dassault-Aviation comment 5 page # 15
**Extract:**
*2.5.3.8 Skill test and proficiency check for MPL, ATPL, type and class ratings and proficiency*

*check for IRs (Appendix 9 to Part FCL)*
Aeroplanes: (a)
(1) Flight test tolerance for 3D 'angular' operations (e.g. LPV, ILS, MLS, GLS, etc.) ;
(2) Flight test tolerance for 3D 'linear' operations (i.e. LNAV/VNAV) using Baro VNAV;
**Comment:**
The meaning of "angular" and "linear" operations is not clear. Furthermore those two terms and are not present in the ICAO PBN Manual.
**Requested Change:**
Provide an explanation of these two terms.

response *Accepted*

Definitions for angular and linear instrument operations are now included in the resulting text of proposed amendments to FCL.010.

comment *162* comment by: *Dassault Aviation*

Dassault-Aviation comment 6 page # 15
**Extract:**
*2.5.3.8 Skill test and proficiency check for MPL, ATPL, type and class ratings and proficiency check for IRs (Appendix 9 to Part FCL)*
(1) Flight test tolerance for 3D 'angular' operations (e.g. LPV, ILS, MLS, GLS, etc.) which, according to the ICAO taxonomy, are no longer called 'Precision approach';
**Comment:**
See comment # 4: a precision approach is an instrument approach procedure whereas 3D corresponds to an instrument approach operation.
**Requested Change:**
Delete: "which, according to the ICAO taxonomy, are no longer called 'Precision approach';"

response *Noted*

The Agency apologises for the imprecision of the text in the Explanatory Note. The latter will, however, not be republished.

comment *189* comment by: *Universal Avionics Systems Corporation*

Throughout this material, LNAV/VNAV is referred to as a 'linear' operation. AMC 20-27A allows alternate displays with other compensation and this use of linear may result in a negative training effect.

response *Not accepted*

The Agency requires ATOs to include all possible displays into training and, therefore, cannot see a possible negative training effect when referring to LNAV/VNAV as 'linear' operation.

comment *198* comment by: *Ryanair*

| NPA Reference 2.5.3.6 IR Skill test | NPA Text At the begining of the procedure (around the FAF), brief deviations above the | RYR position Experience has shown that landing gates of | Suggested Text At the begining of the procedure (around the FAF), brief deviations above the |
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| page 14 | flight path could instead be accepted, but the approach should be stabilised, since unstabilised approaches are one of the most frequent causal factors in several landing accidents, including runway excursions. For this reason, the pilot should also monitor +75 ft at 700 ft above the aerodrome elevation (where the approach has to be definitely stabilised). | 1000ft IMC and 500ft VMC are the most effective for stabilised approaches. | flight path could instead be accepted, but the approach should be stabilised, since unstabilised approaches are one of the most frequent causal factors in several landing accidents, including runway excursions. For this reason, the pilot should also monitor +75 ft at 1000ft above the aerodrome elevation IMC and 500ft VMC (where the approach has to be definitely stabilised). |

response *Partially accepted*

The value of 700 ft for instrument approaches has now been changed to the standard value of 1 000 ft. For further details, please refer to the answer provided to comment No 100.

**2.5 Overview of the affected provisions and proposed amendments — 2.5.10 Commission Regulation (EU) No 965/2012 (AIR-OPS)** p. 17-18

comment *21* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

Approvals: According to ICAO Annex 6, Part I-III, PBN approvals (authorizations) are mandatory for operations in airspace where a navigation specification for performance-based navigation has been prescribed.
The proposed rules are not fully in compliance with the present standard as specified in ICAO Annex 6. This might cause problems for EU operators operating to a third country.
Even though there will be an explanation in a note to the OPS SPEC for CAT operators there is no guarantee for acceptance by a third country. This concern is particularly relevant for non commercial operators as there is no equivalent documentation, as the OPS SPEC, on the ICAO level.
On the EU level a list of specific approvals shall specify Part SPA approvals. However if a non commercial operator does not have any specific approvals there will not be any list issued by the competent authority, hence there will be no formal indication that the European rules does not require a specific approval for certain PBN operations, but yet fulfills an equivalent level of safety compared to the ICAO standard.
In order to mitigate potential effects of the above, EU needs, pending changes in relevant ICAO Annexes and guidance material, to harmonize the European approach on this topic with the ICAO states.
Furthermore it is essential that applicability of the proposed EU rules is synchronized with necessary changes in relevant ICAO Annexes and associated guidance material.

response *Noted*

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| | See the response to comment No 19. |

**2.5 Overview of the affected provisions and proposed amendments — 2.5.14 AMC and GM to Part ARO** p. 20

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| comment | *163* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 7 page # 20<br>**Extract:**<br>2.5.14 AMC and GM to Part ARO<br>Furthermore, a new GM1 ARO.OPS.230 refers to ICAO Doc 9997<br>**Comment:**<br>Add the name of the ICAO Document<br>**Requested Change:**<br>Furthermore, a new GM1 ARO.OPS.230 refers to ICAO Doc 9997 Performance-based Navigation (PBN) Operational Approval Manual |
| response | *Noted*<br>The title of ICAO Doc 9997 was already provided in the proposed GM3 to ARO.OPS.230. |

**2.5 Overview of the affected provisions and proposed amendments — 2.5.16 AMC and GM to Part ORO** p. 21

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| comment | *164* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 7 page # 21<br>**Extract:**<br>2.5.16 AMC and GM to Part ORO<br>In line with the new approach classification adopted by ICAO, the term 'precision instrument approach' has been replaced with '3D approach operation' and the term 'non-precision approach' with '2D approach operation'.<br>**Comment:**<br>In the ICAO PBN Manual, the terms 'precision instrument approach' and 'non-precision approach' still exist but are linked to procedures.<br>**Requested Change:**<br>Precise that the replacement of the terms 'precision instrument approach' and 'non-precision approach' is only valid in the specific context of the training. |
| response | *Noted*<br><br>Please note that ICAO differentiates between instrument approach procedures and instrument approach operations. The new approach classification does not change the name of the procedures, which is paramount in Doc 9613, but that of operations. Operations are the principal reference in the context of training, where the terms 2D and 3D approaches are used in the resulting text. |

**2.5 Overview of the affected provisions and proposed amendments — 2.5.17 Annex IV to** p. 21-22

**Commission Regulation (EU) No 965/2012 (Part CAT)**

comment

*148* comment by: *EUROCONTROL*

**Section 2.5.17 - Page 22 - 2nd paragraph**
This paragraph contains the following statement: "On this basis, the decision was made not to transpose from AMC 20-27 the requirement that a conventional approach must be available at the destination if an alternate is not required. Nor does the requirement apply to enroute or take-off alternates."
EUROCONTROL does not understand the meaning of the term "not to transpose from" in this sentence and recommends the inclusion of an explanation or an adaptation of the text.

response

*Noted*

The text seems reasonably clear. The requirement in AMC 20-27 stating that a conventional approach must be available at the destination if an alternate is not required, has not been included, for the reasons explained in the response to comment No 1.

**2.5 Overview of the affected provisions and proposed amendments — 2.5.18 AMC and GM to Part CAT** p. 22-23

comment

*101* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding "the upper limit in AMC 20-27 was removed, because there is no obstacle clearance issue above the vertical profile", this removal might require reconsideration. | FAA guidance still contains the upper limit as aircraft being above vertical paths can result in undesirable energy states and unstabilized approaches. | Recommend reinstating upper limit and, as necessary, including language in guidance material concerning potential negative effects of being above vertical profiles. | Potential for negative effects if aircraft are flown above path resulting in high-energy states and unstabilized approaches. |

response

*Accepted*

The upper deviation limit is now included in the resulting text of AMC4 to CAT.OP.MPA.126, AMC3 to NCC.OP.116, AMC3 to NCO.OP.116 and AMC3 to SPO.OP.116, in line with the requirements for pilot training.

**2.5 Overview of the affected provisions and proposed amendments — 2.5.19 Annex V to Commission Regulation (EU) No 965/2012 (Part SPA)** p. 24-26

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| comment | *86* comment by: *Virgin Atlantic*<br>Re 2.5.19 para 3 and 5: Will it always be clear from the AIP or competent authority that a particular procedure does not meet Doc 9905 criteria and therefore requires a SPA for that individually? |
| response | *Noted*<br>In the EU, all AIS providers are certified organisations subject to oversight by the competent authority and hence working according to documented procedures.<br>Outside the EU, this is the responsibility of other ICAO Contracting States. |

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| comment | *124* comment by: *UK CAA*<br>The CAA recognises that some States are implementing RNP(AR) approach procedures where the full capability of RNP(AR) is not being applied, eg to facilitate Noise abatement and for ATM convenience etc. These approach operations may, for instance, use RF legs inside the FAF with normal RNP Approach accuracy values ie 0.3nm, or using the accuracy of 0.1nm with no terrain implications. ie RNP (AR) approach operations are being established where there are no Safety Assurance considerations that would merit a full RNP(AR) operational approval as required under AMC 20-26. The CAA supports the principle of the removal of approval requirements in such cases but before such operations are deemed 'Public' and outside of the requirement for a formal RNP (AR) approval an assessment for the 'Criteria' for such approach operations should be agreed. |
| response | *Noted*<br>Indeed, the proposed rules distinguish between 'public' AR procedures (published in the AIP) and other AR procedures (not published in the AIP) since they are specific to an aircraft type or to an operator. For the former, a generic approval is maintained.<br>Additional guidance material may be issued by the Agency when more concrete experience will have been accrued by the competent authorities at national level. It is, therefore, recommended that States and operators develop clearer guidance on RNP AR APCH.<br>Once more collective experience would be available, the Agency may draft common AMC/GM. |

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| comment | *149* comment by: *EUROCONTROL*<br>**Page 24 - Section 2.5.19 - First paragraph and page 55**<br>The time of arrival control function is not one of the standard functions of advanced RNP. It is an optional function in the PBN manual. EUROCONTROL therefore wonders why specific approval (SPA) is needed for this function. A justification should be made. |
| response | *Accepted*<br>Indeed, this function is optional in advanced RNP. No SPA is required for it by the resulting text of SPA.PBN.100. |

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| comment | *150* comment by: *EUROCONTROL* |
| | **Page 24 - Section 2.5.19**<br>(Text below underlined by EUROCONTROL)<br>Reference is made by EUROCONTROL to the 3rd paragraph that contains the following statement:<br>"*The new proposed rules would allow a single approval for each of the PBN specifications, when so required, conferring the privilege of flying such operations at any geographical location. An individual approval (site specific) would only be necessary if the AIP or the competent authority required so."*<br>EUROCONTROL notes that this approach creates a content change to AMC 20-26 for RNP AR APCH operations which mandates individual operational approvals. The rulemaking group, however, considered that the design of most RNP AR APCH procedures are standardised in accordance with ICAO Doc 9905 and, for this reason, proposed a generic operational approval. For those procedures which do not meet the criteria of ICAO Doc 9905 an individual operational approval for the specific procedure would be required. EUROCONTROL recommends that the 3rd paragraph be clarified.<br>Reference is made by EUROCONTROL to two separate statements that can be found:<br>- on page 24 in the 5th paragraph<br>*"Furthermore, the competent authority could specify that individual approvals are necessary for certain RNP AR APCH operations. The rationale behind this rule is that the authority could specify that RNP AR APCH operations on aerodromes, which are classified by the operator or considered by the authority as C aerodromes, require an individual approval."*<br>- and on page 94, under point 3 (a) (2)<br>*"A flight operational safety assessment (FOSA) should be conducted for each RNP AR APCH approach procedure where more stringent aspects of the nominal procedure design criteria are applied (e.g. RNP AR APCH procedures with RNP values less than 0.3, RF legs, and RNP missed approaches less than 1.0) or where the application of the default procedure design criteria is in an operating environment with special challenges…"*<br>Knowing that there is limited experience with RNP AR in Europe so far, EUROCONTROL recommends that a confirmation is given as to whether the rulemaking group foresees an application of "public AR" procedures in the future, which can be flown under the generic RNP AR approval of the operator.<br>EUROCONTROL questions the need for this, taking into account that there are already NAV specs (RNP 1 with RF, ARNP) to design environmental friendly procedures including curved paths outside of challenging environments.<br>Moreover, in the case when a NAV spec is getting used for purposes it was originally not designed for, would not the following two situations generate a risk: aircrew / pilots mistakenly flying procedures for which they were not authorised and reduced vigilance of crew / pilots with regards to these procedures? |
| response | *Partially accepted*<br><br>The proposed rules allow for, but do not require, a 'generic' approval. This is in line with the USA experience. The new rules may probably contribute to more RNP AR APCH procedures being published in the EU by the AIP service providers and so enhance the benefits for the community.<br><br>In any case, a reference to the ICAO Doc 9905 has been added to the resulting text of GM1 to SPA.PBN.100. |

**2.5 Overview of the affected provisions and proposed amendments — 2.5.29 AMC 20** p. 29-32

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| comment | *87* comment by: *Virgin Atlantic*<br>Ref 2.5.29.3 AMC 20-12: Whilst understanding that FAA Order 8400.12A was cancelled in January 2010, (it has been suspended twice), current Order 8400.12C from 2011 still remains in force. The statement is misleading, it implies that no Order remains in existence. |
| response | *Noted*<br>The Agency is in the process of transitioning all airworthiness-related RNAV and RNP provisions from AMC 20-xx and JAA TGL guidance material, into subpart C of the new Certification Specification — Airborne Communication, Navigation and Surveillance (CS-ACNS). The related tasks are RMT.0519 & RMT.0520. The NPA stemming from said tasks is scheduled for publication in 2015.<br>In order to most efficiently use the limited resources available, the Agency has, therefore, decided to only remove material related to operations from relevant and existing AMC 20-xx documents, but not to update the airworthiness aspects through NPA 2013-25 and this CRD. |

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| comment | *96* comment by: *LVNL Pro (ATC the Netherlands)*<br>Ref. AMC 20-26 , page 31.<br>It is stated that RNP AR procedures must be designed by organisations certified under Art 8.b. of the B.R., which applies to ATM/ANS providers.<br>The question arises how this corresponds to other regulation where we see a trend to shift such responsibility to Airport authorities. |
| response | *Noted*<br>Nothing prevents an aerodrome operator from being certified also as airspace designer or even as provider of radio navigation signals in space, or of ATC services. For instance, the operator of Mannheim airport (Germany) is also certified to provide tower ATC services. In the knowledge of the Agency, the majority of the EU ATC service providers are also certified to provide airspace design services.<br>Furthermore, a public or private organisation may request to be certified only as airspace designer, even at pan-European level, as per Article 22a(c) of the Basic Regulation.<br>Conversely, the same organisation may be certified as ATC provider, but also as aerodrome operator (e.g. AENA in Spain), if so desired by the organisation and accepted by the competent authority.<br>Detailed technical requirements and operation procedures for Airspace Design (ASD) including procedure design are being developed by the Agency through RMT.0445 & RMT.0446. |

**3 Proposed amendments — 3.1 Draft Opinion** p. 33-61

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| comment | *4* comment by: *KLM* |

CAT.OP.MPA.185 Planning minima for IFR flights - aeroplanes …
(d) The operator shall only select an aerodrome as a destination alternate aerodrome if an approach procedure that does not rely on GNSS is used for planning minima either at that aerodrome or at the destination aerodrome
Comment :
This requirement is not realistic. It cannot be expected that at all aerodromes in the near future a conventional approach aid is available.
Before planning an approach procedure at an aerodrome a RAIM check has to be performed and if there is no outage expected there is no reason to plan on a conventional procedure, moreover the on board navigation system performs RAIM constantly and before actually commencing the approach procedure the pilot checks if GNSS reception is sufficient and he has to monitor the ANP. With all this the execution of the RNP APCH is ensured. When a diversion is required it does not mean that at the destination aerodrome a RAIM outage is applicable.
A more realistic requirement is that the on board RNP system is working but that is covered in **CAT.OP.MPA.175 Flight preparation.**
The requirement is too conservative and not argued properly and the need is unclear.

response

*Partially accepted*

Today the basic space-based navigation facility is the Global Positioning System (GPS) funded and managed by the USA Department of Defence. The EU aviation authorities have no control on it and, since it is a military system, they can neither certify nor audit it.

In the future, when multi-constellation GNSS facilities are available, with at least one provider (e.g. Galileo) certified and under oversight by the competent EU authority, CAT.OP.MPA.185 and 186 will be reconsidered.

In any case, the text proposed by NPA 2013-25 on the matter, was considered by other stakeholders clearer than the current AMC 20-27 (please refer to comment No 11).

The proposed CAT.OP.MPA.185 (and 186) clearly allows to plan, as destination, an aerodrome where only GNSS procedures are available, which is already an improvement of the past requirement.

The resulting text of CAT.OP.MPA.185 (and 186) has, however, been made clearer. Please see the response to comment No 33.

comment

*5* comment by: *KLM*

**SPA.PBN.105 PBN operational approval**
(6f) a management RNP monitoring programme has been established
Comment:
This is a paper burden that is not necessary; proper training for flight crew and other personnel is established and a proper reporting system has to be in place. There is no need for an additional burden as suggested here.
The requirement is too vague and can mean anything but whatever is intended it is bureaucracy only and has to be deleted.
When there is no need for an approval by the NAA there is no need for this prograqmme as it does not add anything.

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| response | *Accepted*<br><br>The intent of SPA.PBN.105(f) and the related AMC1 has been clarified, to make explicit that it is applicable only to RNP AR APCH. The scope of the monitoring programme is in fact very limited. |

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| comment | *6* comment by: *KLM*<br><br>**CAT.IDE.A.355**<br>Part (e) should be a full stop after accuracy and integrity.<br>Any failure of the data is a hazard but has to be reported and not only if it is expected to constitute a hazard to flight and not explain when this can be expected.<br>The term expected is subjective and may be wrongly or differently interpreted and therefore is not meaning anything |
| response | *Accepted.*<br><br>CAT.IDE.A/H.355 has been shortened to remove the ambiguity without introducing a subjective judgement. |

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| comment | *11* comment by: *AIR FRANCE*<br><br>*CAT.OP.MPA.185 Planning minima for IFR flights - aeroplanes*<br>*…*<br>*(d) The operator shall only select an aerodrome as a destination alternate aerodrome if an approach procedure that does not rely on GNSS is used for planning minima either at that aerodrome or at the destination aerodrome.*<br>*…*<br>This new § is welcome as it clarifies the intent of AMC 20-27 :<br>*c) Flight crew should ensure sufficient means are available to navigate and land* ***at the destination or at an alternate aerodrome*** *in the case of loss of RNP APCH airborne capability.*<br>*In particular, the pilot should check that:*<br>*a nonRNP APCH procedure is available at the alternate, where a destination alternate is required*<br>*at least one nonRNP APCH procedure is available at the destination aerodrome, where a destination alternate is not required.*<br><br>which was confusing and could be interpreted as "no RNP APCH at the destination alternate any time".<br>Now that Cat 1 ILSs start to be decommissioned on smaller airports used as Destination alternate, it is important to take advantage of RNP APCH at these aerodromes (when the destination often is ILS equiped). |
| response | *Noted*<br><br>The comment is appreciated. |

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| comment | *15* comment by: *KLM*<br><br>CAT.OP.MPA.185 Planning minima for IFR flights - aeroplanes … |

(d) The operator shall only select an aerodrome as a destination alternate aerodrome if an approach procedure that does not rely on GNSS is used for planning minima either at that aerodrome or at the destination aerodrome
Comment :
This requirement is not realistic. It cannot be expected that at all aerodromes in the near future a conventional approach aid is available.
Before planning an approach procedure at an aerodrome a RAIM check has to be performed and if there is no outage expected there is no reason to plan on a conventional procedure, moreover the on board navigation system performs RAIM constantly and before actually commencing the approach procedure the pilot checks if GNSS reception is sufficient and he has to monitor the ANP. With all this the execution of the RNP APCH is ensured. When a diversion is required it does not mean that at the destination aerodrome a RAIM outage is applicable.
A more realistic requirement is that the on board RNP system is working but that is covered in **CAT.OP.MPA.175 Flight preparation.**
The requirement is too conservative and not argued properly and the need is unclear.

response

*Partially accepted*

See the response to comments Nos 4 and 33.

comment

*16* comment by: *KLM*

**SPA.PBN.105 PBN operational approval**
(6f) a management RNP monitoring programme has been established
Comment:
This is a paper burden that is not necessary; proper training for flight crew and other personnel is established and a proper reporting system has to be in place. There is no need for an additional burden as suggested here.
The requirement is too vague and can mean anything but whatever is intended it is bureaucracy only and has to be deleted.

response

*Accepted*

See the response to comment No 5.

comment

*17* comment by: *KLM*

**SPA.PBN.105 PBN operational approval**
(6f) a management RNP monitoring programme has been established
Comment:
This is a paper burden that is not necessary; proper training for flight crew and other personnel is established and a proper reporting system has to be in place. There is no need for an additional burden as suggested here.
The requirement is too vague and can mean anything but whatever is intended it is bureaucracy only and has to be deleted.

response

*Accepted*

See the response to comment No 5.

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| comment | *18* comment by: *KLM*<br><br>**CAT.IDE.A.355**<br>Part (e) should be a full stop after accuracy and integrity.<br>Any failure of the data is a hazard but has to be reported and not only if it is expected to constitute a hazard to flight and not explain when this can be expected.<br>The term expected is subjective and may be wrongly or differently interpreted and therefore is not meaning anything |
| response | *Accepted*<br><br>See the response to comment No 6. |

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| comment | *22* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br><br>Ref page 51 OPS SPEC<br>Approvals: According to ICAO Annex 6, Part I-III, PBN approvals (authorizations) are mandatory for operations in airspace where a navigation specification for performance-based navigation has been prescribed.<br>The proposed rules are not fully in compliance with the present standard as specified in ICAO Annex 6. This might cause problems for EU operators operating to a third country.<br>Even though there will be an explanation in a note to the OPS SPEC for CAT operators there is no guarantee for acceptance by a third country. This concern is particularly relevant for non commercial operators as there is no equivalent documentation, as the OPS SPEC, on the ICAO level.<br>On the EU level a list of specific approvals shall specify Part SPA approvals. However if a non commercial operator does not have any specific approvals there will not be any list issued by the competent authority, hence there will be no formal indication that the European rules does not require a specific approval for certain PBN operations, but yet fulfills an equivalent level of safety compared to the ICAO standard.<br>In order to mitigate potential effects of the above, EU needs, pending changes in relevant ICAO Annexes and guidance material, to harmonize the European approach on this topic with the ICAO states.<br>Furthermore it is essential that applicability of the proposed EU rules is synchronized with necessary changes in relevant ICAO Annexes and associated guidance material. |
| response | *Noted*<br><br>The ICAO FLTOPS Panel, at its 1st meeting in October 2014, has proposed amendments to ICAO Annex 6, based on the European approach. Furthermore, the Australian Civil Aviation Safety Authority (CASA) already adopted a policy change with the aim of following the European approach. It is very likely that the ICAO documents will be amended at the same time as the European rules. If the European rules would be ahead of the ICAO amendment cycle, entries in the OPSPECS as well as a list of specific approvals should be retained to ensure global recognition.<br><br>If a non-commercial operator not holding any special approvals faces recognition problems outside Europe, such an operator should ask its competent authority to issue a list of specific approvals listing all PBN operations, which the operator is entitled to conduct. |

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| comment | *23* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br><br>Article 3 - Page 35<br>Timelines: We do not believe that the proposed timelines for the proposed applicabilty date of this major change is realistic due to the need to adapt to the new proposed rules and the foreseen costs for investments in new equipment. There must be a realistic transition period for the implementation of the proposed rules. |
| response | *Noted*<br><br>See the response to comment No 19 on timelines. |

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| comment | *24* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br><br>Ref Page 52<br>Annex II – Amendments to Commission Regulation (EU) No 965/2012 Appendix V (List of specific approvals)<br>Note 16 to the table (EASA FORM 140 Issue 1)..... The reference should be to 6 insted of 16. |
| response | *Accepted* |

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| comment | *29* comment by: *AIR FRANCE*<br><br>In CAT.OP.MPA.185 we suggest to also clarify the use of GNSS for<br>a) take off alternate (suggest to allow if RAIM prediction OK during the period)<br>c) Isolated aerodrome (suggest to vorbid in accordance with AMC 20-27 "at least one non-RNP APCH procedure is available at the destination aerodrome, where a destination alternate is not required "<br>c) Fuel ERA or other ERA (suggest to allow if RAIM prediction OK during the period) |
| response | *Accepted*<br><br>However, clarification is included at the Guidance Material level, since the legally binding Implementing Rules are not meant to serve as guidance. |

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| comment | *31* comment by: *Airbus Helicopters*<br><br>*Location*<br>Annex I – Amendments to Commission Regulation (EU) No 1178/2011. Proposal No 5 (amendments to Appendix 9), paragraph B.4, page 43<br>*Comment*<br>The following text: "*Vertical deviations not below - 75ft*" is not precise and not consistent with the equivalent text on page 37: "*For linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV): not more than –75 ft below the vertical profile*"<br>*Rationale for comment*<br>Consistency and accuracy of text.<br>*Recommendation* |

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| | Change wording to: "*Vertical deviations not more than – 75 ft below the vertical profile*" |
| response | *Accepted*<br><br>The resulting text on acceptable vertical deviation in Appendix 9 to Part-FCL has been reviewed. |

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| comment | *32* comment by: *Airbus Helicopters*<br><br>*Location*<br>Annex II – Amendments to Commission Regulation (EU) No 965/2012. Proposal 3, page 52.<br>*Comment*<br>The NPA states about amending note 16 to the table (EASA FORM 140 Issue 1) in Appendix V to Annex II (Part ARO).<br>As a matter of fact, Appendix V to Annex II (Part ARO) was introduced by the first amendment to (EU) No 965/2012 (i.e. (EU) No 800/2013), where it appears that the note to be amended is number 6.<br>*Rationale for comment*<br>Spelling mistake.<br>*Recommendation*<br>Change "Note 16" to "Note 6". |
| response | *Accepted* |

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| comment | *33* comment by: *Airbus Helicopters*<br><br>*Location*<br>Annex II – Amendments to Commission Regulation (EU) No 965/2012. Proposal No 5 (amendments to Annex IV (Part CAT)). CAT.OP.MPA.185 & CAT.OP.MPA.186, page 53.<br>*Comment*<br>"*The operator shall only select an aerodrome as a destination alternate aerodrome if an approach procedure that does not rely on GNSS is used for planning minima either at that aerodrome or at the destination aerodrome*"<br>Wording is very complex and hence may be confusing.<br>*Rationale for comment*<br>Improve understandability.<br>*Recommendation*<br>Change wording to:<br>"*An approach procedure that does not rely on GNSS for planning minima shall be available either at destination or at destination alternate aerodrome selected by the operator*" |
| response | *Accepted*<br><br>The resulting text of CAT.OP.MPA.185 and 186 has been amended as proposed. This is also the case for the text of NCC.OP.153, NCO.OP.142 and SPO.OP.152. |

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| comment | *34* comment by: *Airbus Helicopters*<br><br>*Location*<br>Annex II – Amendments to Commission Regulation (EU) No 965/2012. Proposal No 5 |

(amendments to Part CAT):
- page 54, (CAT.IDE.H.355), and
- page 57, (NCC.IDE.H.260)

*Comment*
The word "*aeroplane*" is not appropriate in the following sentence:
"*(d) The operator shall ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aeroplanes that require it.*"
*Rationale for comment*
CAT.IDE.H is related to helicopters, not to aeroplanes.
*Recommendation*
Change "*aeroplane*" to "*helicopter*" or "*aircraft*".

response *Accepted.*

comment *35* comment by: *Airbus Helicopters*

*Location*
Annex II – Amendments to Commission Regulation (EU) No 965/2012:
- proposal No 7 (amendments to Annex VI (Part NCC)), NCC.OP.153 page 56, and
- proposal No 8 (amendments to Annex VII (Part NCO)), NCO.OP.142 page 58.

*Comment*
"*The pilot-in-command shall only select an aerodrome as a destination alternate aerodrome if an approach procedure that does not rely on GNSS is available either at that aerodrome or at the destination aerodrome.*"
Wording is very complex and hence may be confusing.
*Rationale for comment*
Improve understandability.
*Recommendation*
Change wording to:
"*An approach procedure that does not rely on GNSS for planning minima shall be available either at destination or at destination alternate aerodrome selected by the pilot-in-command*"

response *Accepted*

The resulting text of CAT.OP.MPA.185 and 186 has been amended as proposed. This is also the case for the text of NCC.OP.153, NCO.OP.142 and SPO.OP.152.

comment *91* comment by: *AESA / DSANA*

| COMMENT | JUSTIFICATION |
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| In relation to the the Advanced RNP function 'Time of Arrival Control' (A-RNP TOAC), we are of the opinion that either the full A-RNP specification is subject to a specific approval or no approval is required for this specification.<br><br>We propose not to include the A-RNP specification in this NPA and wait until the procedures associated | There is a risk is splitting the approval of the A-RNP specification between the instrumental rating (IR) and a particular approval for the TOAC feature for two reasons:<br><br>1.- the same exact reason given for this splitting ("*the associated* |

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| to the TOAC feature are fully developed and published in order to take a final decision whether to subject this specification to a particular approval or not. | *procedures are still in development*") which brings uncertainty into the approval process; and<br><br>2.- The administrative process will result in the lack of clarity of what is actually approved and where does the approval reside. |

response *Not accepted*

See the response to comment No 149.

comment *102* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Revise "An approval is required…(3) the Advanced RNP function Time of Arrival Control." | Time of Arrival Control (TOAC) can be associated with other navigation applications or specifications other than Advanced RNP. | Either delete requirement against TOAC (pending more information from RTCA/EUROCAE efforts) or remove reference to "Advanced RNP". | Minor – however, there will likely be confusion regarding application of TOAC against other operations. |

response *Not accepted*

See the response to comment No 149.

comment *103* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Consider augmenting references to a "reasonableness check" here and in other sections. | A reasonableness check has value but operational experience has shown that a more detailed examination of waypoint sequence and | Consider adding additional considerations for procedure checks. FAA Aeronautical Information Manual contains the following language, "Flight crews should | Potential for negative effects if pilots miss seemingly minor, yet operationally |

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| | other procedure aspects can trap errors (for example, selection of incorrect procedure transition and identification of route discontinuities.) | crosscheck the cleared flight plan against charts or other applicable resources, as well as the navigation system textual display and the aircraft map display. This process includes confirmation of the waypoints sequence, reasonableness of track angles and distances, any altitude or speed constraints, and identification of fly−by or fly−over waypoints.” | important aspects of procedures. |

response *Accepted*

The recommended text has been inserted in a footnote in the resulting text of Appendix 1.062: AMC1 FCL.310; FCL.515(b); FCL.615(b).

comment *108* comment by: *Air France*

1. **page 37 : "tracking : For linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV):**

   not more than –75 ft below the vertical profile, and not more than +75 ft above the vertical profile at or below 700 ft above aerodrome level"

proposal :
replace by " not more than –75 ft below the vertical profile, or OEM instructions" as some guidance systems give angular guidance even for those linear vertical deviations.
remove "and not more than +75 ft above the vertical profile at or below 700 ft above aerodrome level " as it is not a criteria based on obstacle protection . Keep it simple and identical to page 43 of this NPA.
**2. page 53 : CAT.OP.MPA.175 Flight preparation**
"§b.8 (8) any navigational database required for performance-based navigation is suitable and current"
Question : what do you expect as MEL requirement?
**3. page 53 : CAT.OP.MPA.185 Planning minima for IFR flights - aeroplanes**
Proposal : add GM : Accessibility of take off and En route alternate airport can be determined with an RNAV procedure.
Justification : The probability of use of TO or ERA airport with a RNAV failure is too remote to be taken into account.

**4 page 53 : CAT.IDE.A.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks**
"(f) When performance-based navigation is required, the aircraft shall meet **the airworthiness certification requirements** for the appropriate navigation specification."
Proposal :
add an AMC : Compliance with this requirement is possible through a flight manual statement of the european airworthiness regulation or an other statement (other basis) acceptable for the competent authority.

Justification : The proposed AMC covers a common case: a new possibility is offered by the operational regulation, but all the airworthiness documents take a long time to be updated. For instance, since more than 10 years, there is no european regulation stated in the Boeing AFM for RNP APCH. Nevertheless equivalent regulatory materials (FAA) is present. The operator shouldn't be blocked in such a situation.
**5. page 55 : SPA.PBN.100 PBN operations**
"(b) An approval for RNP AR APCH operations shall allow operations on procedures which meet the applicable design criteria. A procedure-specific approval shall be required for any procedure that does not meet the applicable design criteria or where required by the Aeronautical Information Publication (AIP) or the competent authority."
Proposal : Remove §b.
Justification :
Procedures that don't comply with ICAO PANS OPS, are under responsability of the airport authority. Their publication in AIP is possible only if they demonstrate an equivalent level to the ICAO annex 14.

response

*Partially accepted*

1. Partially accepted: The reference to the OEM has been removed. In addition, the '-75ft below' comes from procedure design criteria (ICAO Doc 9905, max FTEz fixed at 23 m).

   Regardless of the guidance, angular or vertical, the FTEz should not exceed 75 ft, and the aircraft documentation shall provide the adequate procedure to respect this criterion.

   The +75ft results from previous requirements (AMC20-26 and AC90-101). It was initially proposed to remove this upper limit that has an impact only in terms of energy management.

   By similarity to other guidance mode's FTEz, and because of the need of clear limits definition in FCL guidance material, it has been decided to keep the +75 ft above path, but to limit this requirement to the last part of the final approach where an excessive energy is detrimental to safety. The last change was to raise the gate at 1 000 ft to be consistent with the IMC stabilisation at 1 000 ft.

2. Accepted. For PBN operation, the database should be suitable; i.e.:

   — the procedure should be retrievable from the database; and,

   — the database should be current.

*Note: the maximum limit fixed at the level of AMC is one cycle (28 days)*

Resulting text:

**AMC2 CAT.OP.MPA.175 Flight preparation**

DATABASE SUITABILITY

The flight crew should check that any navigational database required for PBN operations includes the routes and procedures required for the flight.

DATABASE CURRENCY

Where a navigation database is required for PBN operations, the database validity (current AIRAC cycle) should be checked before the flight.

Navigation databases are expected to be current for the duration of the flight. If the AIRAC cycle is due to change during flight, operators and flight crew should establish procedures to ensure the accuracy of navigation data, including the suitability of navigation facilities used to define the routes and procedures for the flight.

An expired database may only be used if the following conditions are satisfied:

(a) the operator confirms that the parts of the database which are intended to be used during the flight and any contingencies that it is reasonable to expect are not changed in the current version;

(b) any NOTAMs associated with the navigational data are taken into account;

(c) the paper (or electronic) maps and charts corresponding to those parts of the flight are current and have not been amended since the last cycle;

(d) any aircraft MEL limitations are observed; and

(e) the database is expired by no more than 28 days.

3. Not accepted

CAT.OP.MPA.185 neither addresses take-off alternate aerodromes, nor en-route alternate aerodromes.

Furthermore, the current **GM1 CAT.OP.MPA.185 (Planning minima for IFR flights — aeroplanes )** states:

'PLANNING MINIMA FOR ALTERNATE AERODROMES

Non-precision minima in Table 1 of CAT.OP.MPA.185 mean the next highest minima that apply in the prevailing wind and serviceability conditions. Localiser only approaches, if published, are considered to be non-precision in this context. It is recommended that operators wishing to publish tables of planning minima choose values that are likely to be appropriate on the majority of occasions (e.g. regardless of wind direction). Unserviceabilities should, however, be fully taken into account.

As Table 1 does not include planning minima requirements for APV, LTS CAT I and OTS CAT II operations, the operator may use the following minima:

(a) for APV approaches: NPA or CAT I minima, depending on the DH/MDH;

(b) for LTS CAT I approaches: CAT I minima; and

(c) for OTS CAT II approaches: CAT II minima.

The Agency considers that no additional GM is necessary.

4. Accepted

While it is expected and needed, that OEMs adopt a customer-oriented policy which entails that they provide up-to-date information on the capability of their systems to

their customers, it also understood that this may be extremely difficult for legacy aircraft.

Specific GM1 to CAT.IDE.A/H.345 has been included in the resulting text, on Aircraft eligibility to PBN navigation specification not requiring specific approval.

5. Partially accepted

A RNP APCH or RNP AR APCH may be published without special restriction even if design rules from ICAO PANS OPS are not totally complied with. But these cases might not be too much out of standard. Any deviation from ICAO standards is assumed to be assessed and mitigated. All this is documented in a FOSA, and when impacting the flight procedure, the publication of a special advice in the AIP can be reasonably expected (except penalisation on minimum, etc.).

From the operator or commander point of view, and based on AIP only, it is not possible to assess the design compliance. Rules aiming at differentiating airports where a specific approval will be required are applicable only if a clear restriction is published such as: 'for approved operator only or, crew training required,…'

Today all 'tricky' public airports' AIPs contain such restrictions, and at the end the selection of airports remains the operator's (or the commander's) responsibility.

The Agency, based on this comment, hence proposes to remove the 'applicable design criteria' consideration and split paragraph (b) in SPA.PBN.100 into two, as presented in the resulting text of the draft IR.

comment *113* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Regarding: "Content Of The Test" | The Practical Test Standards for Instrument, Commercial, and Airline Transport Pilot would need to be aligned with the various sections on subject pages. | Further study. | Minimal |

response *Noted*

Yes. Through its 'safety intelligence' function, the Agency constantly maintains active monitoring of what happens in concrete on the field, to continuously improve the regulatory material.

comment *121* comment by: *DGAC France*

Page 35 : a few lines before the end of the page, one can read
"Article 2 :

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| | Annexes I, II, V, VI [...] are amended..."<br>Annex IV should be added to the list |
| response | *Accepted*<br><br>The list has been amended. |

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| comment | *125* comment by: *UK CAA*<br><br>**Page No:** 43<br>**Paragraph No:** B. Specific requirements for the aeroplane category – Flight Test Tolerance, sub-paragraph 4.<br>**Comment:** With reference to pilot tracking in 2D Linear Operations (LNAV), the tolerance for FTE for PBN is ½ the navigation accuracy not < RNP value as stated. The only exception is on fly-by transitions where the allowance increases to the whole of the navigation accuracy. This applies irrespective of whether the airspace is designed for an RNAV or RNP specification i.e., it is linked to the fly-by turn. For RNP specifications where a curved path transition (RF or FRT) is applied in the design, the tolerance is ½ the navigation accuracy throughout the turn.<br>The same comment applies to Page 47, C. Specific requirements for the helicopter category – Flight Test Tolerance, sub-paragraph 4.<br>**Justification:** Alignment with ICAO PBN Manual Doc 9613.<br>**Proposed Text:** UK CAA suggests the text should be changed to reflect the PBN Manual FTE tolerances for straight and turning segments using fly-by and curved path (RF or FRT) transitions. |
| response | *Partially accepted*<br><br>Appendices 7 and 9 to Part-FCL have been modified to refer to the ½ RNP deviation. |

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| comment | *126* comment by: *UK CAA*<br><br>**Page No:** 53<br>**Paragraph No:** CAT.OP.MPA.175 Flight Preparation<br>**Comment:** No mention is made of flight planning and in particular, the specific requirements for reflecting PBN capability/approval specified in Item 10 and 18 of the ICAO Flight Plan. This should also be captured in the relevant sections dealing with organisation and flight crew training.<br>UK CAA recommends that EASA liaises with EUROCONTROL to take advice on the specific criteria and then review the NPA to see where appropriate text could be inserted.<br>**Justification:** There are specific PBN requirements associated with flight planning that should be captured within the flight preparation, either within a commercial organisation or by an individual conducting non-commercial operations. The training syllabus for relevant personnel should address this. |
| response | *Not accepted*<br><br>Any provision on Flight Plan stems from rules in that domain and it is outside the scope of RMT.0256 and RMT.0257. |

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| comment | *127* comment by: *UK CAA*<br><br>**Page No:** 53<br>**Paragraph No:** CAT.OP.MPA.185 Planning minima for IFR flights<br>**Comment:** Whilst recognising that loss of GNSS is one factor that can result in the flight crew reverting to an alternative means of conducting an operation (specifically an RNP Approach), there are other reasons which might result in the loss of capability e.g., loss of the equipment or any display/control elements that prevent the approach from being conducted. Rather than specifically highlighting GNSS, it is suggested that the FAA AC 90-105 wording be used.<br>This comment applies throughout the NPA wherever the CAT.OP.MPA.185 text is repeated.<br>**Justification:** Consistency/harmonisation with FAA and a wider consideration of the factors influencing an alternative approach, rather than just focusing on GNSS.<br>**Proposed Text:** UK CAA suggests replicate the following wording contained in FAA AC 90-105 (which may not necessarily be included in Planning minima) :<br>**"(8)** The operator's contingency procedures need to address at least the following conditions:<br>**(a)** Failure of the RNP system components, including those affecting lateral or vertical deviation performances (e.g., failures of a GPS sensor, flight director, or automatic pilot);<br>**(b)** Loss of navigation signal-in-space (loss or degradation of external signal) and;<br>**(c)** The pilot must ensure the capability to navigate and land at an alternate if loss of RNP approach capability occurs." |
| response | *Not accepted*<br><br>This comment is not appropriate to the level of legally binding Implementing Rules. In fact, even in the FAA framework, the text is only at the level of Advisory Circular.<br><br>In any case, at the AMC level (equivalent to the FAA AC), provisions regarding contingency procedures are already addressed, in much more detail than suggested by the commentator, in AMC7 CAT.OP.MPA.126 on Performance-Based Navigation. |

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| comment | *128* comment by: *UK CAA*<br><br>The UK CAA supports the NPA proposal of removing a number of PBN specifications from the requirement of Part SPA. Key to achieving this aim must be in ensuring that the Flight Crew Licencing requirements are sufficiently robust to ensure all pilots, and particular those operating under NCC, NCO and SPO undergo an appropriate level of initial and recurrent training and checking, such that they remain familiar with those aspects of PBN that they are likely to encounter. Care should also be taken with those PBN specifications that are not purely navigation specifications but have a Communication and/or Surveillance aspect, these may have approval requirements over and above normal PBN requirements. The UK CAA also encourages EASA to develop guidance material (and approval requirements if thought appropriate) for those items in the PBN toolbox such as RF, FRT and Time of Arrival Control that are not yet mature. |
| response | *Noted*<br><br>The Agency, supported by the Review Group on the matter, believes that RNP AR APCH |

procedures may be 'public' (i.e. published in AIP and useable by different operators) or 'private' (i.e. not published and normally authorised only for one operator).

Historically, operational approvals for COM and SUR where never required by aviation authorities. Of course, the airborne CNS equipment should be airworthy (refer to CS-ACNS) and the pilots trained to use radio, data links, transponders, etc., which is already the case today.

The airspace concept, which indeed includes COM and SUR, is beyond the scope of RMT.0256 & RMT.0257.

The suggestion to develop additional guidance material for PBN items not yet mature is appreciated by the Agency and will be taken into account considering the evolution of the ICAO provisions on the matter, as well as the technological advancements, in particular in the context of the ongoing RMT.0519 and RMT.0520: http://easa.europa.eu/document-library/terms-of-reference/tor-rmt0519-and-0520-issue-1

comment | *144* | comment by: *EUROCONTROL*

**PaPage 10 2.5.1 (b) and page 35 article 4a (2) (b) (iii):** what is the reasoning behind the requirement for 6 RNP APCHs? Why 6?

response | *Noted*

The requirement of 6 RNP APCHs is based on the input of international experts who considered this to be the current best practice for the specific situation.

comment | *147* | comment by: *EUROCONTROL*

**Page 14 - Section 2.5.3.6 IR Skill test**
**Page 37 - Table (11)**
EUROCONTROL does not understand where the 700ft value comes from. The industry standard is that the aircraft needs to be stable at 1000ft AGL. Moreover it is important to keep the vertical deviations within limits, at least until DH.
The proposed text needs therefore further explanation and adaptation.

response | *Accepted*

The 700 ft value has been replaced by the 1 000 ft value in the resulting text of Appendices 7 and 9 to Part-FCL.

comment | *151* | comment by: *EUROCONTROL*

**Page 37 - Table 11**
Should "tracking for linear lateral deviations: < RNP value" not be changed into "tracking for linear lateral deviations < half of RNP value"?

response | *Accepted*

In the resulting text of Appendix 7 to Part-FCL, the normal limit is now ½ RNP value.

comment | *152* | comment by: *EUROCONTROL*

**Page 43 - B. Specific requirements for the aeroplane category - Item 4.**
For 2D and 3D 'linear' operations, should “lateral deviations < RNP value” not be changed into “lateral deviations < half of RNP value”?

response *Accepted*

In the resulting text of Appendix 9 to Part-FCL, the normal limit is now ½ RNP value for the aeroplane category.

comment *153* comment by: *EUROCONTROL*

**Page 47 - C. Specific requirements for the helicopter category - Item 4 (a) Tracking**
For 2D and 3D 'linear' operations, should “lateral deviations < RNP value” not be changed into “lateral deviations < half of RNP value”?

response *Accepted*

In the resulting text of Appendix 9 to Part-FCL, the normal limit is now ½ RNP value for the helicopter category.

comment *165* comment by: *Dassault Aviation*

Dassault-Aviation comment page # p 37
**Extract:**
On radio aids: ± 5°
~~Precision approach:~~
~~half scale deflection, azimuth and glide path~~
For angular deviations:
Half scale deflection, azimuth and glide path (e.g. LPV, ILS, MLS, GLS,…), or as stated in the OEM instructions.
For linear lateral deviations:
< RNP value (e.g. RNP APCH(LNAV) )
For linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV):
not more than –75 ft below the vertical profile, and not more than +75 ft above the vertical profile at or below 700 ft above aerodrome level
**Comment:**
Indicated deviations have a different value between angular and linear approaches. For an identical difference of height, an indicated deviation will be different for angular and linear approaches.
**Requested Change:**
Flight Crew should be made aware of the difference of construction between the two kinds of approaches, and the consequences in terms of flying of these approaches.

response *Accepted*

Definitions for angular and liner approaches are now contained in the proposed resulting text for amendment to Annex I (Part-FCL). Furthermore, the capability to explain the difference between these two types of approach guidance has been included in the learning objectives at AMC level, in the proposed Appendix 1.062 (AMC1 FCL.310; FCL.515(b); and FCL.615(b)).

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| comment | *166* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment page # p 37<br>**Extract:**<br>On radio aids: ± 5°<br>Precision approach:<br>Half scale deflection, azimuth and glide path<br>For angular deviations:<br>Half scale deflection, azimuth and glide path (e.g. LPV, ILS, MLS, GLS,…), or as stated in the OEM instructions.<br>For linear lateral deviations:<br>< RNP value (e.g. RNP APCH(LNAV) )<br>For linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV):<br>not more than –75 ft below the vertical profile, and not more than +75 ft above the vertical profile at or below 700 ft above aerodrome level<br>**Comment:**<br>What could be the OEM instructions in regards to the definition of an angular deviation for the approach?<br>This is not consistent with the definition of 3D angular operation as in page 47 for helicopter.<br>**Requested Change:**<br>Remove "or as stated in the OEM instructions |
| response | *Accepted*<br><br>The reference to OEM instructions has been removed from the resulting text of the proposed amendments to Appendix 7 to Part-FCL. |

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| comment | *167* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 8 page # 38<br>**Extract:**<br>SECTION 5 4 — 3D OPERATIONS ++ PRECISION APPROACH PROCEDURES°<br>**Comment:**<br>3D operation only means that a vertical guidance is provided. Which minima are to be used?<br>**Requested Change:**<br>Define a minimum (200ft, or 250 ft/type B [ICAO PBN Manual Ed 4]) in order to reach the level of the precision approach. |
| response | *Not accepted*<br><br>The height and visibility (or RVR) minima are established elsewhere in the Air OPS Regulation. Amending them is out of scope of RMT.0256 & RMT.0257. |

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| comment | *168* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 11 page # 43<br>**Extract:**<br>3D 'angular' operations (e.g. LPV, ILS, MLS, GLS,…) : Precision approach half scale deflection, azimuth and glide path, or as stated in the OEM instructions.<br>**Comment:**<br>What could be the OEM instructions in regards to the definition of an angular deviation for |

the approach?
This is not consistent with the definition of 3D angular operation as in page 47 for helicopter.
**Requested Change:**
Remove "or as stated in the OEM instructions"

response *Accepted*

The reference to OEM instructions has been removed from the resulting text of the proposed amendments to Appendix 9 to Part-FCL.

comment *186* comment by: *PPL/IR Europe*

Our general comment is that we are supportive of this NPA and commend EASA and the rulemaking teams on reflecting the feedback of General Aviation stakeholder organisations on the subjects addressed therein.
We support the changes such that Instrument Rating training and checks shall include appropriate PBN content.
In particular, we fully support the amendment to **SPA.PBN.100 PBN operations**

response *Noted*

The support is noted with appreciation.

comment *199* comment by: *Ryanair*

| NPA Reference, Conversion of training organisations to PBN page no 37 | NPA Text<br>For linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV): not more than –75 ft below the vertical profile, and not more than +75 ft above the vertical profile at or below 700 ft above aerodrome level | RYR position<br>Experience has shown that landing gates of 1000ft IMC and 500ft VMC are the most effective for stabilised approaches. | Suggested Text<br>For linear vertical deviations (e.g. RNP APCH (LNAV/VNAV) using BaroVNAV): not more than –75 ft below the vertical profile, and not more than +75 ft above the vertical profile at or below 1000 ft above aerodrome level in IMC and 500 ft VMC |
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response *Accepted*

The altitude of the landing gate has been raised to 1 000 ft, instead of 700 ft.

| **3 Proposed amendments — 3.2 Draft Decision (CS-FSTD(A))** | p. 62-63 |
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| comment | *129* comment by: *UK CAA*<br><br>**Page No:** 62 and 63<br>**Paragraph No:** Table of Functions and Subjective Tests<br>**Comment:** In this table the UK CAA believes there should be mention of specific PBN functions such as Radius to Fix (RF) and Fixed Radius Transition (FRT). Flight simulation training devices can only be deemed as fit for purpose if they can reproduce all of the functions encountered within a PBN application e.g., RNP APCH with RF in the Intermediate segment. At present the table only seems to expand upon the different approach types and that expanding the existing text and table should be considered.<br>**Justification:** For completeness. |
| response | *Accepted*<br><br>The table has been amended in line with the UK CAA suggestions, by introducing one more line in the table explicitly referring to RF and FRT for FFS.<br><br>Furthermore, the approach operations are no longer labelled as 'precision' or 'non-precision', but as '3D' or '2D' in line with the recent ICAO taxonomy for them. This latter modification applies to both simulators for aeroplanes and helicopters. |

| **3 Proposed amendments — 3.3 Draft Decision (CS-FSTD(H))** | p. 64 |
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| comment | *122* comment by: *DGAC France*<br><br>Page 64 : The table of functions and subjective tests proposed in AMC1 FSTD(H).300 is not in line the one mentionned page 63/228 (AMC1 FSTD(A).300). Indeed, a tick has to be taken out from the FNPT 1 column (line dedicated to the RNP approach) of the table. Then, both tables will be consistent. |
| response | *Accepted*<br><br>The table has been amended as suggested by DGAC France. |

**3 Proposed amendments — 3.4 Draft Decision (AMC /GM to Part FCL)** p. 65-69

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| comment | *36* comment by: *Airbus Helicopters*<br><br>*Location*<br>DETAILED THEORETICAL KNOWLEDGE SYLLABUS AND LEARNING OBJECTIVES FOR SUBJECT 062 - RADIO NAVIGATION, page 65<br>*Comment*<br>1) The changed item seems unduly identified as "*Alternative MC1 FCL.310; FCL.515(b); FCL.615(b)*", whereas it is simply the "*AMC1 FCL.310; FCL.515 (b); FCL.615 (b)*".<br>2) The NPA states about deleting items 062 05 01, 062 05 02, 062 05 03, whereas the present table only contains item "062 05 00 00".<br>*Rationale for comment*<br>Mistakes.<br>*Recommendation*<br>Check and correct mistakes. |
| response | *Partially accepted*<br>(1) The title of the AMC has been changed accordingly.<br><br>(2) The references to the Learning Objectives refer to the changes proposed through NPA 2014-29 (stemming from RMT.0188 (FCL.002a). |
| comment | *37* comment by: *Airbus Helicopters*<br><br>**Major comment**<br>*Location*<br>DETAILED THEORETICAL KNOWLEDGE SYLLABUS AND LEARNING OBJECTIVES FOR SUBJECT 062 - RADIO NAVIGATION, page 66<br>*Comment*<br>"*State that RNAV1 and RNP1 are used in the arrival and departure phases of flight*"<br>This statement is restrictive.<br>*Rationale for comment*<br>For the purpose of Low Level IFR helicopter navigation, RNAV1, RNP1 and RNP 0.3 may also be used in en-route phases.<br>*Recommendation*<br>Add the following statement:<br>"*State that RNAV1, RNP1 and RNP 0.3 may also be used in en-route phases of low level IFR helicopter flights*" |
| response | *Accepted*<br><br>An additional Learning Objective has been inserted, as proposed. |
| comment | *154* comment by: *EUROCONTROL*<br><br>**Page 67**<br>EUROCONTROL recommends that the need to understand the importance to respect the flight director guidance and the speed constraints associated with an RF procedure is added. |

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| response | *Accepted*<br>An additional Learning Objective has been inserted, as proposed. |

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| comment | *169* comment by: *Dassault Aviation*<br>Dassault-Aviation comment 9 page # 66<br>**Extract:**<br>State that RNP 0.3 navigation specification is used in all phases of flight except for oceanic/remote and final approach, primarily for helicopters.<br>**Comment:**<br>Can RNP 0.3 be used by aeroplanes?<br>**Requested Change:**<br>Clarify if the RNP 0.3 navigation specification is intended to be applicable only to helicopters. |
| response | *Accepted*<br>It is not clear from ICAO material whether or not RNP 0.3 will be relevant to aeroplanes. The word 'primarily' is, however, deleted from the Learning Objectives. |

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| comment | *170* comment by: *Dassault Aviation*<br>Dassault-Aviation comment page # 68<br>**Extract:**<br>062 07 05 03 RNAV/RNP1/2<br>**Comment:**<br>The writing may bring confusion.<br>**Requested Change:**<br>Modify the text as RNAV 1/2 or RNP 1/2 |
| response | *Accepted*<br>The editorial suggestions have been taken into account in the resulting text. |

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| comment | *187* comment by: *PPL/IR Europe*<br>Our organisation was consulted on the content of GM2 to FCL.010 and we support the new Learning Objectives proposed |
| response | *Noted*<br>The support is noted with appreciation. |

**3 Proposed amendments — 3.5 Draft Decision (AMC/GM to Part ARA)** p. 70-71

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| comment | *123* comment by: *DGAC France*<br>Page 70: wrong copy-paste in the FSTD evaluation report. Indeed, details related to the theoretical knowledge examination (Radio navigation) have nothing to do there and must be taken out. |
| response | *Accepted*<br>The details on theoretical knowledge on Subject 062 (radio navigation) have been removed from the resulting text of the proposed amendments to AMC/GM to Part-ARA. |

**3 Proposed amendments — 3.6 Draft Decision (AMC/GM to Annex I to AIR-OPS)** p. 72-73

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| comment | *38* comment by: *Airbus Helicopters*<br>*Location*<br>GM2 Annex I Definitions - ABBREVIATIONS AND ACRONYMS, page 73<br>*Comment*<br>At least LRNS is missing in the abbreviations.<br>*Rationale for comment*<br>Abbreviation used several times in new AMC/GM to part CAT, but not defined.<br>*Recommendation*<br>Add definition for LRNS |
| response | *Not accepted*<br>What LNRS stands for is already included in GM2 to Annex I to the Air OPS Regulation. |

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| comment | *130* comment by: *UK CAA*<br>**Page No:** 72<br>**Paragraph No:** GM1 Annex 1 Definitions<br>**Comment:** There appears to be some definitions missing. Examples are 'RNP' and 'Lateral Navigation'.<br>UK CAA recommends that the ICAO PBN Manual Doc 9613 and the ICAO PBN Operational Approval Manual Doc 9997 should be reviewed for completeness of definitions.<br>**Justification:** For clarity and completeness. |
| response | *Accepted*<br>In ICAO Doc 9997 there is only a list of acronyms (glossary) but no 'explanation of terms'.<br>The list of terms listed in Fourth Edition of Doc 9613 has been checked. Some of them (e.g. PBN) are already defined in Article 2 of the Air OPS Regulation and so it is not necessary to repeat them at AMC/GM level. Equally, some of them are in Annex I to the Air OPS Regulation (e.g. APV) or proposed for insertion therein by NPA 2013-25 (e.g. RNP specification).<br>Other definitions contained in Doc 9613 may be specific to airspace design: e.g. 'airspace |

concept', 'area navigation route', 'navigation application', 'RNP route', 'SID' and 'STAR'. They are therefore not relevant to AMC/GM to the Air OPS Regulation.

Equally not relevant to OPS regulatory material, are definitions contained in Doc 9613, but related to ATS or ground CNS infrastructure: e.g. 'ATS surveillance service', 'ATS surveillance system', 'mixed navigation environment', 'NAVAID infrastructure', 'procedural control'.

Furthermore, other definitions contained in said Doc are considered either too technical or linked to airworthiness, and therefore unnecessary in regulatory material on operations: e.g. 'CRC', 'navigation function', 'RNAV system', 'RNP system'.

A couple of terms used in Doc 9613 (i.e. 'ABAS', 'RAIM', 'RNAV') have already been proposed for insertion in GM1 to Annex I the Air OPS Regulation by NPA 2013-25.

In conclusion, only definitions for 'lateral navigation' and 'SBAS' are added in GM1 to Annex I to the Air OPS Regulation by NPA 2013-25.

comment *131* comment by: *UK CAA*

**Page No:** 73
**Paragraph No:** GM2 Annex 1 Definitions - Abbreviations and Acronyms
**Comment:** The list does not appear to be complete e.g., FRT, TSE, PDE, NSE, OBPMA (On-board Performance Monitoring and Alerting).
UK CAA recommends that the ICAO PBN Manual Doc 9613 and the ICAO PBN Operational Approval Manual Doc 9997 should be reviewed for completeness of Abbreviations and Acronyms.
**Justification:** For clarity and completeness.

response *Accepted*

A few more acronyms have been added in GM2, extracted from ICAO Doc 9163 and Doc 9997.

**3 Proposed amendments — 3.7 Draft Decision (AMC/GM to Part ARO)** p. 74

comment *92* comment by: *AESA / DSANA*

| COMMENT | JUSTIFICATION |
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| We think that this section should refer to the DA/H and not to the RVR. | This section deals with an RNP AR approach, not with a take-off. |

response *Not accepted*
It is understood that the commentator commented GM1 ARO.OPS.230 on Temporary limitation on RVR. DA/H or MDA/H and RVR are the two minima used to specify aerodrome operating minima for approach operations. The Agency is of the opinion that a limitation on the RVR value is the preferred option. A higher RVR would eventually lead to a higher DA/H.

comment *93* comment by: *AESA / DSANA*

| COMMENT | JUSTIFICATION |
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| The wording of this Guidance Material is misleading.<br><br>We propose to explicitly refer to the RNP AR specification (**ARO.OPS.230**) in the following way: "*Where operators are new to RNP* **AR** *operations and whose initial…*" | It really has to do with the RNP AR specification (**ARO.OPS.230**) but seems to be related to the RNP 0.3 specification when read in isolation. |

response *Accepted*

The resulting text of GM1 to ARO.OPS.230 has been amended accordingly.

comment *94* comment by: *AESA / DSANA*

| COMMENT | JUSTIFICATION |
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| In general, the procedures referred by this Guidance Material require an RNP lower that 0.3 due to terrain and/or operational constraints that cannot be met with a normal RNP AR procedure. | We feel that there is limited use in requiring minima consistent with RNP 0.3 as the issue is not only related with the final approach but with the full procedure (including initial, intermediate and missed approaches).<br><br>Further to this, in the case of an RPN AR approach the operational difficulties are mostly associated to the initiation of the procedure and the missed approach (e.g. RNAV (RNP) RWY 05 at Queenstown, New Zealand; http://www.aip.net.nz/pdf/NZQN_45.1_45.2.pdf). |

response *Accepted*

The resulting text of GM1 to ARO.OPS.230 has been amended for clarity purposes, although it is not possible to clearly identify which modifications were suggested through this comment.

comment *104* comment by: *FAA*

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| **Comment:** Requirements for procedure-specific RNP AR APCH approval might be overly restrictive. | **Reason:** The language in this paragraph appears inconsistent with that found in Section 2.5.19, Subpart B, Paragraph 4 on page 24 and SPA.PBN.100 PBN Operations (b) on page 55. Specifically, "RNP lower than 0.3 on the leg" and "Missed approach with an RNP value below 1 with RF leg" are allowed by ICAO Doc 9905. The U.S. does not require procedure-specific approvals unless the procedure deviates significantly from standard design criteria or is designed for a particular user or type of aircraft/avionics. Limitations are annotated on operational approvals and pilots are able to use any procedure for which they are qualified. Procedure chart notes are employed to allow identification of relevant characteristics. No operational issues have resulted from this approach to approvals. | **Recommendation:** Consider removing limitations and only requiring specific RNP AR APCH approval for procedures that deviate significantly from ICAO Doc 9905 standards. | **Safety Impact:** Adding specific-approval may slow use of beneficial RNP AR APCH procedures, potentially negatively affecting safety at terrain-challenged locations. |

response

*Accepted*

The resulting text GM2 to ARO.OPS.230 has been revised accordingly.

comment *132* comment by: *UK CAA*

**Page No:** 74
**Paragraph No:** GM2.ARO.OPS.230 Specific approval of RNP AR APCH
**Comment:** Sub-paragraphs a) and b) are incomplete. RNP AR is required whenever the obstacle protection is 2xRNP as per ICAO Doc 9905, whenever a VEB is applied in the vertical

path, whenever RNP is less than 0.3, whenever the Missed Approach has an RNP value < 1 NM or whenever RF is used in the final approach segment or the initial portion of the Missed Approach i.e., beyond what is allowed for the normal association of RF.
UK CAA recommends the points mentioned above should be included as a numbered list.
**Justification:** For clarity and completeness.

response *Accepted*

The list of items to be considered in GM2 to ARO.OPS.230 has been expanded as proposed.

comment *171* comment by: *Dassault Aviation*

Dassault-Aviation comment page # 74
**Extract:**
GM1 ARO.OPS.230 Temporary limitation on RVR
Where operators are new to RNP operations and whose initial application is for RNP < 0.3, it is appropriate to establish a temporary limitation for minima consistent with RNP 0.3, until operational experience is gained. This period could be based upon time (e.g., 90 days) and/or (2) a number of conducted operations (1) (e.g., 100 RNP approach operations), as agreed by the competent authority and operator.
**Comment:**
(1) The example given regarding the number of conducted operations (100) is unacceptable for business aviation.
(2) If the period is based only upon time, operators may not perform a sufficient number of PBN operations and see their limitation removed without enough experience.
**Requested Change:**
(1) Regarding the temporary limitation on RVR, Dassault Aviation proposes a lower number of RNP operations. These limitations of time and number of operations need to be addressed between operator and its authorities during pre-application period.
(2) Maintain the criteria of the number of PBN operations and remove “or”.

response *Accepted*

(1) The bracket (e.g. 100 RNP approach operations) has been removed from the resulting text; and

(2) The word ‘or’ has been removed as well: authorities would negotiate with applicants for how long and for how many approaches the limitation would apply.

**3 Proposed amendments — 3.9 Draft Decision (AMC/GM to Part CAT)** p. 77-85

comment *12* comment by: *AIRBUS*

*"Crosstrack error/deviation (the difference between the RNAV system computed path and the aircraft position relative to the path) should normally be limited to ± ½ the RNAV/RNP value associated with the procedure. Brief deviations from this standard (e.g. overshoots or undershoots) during and immediately after turns, up to a maximum of 1 times the RNAV/RNP value are allowable"*
The crosstrack immediatly before or after turn may be induced by a TF/TF transition. But crosstrack can come from other causes and this item must not be restrictive to one causality.

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| | Therefore, AIRBUS suggests to modify the text as follow:<br>Brief deviations from this standard (e.g. overshoots or undershoots during and immediately after turns), up to a maximum of 1 times the RNAV/RNP value are allowable |
| response | *Accepted*<br><br>The phrase 'during and immediately after turns' has been inserted in the resulting text of AMC4 CAT.OP.MPA.126. |

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| comment | *25* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br><br>Ref Page 80.<br>AMC4 CAT.OP.MPA.127 Performance-based navigation - VECTORING AND POSITIONING<br>Second pargraph - "track at least 2 miles from"<br>As the proposal is written it creates uncertainty and should be amended to "track at least 2 **nautical miles** from" |
| response | *Accepted*<br><br>Indeed. The wording has been improved as suggested (ref. resulting text of AMC5 CAT.OP.MPA.126). |

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| comment | *39* comment by: *Airbus Helicopters*<br><br>*Location*<br>Subpart B - Operating procedures - Section 1 - Motor-powered aircraft, pages 77-81<br>*Comment*<br>A series of new AMC / GM is supposed to apply to CAT.OP.MPA.127, which does not exist.<br>According to the explanatory note § 2.5.17, CAT.OP.MPA.127 is supposed to be introduced in this NPA, but could not be found.<br>*Rationale for comment*<br>Mistake.<br>It is guessed that those AMC / GM should be linked to new requirement CAT.OP.MPA.126.<br>*Recommendation*<br>Check and correct. |
| response | *Accepted*<br><br>The editorial mistake has been corrected. The correct identification of the rule is CAT.OP.MPA.126. Seven AMC and one GM now refer to this rule in the resulting text of the proposed Decision on AMC/GM to Part-CAT. |

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| comment | *40* comment by: *Airbus Helicopters*<br><br>*Location*<br>AMC1 CAT.OP.MPA.127, item (b), page 77<br>*Comment*<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll commences and* |

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| | *GNSS position may be used in place of the runway update.*"<br>The paragraph concerns aeroplanes and helicopters. Helicopters usually do not perform rolling take-offs.<br>*Rationale for comment*<br>Adapt the concept to helicopters.<br>*Recommendation*<br>Change wording to:<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll (aeroplanes) or lift-off (helicopters)*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll (aeroplanes) or lift-off (helicopters) commences and GNSS position may be used in place of the runway or FATO update*" |
| response | *Accepted*<br><br>Additional text, as proposed, has been added in the resulting text of AMC2 CAT.OP.MPA.126. |

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| comment | *41* comment by: *Airbus Helicopters*<br><br>*Location*<br>AMC1 CAT.OP.MPA.127, item (b), page 77<br>*Comment*<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll commences and GNSS position may be used in place of the runway update.*"<br>The paragraph concerns aeroplanes and helicopters. Helicopters usually do not perform rolling take-offs.<br>*Rationale for comment*<br>Adapt the concept to helicopters.<br>*Recommendation*<br>Change wording to:<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll (aeroplanes) or lift-off (helicopters)*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll (aeroplanes) or lift-off (helicopters) commences and GNSS position may be used in place of the runway or FATO update*" |
| response | *Accepted.*<br><br>See the response to comment No 40, which is identical. |

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| comment | *42* comment by: *Airbus Helicopters*<br><br>*Location*<br>Subpart B - Operating procedures - Section 1 - Motor-powered aircraft, AMC6 CAT.OP.MPA.127, page 81<br>*Comment*<br>The text references GM2 CAT.OP.MPA.127, whereas such GM does not exist.<br>*Rationale for comment* |

Mistake.
One possible explanation is that EASA has first adopted a structure with an AMC referencing a GM (like for Parts NCC and NCO), then suppressed the GM, without suppressing the reference.
*Recommendation*
Check and correct.

response *Accepted*

The reference has been changed (now to AMC1 CAT.OP.MPA.126) in the resulting text of AMC7 CAT.OP.MPA.126.

comment *88* comment by: *Virgin Atlantic*

Ref AMC2 CAT.OP.MPA.127 PBN:
In this section and in the actual updated AMC material itself, it would be useful if some alleviation statement was also made in relation to:
The insertion of waypoint altitude/speed constraints on a procedure where said constraints are not included in the navigation database coding, because published constraints differ depending on the landing runway. E.G. 16000' landing east, 18000' landing west.

response *Accepted*

The exception has been included in the resulting text of AMC3 CAT.OP.MPA.126.

comment *95* comment by: *AESA / DSANA*

| COMMENT | JUSTIFICATION |
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| There Guidance Material **GM2 CAT.OP.MPA.127** referred in this AMC cannot be found in the NPA. | n/a |

response *Accepted*

The reference has been changed (now to AMC1 CAT.OP.MPA.126) in the resulting text of AMC7 CAT.OP.MPA.126.

comment *109* comment by: *Air France*

1."The active flight plan, if applicable, should be checked by comparing the charts or other applicable documents with navigation equipment and displays. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over. Where relevant, the RF leg arc radii should be confirmed."
Proposal : add "For departure procedure"

Justification :
This verification is performed at the preflight for departure procedure, but for STAR and approches, they're performed before descent as it is explained later.
2. "During the PBN operation, where feasible, flight progress should be monitored by cross-checks, with conventional navigation aids:
1) for navigational reasonableness, and
2) so as to allow immediate cross-checking or reversion in the event of loss of
GPS GNSS navigation capability."
Proposal : remove this paragraph
Justification :
This is "perhaps" a good practice but should not be in an AMC, as it becomes binding even if an A-AMC is possible.
First of all, RNAV is a primary means of navigation for lots of navigation specification.
The OEM documents state that it is not applicable for PBN operations on Boeing and Airbus aircraft (RNAV 5, RNAV 1, even RNP APCH), as long as the RNAV monitoring is correct.
3. "Departure: Prior to commencing a take-off on a PBN procedure, the flight crew should verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded.
A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll."
Justification : This verification is not necessary for some aircraft.
Proposal : Transform it into GM.
4. "Flight crew should check approach procedures (including alternate aerodromes if needed) as extracted by the system (e.g. CDU flight plan page) or presented graphically on the moving map, in order to confirm the correct loading and the reasonableness of the procedure content."
Justification : Alternate arpt can't be checked at that time.
Alternate arpt is checked after diversion decision.
Proposal : remove this note

response

*Partially accepted*

1. Not accepted: The current heading pre-flight and general consideration is preferred, because it better describes the scope. Such a check is not only used for departure procedures, but also for STARs and approaches.
2. Accepted: The entire block is deleted from paragraph (a) of the resulting text of AMC2 CAT.OP.MPA.126, since situational awareness and cross-checking are part of the basic airmanship. For consistency purposes, the same block of text is also deleted from paragraph (a) of resulting text of AMC1 to NCC.OP.116 to NCO.OP.116 and to SPO.OP.116.
3. Not accepted: In such cases, where for some aircraft other mitigating measures can be applied, an alternative means of compliance procedure should be developed.
4. Not accepted: The text clearly states ‘if needed’.

comment

*120* comment by: *AEA*

Attachment #3

ñ AMC1 CAT.OP.MPA.127 Performance-based navigation – (d)

<...> Only the final approach segment is protected by the promulgated aerodrome temperature limits, and the flight crew should consider the effect of temperature on terrain and obstacle clearance in other phases of flight.
ñ AMC2 SPA.PBN.105(d) PBN operational approval – (a) Modification of flight plan
<...> The only other acceptable modification to the loaded procedure is to change altitude and/or airspeed waypoint constraints on the initial, intermediate, or missed approach segments flight plan fixes (e.g. to apply cold temperature corrections or comply with an ATC clearance/instruction).
ñ GM1 NCC.OP.117 Performance-based navigation — aeroplanes and helicopters – (d)
<...> Only the final approach segment is protected by the promulgated aerodrome temperature limits, and the flight crew should consider the effect of temperature on terrain and obstacle clearance in other phases of flight. Where BARO VNAV is used in other operations, the flight crew should consider the effect of temperature on terrain and obstacle clearance in all phases of flight, in particular on any step-down fix.
**EASA AMC 20-27** (2009) - Appendix 4-1.2 Prior to commencing the procedure (page 29/33)
For APV BAROVNAV operation, pilots are responsible for any necessary cold temperature compensations to all published minimum altitudes/heights. This includes:
a) the altitudes/heights for the initial and intermediate segment(s);
b) the DA/H; and
c) subsequent missed approach altitudes/heights.
**EASA AMC 20-26** (2009) - Appendix 3-3 Flight Considerations item a) (page 40/58)
<...> The only other acceptable modification to the loaded procedure is to change altitude and/or airspeed waypoint constraints on the initial, intermediate, or missed approach segments flight plan fixes (e.g. to apply cold temperature corrections or comply with an ATC clearance/instruction).
**AC No: 90-101A** (FAA) contains a similar description:
Since the charted temperature limits ensure obstacle clearance solely in the FAS <Final Approach Segment> and since temperature compensation only affects the vertical guidance, the pilot may need to manually adjust the minimum altitude on the initial and intermediate approach segments and the DA.
NOTE
Some regulatory publicatuions speak of segments, other (only) of segments.
ISSUE
As explained in the following practical case, allowing cold temperature corrections only on the initial, intermediate, or missed approach segments flight plan fixes results in a steep increase of the vertical (VNAV) path between the intermediate and final segment flight plan fixes, violating the Continuous Descent (CDA) principle, and violating obstacle clearance on the intermediate segment.
Therefore vertical modifications should be allowed up to and including the final approach fix for RNAV (GNSS) / RNAV (RNP) AR operation, except for the Final Approach Segment (FAS) for APV approaches, thus the segment *between* the FAF and DA.
RNP APCH PRACTICAL CASE
Consider the Burlington BTV-KBTV RNAV (GPS) Z 33 approach, as depicted on the approach plate below, at a temperature of -10°C.
Based on regulatory requirements, use of VNAV as described in the 777 FCTM and with reference to the KLM LOW TEMPERATURE ALTIMETER CORRECTION – TMA table below, KLM believes pilots should deal with cold temperature as follows:

With reference to the applicable approach plate below note:
· Minimum Obstacle Clearance (MOC) altitudes for all segments of the approach provide an obstacle clearance of 75m/246ft with FAF.
· Terminal Arrival Altitude (TAA), which replaces the MSA for RNAV approaches, is 6000' in the approach sector.
Assume the RNAV(GPS) Z 33 approach from the IAF JANUD.
JANUD (IF at 20.1 RW33) MOC is 6000ft. Temperature correction 590ft (interpolated)
NIQUD (at 15.2 RW33) MOC is 5400ft. Temperature correction 530ft (interpolated)
HONIB (at 13 RW33) MOC is 4800ft. Temperature correction 470ft (interpolated)
EHIKO (FAF at 9.8 RW33) MOC is 3800ft. Temperature correction 370ft (interpolated)
Regulatory agencies hold pilots responsible for any necessary cold temperature compensations to all published minimum altitudes/heights on the initial and intermediate approach segments (fixes).
In this case:
· the initial approach segment is the holding pattern from the IAF JANUD until the IF JANUD, and
· the intermediate approach segment is from the IF JANUD until the F EHIKO.
Thus, in order to obtain sufficient obstacle clearance, the minimum altitudes on the initial and intermediate approach segments will have to be adjusted by the appropriate amount and the cold temperature correction will have to be applied to the waypoint altitude constraints in the FMC. (Refer to FCTM 5.27)
In this case, apply cold temperature correction to the (FMC) waypoint altitude constraints for both the APV (VNAV limits) and LPV (LNAV limits) approach as follows.
For the initial approach segment from the IAF JANUD to the IF JANUD:
· Adjust waypoint altitude constraint at JANUD to MOC 6000ft plus 590ft (interpolated) is 6590ft.
Adjust waypoint altitude constraint at JANUD from 6000A to 6590A.
For the intermediate approach segment from the IF JANUD to the FAF EHIKO via NIDUQ and HONIB:
· From JANUD to NIQUD MOC 5400ft plus 530ft (interpolated) is 5930ft.
Adjust waypoint altitude constraint at NIQUD from 5400A to 5930A.
· From NIQUD to HONIB MOC 4800ft plus 470ft (interpolated) is 5270ft.
Adjust waypoint altitude constraint at HONIB from 4800A to 5270A.
· From HONIB to FAF EHIKO MOC 3800ft plus 370ft (interpolated) is 4170ft.
Adjust waypoint altitude constraint at EHIKO from 3800A to 4170A.
I.a.w. KLM 777 FCTM 5.28 VNAV will follow the higher of the glide path angle associated with the approach or the geometric path defined by the waypoint altitude constraints.
Note: Due to the low temperature the higher glide path should not be much higher than the glide path angle associated with the approach in ISA conditions when referenced to earth.
Note that according NPA 2013-25 AMC2 SPA.PBN.105(d) modification of the final approach segment flight plan fix is not allowed. In this case EHIKO. This will result in a steep increase of the vertical path between HONIB and EHIKO, violating the Continuous Descent (CDA) principle, and violating obstacle clearance on the intermediate segment.
CONCLUSION
Based on the above vertical modifications should be allowed up to and including the final approach fix for RNAV (GNSS) / RNAV (RNP) AR operation, except for the Final Approach

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| | Segment (FAS) for APV approaches, thus the segment *between* the FAF and DA. |
| response | *Partially accepted*<br>See the response to comment No 118. |

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| comment | *133* comment by: *UK CAA*<br>**Page No:** 77<br>**Paragraph No:** AMC1 CAT.OP.MPA.127 Performance-based navigation - Monitoring and Verification paragraph (a)<br>**Comment:** In the 5th sub-paragraph the term "where feasible" is used to refer to monitoring of flight progress through means of cross-checks with conventional navigation aids. The term "where feasible" does not imply any form of requirement and therefore it is suggested that "Standard Operating Procedures should include cross-checks, where required", might be a slightly stronger way of conveying the intent. The term "where required" is necessary because it is only those systems that are not RNP systems i.e., do not have an On-board Performance Monitoring and Alerting capability that need to perform this navigation position gross-error check. All RNP systems automatically perform the check and alert the flight crew when NSE monitoring is lost. All flight crew should continuously be monitoring FTE as part of the flight progress.<br>**Justification:** Clarification of when navigation position gross-error checks are required.<br>**Proposed Text:** Amend text in 5th sub-paragraph to read:<br>"Standard Operating Procedures should include cross-checks, where required." |
| response | *Accepted.*<br>The entire block is deleted from paragraph (a) of the resulting text of AMC2 CAT.OP.MPA.126, since situational awareness and cross-checking are part of the basic airmanship.<br>For consistency purposes, the same block of text is also deleted from paragraph (a) of the resulting text of AMC1 to NCC.OP.116, to NCO.OP.116 and to SPO.OP.116. |

comment *200* comment by: *Ryanair*

| NPA Reference, | NPA Text(b) Departure | RYR position | Suggested Text |
|---|---|---|---|
| AMC1 CAT.OP.MPA.127 Performance-based navigation Departure page no 77 | Prior to commencing a take-off on a PBN procedure, the flight crew should verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded. | Airlines in place robust procedures to cover this area and this should be reflected in the text. | Prior to commencing a take-off on a PBN procedure, the flight crew should have procedures that verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded. |

response *Accepted*

The resulting text of paragraph (b) of AMC2 CAT.OP.MPA.126 has been amended as suggested by the commentator.

For consistency purposes, the same paragraph (b) is also similarly amended in the resulting text of AMC1 to NCC.OP.116, to NCO.OP.116 and to SPO.OP.116.

comment *201* comment by: *Ryanair*

| NPA Reference, AMC1 CAT.OP.MPA.127 Performance-based navigation Arrival and approach page no 77 | NPA Text<br>Arrival and approach<br>Flight crew should verify that their aircraft navigation system is operating correctly and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted. | RYR position<br>Airlines have in place robust procedures to cover this area and this should be reflected in the text. | Suggested Text<br>Arrival and approach<br>Flight crew should have procedures to verify that their aircraft navigation system is operating correctly and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted. |
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response *Accepted.*

The resulting text of paragraph (c) of AMC2 CAT.OP.MPA.126 has been amended as suggested by the commentator.

For consistency purposes, the same paragraph (c) is also similarly amended in the resulting text of AMC1 to NCC.OP.116, to NCO.OP.116 and to SPO.OP.116.

**3 Proposed amendments — 3.10 Draft Decision (AMC/GM to Part SPA)** p. 86-103

comment *7* comment by: *EUROCONTROL*

On page 87, the page number is not shown in the footpage.

As the table on that page is often associated with another table usually put aside (this other table containing additional and optional functionalities as is the case with page 19 of the EUROCONTROL European Airspace Concept Handbook for PBN Implementation), we suspect that the width of page 87 should be modified to show the page number.

response *Accepted*

The edition of the final Decision will be checked also for the graphical aspects.

comment *105* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Amend "Handling of TOGA to LNAV transition" | Numerous aircraft approved for RNP AR APCH operations remain in lateral navigation following TOGA initiation. | Recommend adding "as applicable" or words to this effect | Pilot training should reflect aircraft systems that will be used for RNP AR APCH operations. |

response *Accepted.*

The phrase 'as applicable' has been added to paragraph (c)(3)(viii) of AMC1 SPA.PBN.105(b).

comment *117* comment by: *AEA*

**ISSUE REGARDING QUALIFICATION AND RECURRENT TRAINING FOR RNP AR APCH**
REFERENCE
AMC1 SPA.PBN.105(b) PBN operational approval
TRAINING AND CREW QUALIFICATION for RNP AR APCH
(c) (3) (xii)
As a minimum, each flight crew member should complete **two** RNP approach procedures that employ the unique RNP AR APCH characteristics of the operator's approved procedures (i.e., RF legs, RNP missed). One procedure should culminate in a transition to landing and one procedure should culminate in execution of an RNP missed approach procedure.
(e) (2)
A minimum of **two** RNP AR APCH approaches should be flown by each flight crew member for **each duty position** (pilot flying and pilot monitoring), with one culminating in a landing and one culminating in a missed approach, and may be substituted for any required 3D approach operation.
Note that requirements for qualification and recurrent training appear to have been been copied to AMC.GM to Part SPA, from AMC 20-26.
OTHER REFERENCE
AC 90-101A Appendix 5 page6 item c. RNP AR Approach Requirements.
(1) RNP AR **Initial** Training. With no prior RNP AR approach experience, each pilot must

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| | complete at least **four** RNP AR approach procedures: two as pilot flying and two as pilot monitoring.<br>(2) RNP AR **Recurrent** Training. Each pilot must complete at least **two** RNP AR approach procedures: one as pilot flying and one as pilot monitoring.<br>ISSUES<br>For (initial) qualification as a minimum, each flight crew member should complete two RNP approach procedures. **So minimum a total of two.**<br>For recurrent training a minimum of two RNP AR APCH approaches should be flown by each flight crew member for each duty position (pilot flying and pilot monitoring) **So minimum a total of four.**<br>So for initial qualification minimum two and for recurrent training four? Does not seem logical...<br>Note that AC 90-101A make more sense.<br>In addition regulatory requirements do not consider the use of fixed pilot positions (Captain Pilot Flying en First Officer Pilot Monitoring) as KLM presently applies similar to CAT II/III operation.<br>Suggest to adjust qualification and recurrent training requirements in line with AC 90-101A and to add a note to pilot flying / pilot monitoring requirements saying: "except when fixed duty positions are applied", or other wording of similar meaning. |
| response | *Not accepted*<br><br>There was already a difference between AMC 20-26 and FAA AC 90-101A. However, operators may propose to competent authorities alternate means of compliance in justified cases. The Agency, supported by the Review Group, deems that a generalised relaxation of the training requirements is not appropriate at the present moment. |

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| comment | *134* comment by: *UK CAA*<br><br>**Page No:** 86/87<br>**Paragraph No:** GM1 SPA.PBN.100 PBN Operations and Table 1<br>**Comment:** See UK CAA comment on SPA.PBN.100 PBN Operations (page 54) concerning retaining oceanic/remote specifications and Advanced RNP in SPA.<br>Furthermore, the table omits to mention the association with RNP specifications of RF and FRT as options, and the option within Advanced RNP of scalability. It should be noted that RF is a minimum requirement of Advanced RNP and that ICAO and industry standards for Time of Arrival Control (TOAC) have still to be developed<br>More complete tables can be found in the ICAO PBN Manual Doc 9613 reference Table II-A-1-1. Application of navigation specification by flight phase and Table II-A-1-2. Association of appendices or attachments with navigation specifications, both of which can be found in Vol II Part A.<br>UK CAA suggests table 1 should be amended in accordance with the ICAO PBN Manual Vol II Part A tables.<br>**Justification:** For clarity and completeness. |
| response | *Partially accepted*<br><br>The GM provides a reference to the PBN Manual for further details. The text has been slightly amended for clarity purposes. |

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| comment | *135* comment by: *UK CAA*<br><br>**Page No:** 94<br>**Paragraph No:** GM1 SPA.PBN.105 (c) Flight operational safety assessment<br>**Comment:** Sub-paragraph (b) (1) makes reference to 'Normal performance' which is not a hazard condition, but is rather one aspect that needs to be considered during FOSA in order to identify hazards and mitigations relevant to RNP AR APCH.<br>UK CAA recommends the intent of this paragraph should be clarified to make clear what is a hazard and what considerations should be made in order to identify potential hazards.<br>**Justification:** The text is misleading as written. |
| response | *Accepted*<br><br>The leading sentence of paragraph (b) in GM1 SPA.PBN.105(c) has been amended to improve clarity and precision, as suggested by comment No 195. |

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| comment | *136* comment by: *UK CAA*<br><br>**Page No:** 100<br>**Paragraph No:** AMC2 SPA.PBN.105(d) Flight Considerations sub-paragraph (j) Temperature compensation<br>**Comment:** EUROCAE and RTCA have updated the RNP RNAV MASPS to ED-75C and DO-236C respectively. Temperature compensation is still contained within Appendix H.<br>UK CAA recommends the references should be updated to "EUROCAE ED-75C/RTCA DO-236C".<br>**Justification:** To reflect more up to date references. |
| response | *Accepted*<br><br>The references have been updated to edition C of ED-75/ RTCA DO-236. |

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| comment | *155* comment by: *EUROCONTROL*<br><br>**Page 87**<br>The page is not numbered.<br>EUROCONTROL recommends to check if RNP1 could also be used in en route continental. |
| response | *Not accepted*<br><br>According to ICAO Doc 9613, the RNP 1 specification is limited to use on STARs, SIDs, the initial and intermediate segments of instrument approach procedures and the missed approach after the initial climb phase. |

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| comment | *172* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 10 page # 87<br>**Extract:**<br>RNP AR APCH 1-0.1 1-0-1<br>**Comment:**<br>Typing error<br>**Requested Change:** |

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| | Remplace with “0.1” |
| response | *Accepted*<br><br>The typing error has been corrected. |

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| comment | *193* comment by: *EUROCONTROL*<br><br>**AMC1 SPA.PBN.105(c) PBN operational approval /SAFETY ASSESSMENT (a) (2)**<br>Procedure should be added to " design " in the text's proposal to prevent confusion with aircraft design as follows:<br>"....The assessment should give proper attention to the inter-dependence of the elements of procedure design, aircraft capability, crew procedures and operating environment." |
| response | *Accepted*<br><br>The text has been amended as proposed. |

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| comment | *194* comment by: *EUROCONTROL*<br><br>**GM1 SPA.PBN.105(c) Flight Operational safety assessment (FOSA) (a)**<br>The sentence introducing the quantitative and qualitative assessment is mixing together the aspects to be considered during a FOSA and the outcome of the safety assessments. It is proposed to split the sentence and to add human factors aspect which are crucial for RNP AR as indicated in ICAO Doc 9997:<br>Replace:<br>"...The FOSA blends quantitative and qualitative analyses and assessments for navigation systems, aircraft systems, operational procedures, hazards, failure mitigations, normal, rare-normal and abnormal conditions, hazards, and the operational environment. "<br>By<br>"..The FOSA blends quantitative and qualitative analyses and assessments by considering navigation systems, aircraft systems, operational procedures, Human Factor aspects and the operational environment. During these assessments conducted under normal, rare-normal and abnormal conditions, Hazards and associated mitigations are identified. " |
| response | *Accepted*<br><br>**Paragraph (a) of** GM1 SPA.PBN.105(c) has been amended as suggested by the comment**.** |

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| comment | *195* comment by: *EUROCONTROL*<br><br>**GM1 SPA.PBN.105(c) Flight Operational safety assessment (FOSA) (b)**<br>The list of elements listed in (b) are not hazard conditions but elements to be consider ed during FOSA (e.g. Normal performance is not a hazard condition).<br>Replace :<br>"(b)The following hazard conditions are examples of some of the more significant hazards |

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| | and mitigations addressed in the aircraft, operational and procedure criteria: ...."<br>by<br>"(b) The following aspects need to be considered during FOSA in order to identify hazards and mitigations relevant to RNP AR APCH:..." |
| response | *Accepted*<br><br>The leading sentence of paragraph (b) in GM1 SPA.PBN.105(c) has been amended as suggested by the comment. |

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| comment | *196* comment by: *EUROCONTROL*<br><br>**GM1 SPA.PBN.105(c) Flight Operational safety assessment (FOSA) (b) (6)**<br>ATC operations shall include the "Direct to" clearance in addition to vectoring and phraseology as indicated by ICAO Doc 9997:<br>(6) ATC operations<br>(i) Procedure assigned to ~~incapable~~ non-approved aircraft: operators are responsible for ~~declining~~ rejecting the clearance.<br>(ii) ATC provides "direct to" or vectors aircraft onto approach such that performance cannot be achieved.<br>(iii) Inconsistent ATC phraseology between controller and flight crew |
| response | *Accepted*<br><br>The resulting text has been amended as suggested. |

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| comment | *197* comment by: *EUROCONTROL*<br><br>**GM1 SPA.PBN.105(c) Flight Operational safety assessment (FOSA) (b) (8) (i) and (ii)**<br>Loss of GNSS signals (subsection 8.i) is the consequence of GNSS satellite failure (subsection 8.ii). It is not understood why these two elements are separated, they should be merged. |
| response | *Noted*<br><br>It can be the consequence of a GNSS satellite failure, but there could also be other reasons, e.g. airborne equipment failure. |

**3 Proposed amendments — 3.11 Draft Decision (AMC/GM to Part NCC)** p. 104-111

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| comment | *8* comment by: *EUROCONTROL*<br><br>Page 105: GM1 NCC.OP.117 is an AMC, not a GM. GM1 should be corrected into AMC1. |
| response | *Accepted*<br><br>The GM has turned into AMC1 (now to NCC.OP.116). |

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| comment | *26* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br><br>Ref Page 108. |

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| | AMC4 NCC.OP.117 Performance-based navigation VECTORING AND POSITIONING<br>Second pargraph - "track at least 2 miles from"<br>As the proposal is written it creates uncertainty and should be amended to "track at least 2 **nautical miles** from" |
| response | *Accepted*<br><br>The resulting text has been improved as proposed. |

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| comment | *43* comment by: *Airbus Helicopters*<br><br>*Location*<br>GM1 NCC.OP.117, item (b), pages 105-106<br>*Comment*<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll commences and GNSS position may be used in place of the runway update.*"<br>The paragraph concerns aeroplanes and helicopters. Helicopters usually do not perform rolling take-offs.<br>*Rationale for comment*<br>Adapt the concept to helicopters.<br>*Recommendation*<br>Change wording to:<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll (aeroplanes) or lift-off (helicopters)*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll (aeroplanes) or lift-off (helicopters) commences and GNSS position may be used in place of the runway or FATO update*" |
| response | *Accepted*<br><br>Additional text, as proposed, added in the resulting text of paragraph (b) of AMC1 NCC.OP.116. |

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| comment | *44* comment by: *Airbus Helicopters*<br><br>**Major comment**<br>*Location*: AMC4 NCC.OP.117, page 108.<br>*Comment*<br>"*'Direct to' clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established on the final approach track at least 2 miles from the FAF*"<br>This is not feasible for all types of approaches.<br>*Rationale for comment*<br>Some RNP APCH LNAV (2D) approaches include a course change at FAF. In that case, the aircraft cannot be established on the final approach track before the FAF.<br>*Recommendation*<br>Change wording to:<br>"*For full straight-in 3D approaches, 'Direct to' clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established* |

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| | *on the final approach track at least 2 miles from the FAF* " |
| response | *Not accepted.*<br>The rule clearly states a condition for accepting a 'direct to' clearance. If the condition cannot be fulfilled, the condition cannot be accepted. There may be several causes why the condition cannot be fulfilled. Therefore, it is deemed appropriate to mention only one possible cause. |

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| comment | *156* comment by: *EUROCONTROL*<br>**Page 105**<br>Change GM1 NCC.OP.117 into AMC1 NCC.OP.117 |
| response | *Accepted*<br>The GM has turned into AMC1 now, to NCC.OP.116. |

comment *202* comment by: *Ryanair*

| NPA Reference, section | NPA Text | RYR position | Suggested Text |
|---|---|---|---|
| GM1 NCC.OP.117 Performance-based navigation — aeroplanes and helicopters. Departure page 105 | Prior to commencing a take-off on a PBN procedure, the flight crew should verify that the PBN system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded.<br>A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. | Airlines have in place robust procedures to cover this area and this should be reflected in the text. | Prior to commencing a take-off on a PBN procedure, the flight crew have procedures that verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded.<br>A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. |

response *Accepted.*

See the response to comment No 200.

comment *203* comment by: *Ryanair*

| NPA Reference, section | NPA Text | RYR position | Suggested Text |
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| GM1 NCC.OP.117 Performance-based navigation — aeroplanes and helicopters. Arrival and approach page 106 | Arrival and approach Flight crew should verify that their aircraft navigation system is operating correctly and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted. | Airlines have in place robust procedures to cover this area and this should be reflected in the text. | Arrival and approach Flight crew should have procedures to verify that their aircraft navigation system is operating correctly and the correct arrival procedure and runway (including any applicable transition) are entered and properly depicted. |

response *Accepted*

See the response to comment No 201.

**3 Proposed amendments — 3.12 Draft Decision (AMC/GM to Part NCO)** p. 112-119

comment *27* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

Ref Page 116**.**
AMC4 NCO.OP.117 Performance-based navigationVECTORING AND POSITIONING
Second pargraph - "track at least 2 miles from"
As the proposal is written it creates uncertainty and should be amended to "track at least 2 **nautical miles** from"

response *Accepted*

The resulting text has been improved as suggested.

comment *45* comment by: *Airbus Helicopters*

*Location*
GM1 NCO.OP.117, item (b), page 113
*Comment*
"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll*"
"*Where GNSS is used, the signal should be acquired before the take-off roll commences and GNSS position may be used in place of the runway update.*"
The paragraph concerns aeroplanes and helicopters. Helicopters usually do not perform rolling take-offs.

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| | *Rationale for comment*<br>Adapt the concept to helicopters.<br>*Recommendation*<br>Change wording to:<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll (aeroplanes) or lift-off (helicopters)*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll (aeroplanes) or lift-off (helicopters) commences and GNSS position may be used in place of the runway or FATO update*" |
| response | *Accepted*<br><br>The resulting text of AMC1 NCO.OP.116, item (b) has been amended accordingly. |

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| comment | *46* comment by: *Airbus Helicopters*<br><br>**Major comment**<br>*Location*<br>AMC4 NCO.OP.117, page 116<br>*Comment*<br>"*'Direct to' clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established on the final approach track at least 2 miles from the FAF*"<br>This is not feasible for all types of approaches.<br>*Rationale for comment*<br>Some RNP APCH LNAV (2D) approaches include a course change at FAF. In that case, the aircraft cannot be established on the final approach track before the FAF.<br>*Recommendation*<br>Change wording to:<br>"*For full straight-in 3D approaches, 'Direct to' clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established on the final approach track at least 2 miles from the FAF* " |
| response | *Not accepted.*<br><br>The rule clearly states a condition for accepting a 'direct to' clearance. If the condition cannot be fulfilled, the condition cannot be accepted. There may be several causes why the condition cannot be fulfilled. Therefore it is not deemed appropriate to mention only one possible cause. |

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| comment | *137* comment by: *UK CAA*<br><br>**Page No:** 112<br>**Paragraph No:** AMC1 NCO.GEN.105 Pilot-in-command responsibilities and authority<br>**Comment:** Consider inclusion of flight planning considerations under Flight Preparation for PBN operations. UK CAA comment against page 53, CAT.OP.MPA.175 Flight Preparation, also refers. |
| response | *Not accepted*<br><br>Rule NCO.GEN.110 already mandates the pilot-in-command in NCO operations to follow all |

applicable procedures, which include filing a flight plan when applicable, even beyond PBN.

comment *138* comment by: *UK CAA*

**Page No:** 113
**Paragraph No:** GM1 NCO.OP.117 Performance-based navigation – aeroplanes and helicopters - Monitoring and Verification paragraph (a)
**Comment:** In the 5th sub-paragraph the term "where feasible" is used to refer to monitoring of flight progress through means of cross-checks with conventional navigation aids. The term "where feasible" does not imply any form of requirement and therefore it is suggested that "Standard Operating Procedures should include cross-checks, where required", might be a slightly stronger way of conveying the intent. The term "where required" is necessary because it is only those systems that are not RNP systems i.e., do not have an On-board Performance Monitoring and Alerting capability that need to perform this navigation position gross-error check. All RNP systems automatically perform the check and alert the flight crew when NSE monitoring is lost. All flight crew should continuously be monitoring FTE as part of the flight progress.
**Justification:** Clarification of when navigation position gross-error checks are required
**Proposed Text:** Amend text in 5th sub-paragraph to read:
"Standard Procedures should include cross-checks, where required."

response *Accepted*

The entire block is deleted from paragraph (a) of the resulting text of AMC2 CAT.OP.MPA.126, since situational awareness and cross-checking are part of the basic airmanship. For consistency purposes, the same block of text is also deleted from paragraph (a) of the resulting text of AMC1 to NCC.OP.116, to NCO.OP.116 and to SPO.OP.116.

comment *204* comment by: *Ryanair*

| NPA Reference, section | NPA Text | RYR position | Suggested Text |
|---|---|---|---|
| GM1 NCO.OP.117 Performance-based navigation — aeroplanes and helicopters Performance-based navigation — aeroplanes and helicopters. Departure page 113 | Prior to commencing a take-off on a PBN procedure, the flight crew should verify that the PBN system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded. A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. | Airlines have in place robust procedures to cover this area and this should be reflected in the text. | Prior to commencing a take-off on a PBN procedure, the flight crew have procedures that verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded. A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. |

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| response | *Accepted*<br><br>See the response to comment No 200. |

**3 Proposed amendments — 3.13 Draft Decision (AMC/GM to Part SPO)** p. 120-127

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| comment | *28* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*<br><br>Ref Page 124.<br>AMC4 SPO.OP.117 Performance-based navigation VECTORING AND POSITIONING<br>Second pargraph - "track at least 2 miles from"<br>As the proposal is written it creates uncertainty and should be amended to "track at least 2 **nautical miles** from" |
| response | *Accepted*<br><br>The resulting text has been improved as suggested. |

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| comment | *47* comment by: *Airbus Helicopters*<br><br><u>*Location*</u><br>GM1 SPO.OP.117, item (b), page 121<br><u>*Comment*</u><br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll commences and GNSS position may be used in place of the runway update.*"<br>The paragraph concerns aeroplanes and helicopters. Helicopters usually do not perform rolling take-offs.<br><u>*Rationale for comment*</u><br>Adapt the concept to helicopters.<br><u>*Recommendation*</u><br>Change wording to:<br>"*A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll (aeroplanes) or lift-off (helicopters)*"<br>"*Where GNSS is used, the signal should be acquired before the take-off roll (aeroplanes) or lift-off (helicopters) commences and GNSS position may be used in place of the runway or FATO update*" |
| response | *Accepted*<br><br>The resulting text of AMC1 SPO.OP.116, item (b), has been amended as suggested. |

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| comment | *48* comment by: *Airbus Helicopters* |

**Major comment**
*Location*
AMC4 SPO.OP.117, page 124
*Comment*
"*'Direct to' clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established on the final approach track at least 2 miles from the FAF*"
This is not feasible for all types of approaches.
*Rationale for comment*
Some RNP APCH LNAV (2D) approaches include a course change at FAF. In that case, the aircraft cannot be established on the final approach track before the FAF.
*Recommendation*
Change wording to:
"*For full straight-in 3D approaches, 'Direct to' clearances may be accepted to the Intermediate Fix (IF) provided that it is clear to the crew that the aircraft will be established on the final approach track at least 2 miles from the FAF* "

response *Not accepted*

The rule clearly states a condition for accepting a 'direct to' clearance. If the condition cannot be fulfilled, the condition cannot be accepted. There may be several causes why the condition cannot be fulfilled. Therefore, it is not deemed appropriate to mention only one possible cause.

comment *139* comment by: *UK CAA*

**Page No:** 120
**Paragraph No:** AMC1 SPO.GEN.107 Pilot-in-command responsibilities and authority
**Comment:** Consider inclusion of flight planning considerations under Flight Preparation for PBN operations. UK CAA comment against page 53, CAT.OP.MPA.175 Flight Preparation, also refers.

response *Not accepted*

Rule SPO.GEN.110 already mandates the pilot-in-command in NCO operations to follow all the applicable procedures, which include filing a flight plan when applicable, even beyond PBN.

comment *140* comment by: *UK CAA*

**Page No:** 121
**Paragraph No:** GM1 SPO.OP.117 Performance-based navigation – aeroplanes and helicopters - Monitoring and Verification paragraph (a)
**Comment:** In the 5th sub-paragraph the term "where feasible" is used to refer to monitoring of flight progress through means of cross-checks with conventional navigation aids. The term "where feasible" does not imply any form of requirement and therefore it is suggested that "Standard Operating Procedures should include cross-checks, where required", might be a slightly stronger way of conveying the intent. The term "where required" is necessary because it is only those systems that are not RNP systems i.e., do not have an On-board Performance Monitoring and Alerting capability that need to perform this navigation position gross-error check. All RNP systems automatically perform the check and alert the

flight crew when NSE monitoring is lost. All flight crew should continuously be monitoring FTE as part of the flight progress.
**Justification:** Clarification of when navigation position gross-error checks are required.
**Proposed Text:** Amend text in 5th sub-paragraph to read:
"Standard Procedures should include cross-checks, where required."

response *Accepted*

The entire block is deleted from paragraph (a) of the resulting text of AMC2 CAT.OP.MPA.126, since situational awareness and cross-checking are part of the basic airmanship. For consistency purposes, the same block of text is also deleted from paragraph (a) of resulting text of AMC1 to NCC.OP.116, to NCO.OP.116 and indeed to SPO.OP.116.

comment *205* comment by: *Ryanair*

| NPA Reference, section | NPA Text | RYR position | Suggested Text |
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| GM1 NCO.OP.117 Performance-based navigation — aeroplanes and helicopters Performance-based navigation — aeroplanes and helicopters. Departure page 121 | Prior to commencing a take-off on a PBN procedure, the flight crew should verify that the PBN system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded. A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. | Airlines have in place robust procedures to cover this area and this should be reflected in the text. | Prior to commencing a take-off on a PBN procedure, the flight crew have procedures that verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded. A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. |

response *Accepted*

The resulting text of paragraph (b) of AMC1 to SPO.OP.116 has been amended as suggested, assuming that the reference in the left column of this comment, filed under the 'segment' SPO, was wrong. See also response to comment No 200.

comment *206* comment by: *Ryanair*

| NPA Reference, | NPA Text | RYR position | Suggested Text |
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| section<br>GM1 NCO.OP.117<br>Performance-based navigation — aeroplanes and helicopters<br>Performance-based navigation — aeroplanes and helicopters.<br>Departure page 122 | Prior to commencing a take-off on a PBN procedure, the flight crew should verify that the PBN system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded.<br>A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. | Airlines have in place robust procedures to cover this area and this should be reflected in the text. | Prior to commencing a take-off on a PBN procedure, the flight crew have procedures that verify that the RNAV system is available and operating correctly and, where applicable, the correct airport and runway data have been loaded.<br>A positive check should be made that the indicated aircraft position is consistent with the actual aircraft position at the start of the take-off roll. |

response *Accepted*

This comment is a duplicate of comment No 205 immediately above.

**3 Proposed amendments — 3.14 Draft Decision (AMC 20-4)** p. 128-133

comment *53* comment by: *Garmin International*

Section 2 Scope includes the statement “ICAO RNP-4 criteria are outside the scope of this AMC, but it is expected that navigation systems based on position updating from traditional radio aids and approved for Basic RNAV 5 operations in accordance with this AMC will have an RNP-4 capability.” RNP 4 is an Oceanic/Remote specification where GPS is required to support the necessary 95% accuracy/integrity requirements while RNAV 5 is an Domestic En-route specification that can be accomplished using VOR/DME, DME/DME, GNSS, etc. for the 95% accuracy and integrity is not required. Given these differences, it is suggested that the quoted statement be removed from AMC 20-4A.

response *Noted*

The Agency is in the process of transferring all RNAV and RNP related airworthiness topics from AMC 20 and TGL guidance material into Subpart C of the new Certification Specification — Airborne Communication, Navigation and Surveillance (CS-ACNS). The NPA, stemming from RMT.0519 & RMT.0520, proposing the amendment to CS-ACNS is scheduled in 2015, and after this CRD.

In order to most efficiently use the limited resources available, the Agency has decided to only remove material related to operations from the existing AMC 20 documents, through NPA 2013-25 (i.e. RMT.0256 & 0257) but not update the airworthiness aspects for the time remaining until CS-ACNS is published.

This comment, and other similar below, will therefore be taken into account when developing the above-mentioned NPA on Subpart C (NAV) of CS-ACNS.

comment | *54* comment by: *Garmin International*

Section 2 Reference Documents includes “AC 20-130()”. AC 20-130 was cancelled by FAA AC 20-138B (and now 20-138C). Suggest removing “AC 20-130()” to be consistent with the current FAA guidance.

response | *Noted*

See the response to comment No 53.

comment | *55* comment by: *Garmin International*

Section 2 Reference Documents includes “AC 20-138 Airworthiness Approval of NAVSTAR Global Positioning System (GPS) for use as a VFR and IFR Supplemental Navigation System”. Suggest revising to “AC 20-138() Airworthiness Approval of Positioning and Navigation Systems” to be consistent with the current FAA guidance.

response | *Noted*

See the response to comment No 53.

comment | *56* comment by: *Garmin International*

Section 2 Reference Documents includes ETSO-C145c and ETSO-C146c but is missing the corresponding RTCA DO-229() as the MOPS. Suggest adding “DO-229() Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment” to be consistent.

response | *Noted.*

See the response to comment No 53.

comment | *57* comment by: *Garmin International*

Section 3 includes “GPNSS*”. Suggest changing to “GNSS*”.

response | *Accepted*

The typing error has been corrected.

comment | *58* comment by: *Garmin International*

Section 4.4.1 references “FAA … AC 20-130(), AC 20-138”. AC 20-130() is obsolete and AC 20-

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| | 138 has been superseded by a later revision. Suggest changing this phrase to “AC 20-138()”. |
| response | *Noted*<br>See the response to comment No 53. |

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| comment | *59* comment by: *Garmin International*<br>Section 4.4.1 states “Compliance may be based also on the lateral navigation standards defined in ETSO-C115b, ETSO-C129a, …”. Suggest adding “ETSO-C145()” and “ETSO-C146()” to this statement. |
| response | *Noted*<br>See the response to comment No 53. |

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| comment | *60* comment by: *Garmin International*<br>Section 4.4.2.2 states “AC 20-121A may be adopted as a compliance basis.” A search of FAA’s Regulatory and Guidance Library (http://rgl.faa.gov/) Advisory Circulars database did not find AC 20-121A as a current AC. Consequently, it is unclear how “AC 20-121A may be adopted as a compliance basis.” |
| response | *Noted*<br>See the response to comment No 53. |

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| comment | *61* comment by: *Garmin International*<br>Section 4.4.2.3 includes “ETSO-C 145, or ETSO-C 146”. Suggest removing the blank spaces in the “C 145” and “C 146” portions of these references. |
| response | *Accepted*<br>The blank spaces have been removed. |

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| comment | *62* comment by: *Garmin International*<br>Section 4.4.2.3 includes “In addition, GPS stand-alone equipment should include the following functions:<br>(a) pseudorange step detection,<br>(b) health word checking.<br>These two additional functions are required to be implemented in accordance with ETSO-C129a criteria.” It is unclear why these statements are required since the first sentence in Section 4.4.2.3 states “The use of GPS to perform RNAV 5 operations is limited to equipment approved to ETSO-C129a, ETSO-C 145, or ETSO-C 146” and since each of these ETSOs already requires pseudorange step detection and health word checking. Suggest removing the quoted statements. |
| response | *Noted*<br>See the response to comment No 53. |

comment *84* comment by: *Boeing*

Page:130
Paragraph: *3, Systems capability*
**The proposed text states:**
*" … In general terms, RNAV equipment operates by automatically determining aircraft position from one, or a combination, of the following together with the means to establish and follow a desired path:*
*VOR/DME*
*DME/DME*
*INS* or IRS*
*LORAN C**
*GPNSS**
**REQUESTED CHANGE:** *Change "GPNSS: to **"GNSS"***
**JUSTIFICATION:** Typographical error.

response *Accepted*

The typing error has been corrected.

comment *106* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
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| Revise reference to AC 90-96. | AC was revised in 2005 and 2010. | Recommend revising sentence to read "The FAA published comparable material under AC 90-96 on 20 March 1998 (subsequently revised in 2005 and 2010). | None. |

response *Accepted*

The resulting text of AMC 20-4A has been amended as suggested by the comment.

comment *141* comment by: *UK CAA*

**Page No:** 129
**Paragraph No:** AMC 20-4 - Reference Documents
**Comment:** The list of reference documents should include the source organisation e.g., EASA, FAA, EUROCAE/RTCA. The NPA has strike-throughs where the source organisation is named. AMC 20-4 should be consistent with other AMC.
**Justification:** Editorial.

response *Accepted*

The typing error has been removed and the originating organisation is now explicit in the

resulting text.

comment | *173* | comment by: *Dassault Aviation*

Dassault-Aviation comment 13 page # 130
**Extract:**
3 SYSTEMS CAPABILITY
Area navigation (RNAV) is a method which permits aircraft navigation along any desired flight path within the coverage of either ground station referenced navigation aids, Global Navigation Satellite Systems (GNSS) or within the limits of the capability of self-contained aids, or a combination of both methods.
**Comment:**
This definition is not exactly identical to ICAO PBN Manual RNAV definition (restriction to GNSS for space-based navaids).
**Requested Change:**
Duly take into account ICAO definition of RNAV: A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

response | *Noted*

See the response to comment No 53.

comment | *174* | comment by: *Dassault Aviation*

Dassault-Aviation comment 14 page # 130
**Extract:**
3 SYSTEMS CAPABILITY
GPNSS*
**Comment:**
Typing error
**Requested Change:**
Replace by GNSS

response | *Accepted*

The typing error has been corrected.

comment | *175* | comment by: *Dassault Aviation*

Dassault-Aviation comment 15 pages # 130
**Extract:**
~~4.1.1 Accuracy~~
This navigation performance assumes that the necessary coverage provided by satellite or ground based navigation aids is available for the intended route to be flown.
**Comment:**
Present in paragraph 3, “self-contained aids” are missing in paragraph 4
**Requested Change:**
This navigation performance assumes that the necessary coverage provided by satellite,

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| | ground based navigation or self-contained aids is available for the intended route to be flown. |
| response | *Noted*<br><br>See the response to comment No 53. |

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| comment | *184* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 26 page # 128 to 154<br>**Extract:**<br>AMC 20-4A to AMC 20-28A<br>**Comment:**<br>The numbering of all AMC 20-xx doesn't take into account the new version of these AMC<br>**Requested Change:**<br>This numbering should be updated with the new letter following all the AMC 20-xx of the PBN document (eg AMC 20-12A) |
| response | *Accepted*<br><br>The letter indicating new versions of AMC 20-XX has been checked for all involved AMC 20-XX. |

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| comment | *185* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 18 page # 128 and 134<br>**Extract:**<br>3 REFERENCE DOCUMENTS<br>**Comment:**<br>References to IR Air Ops are not present in AMC 20-4 and AMC 20-12; is it on purpose?<br>**Requested Change:**<br>Add the adequate references to IR Air Ops in AMC 20-4 and AMC 20-12 if necessary |
| response | *Not accepted*<br><br>The Agency is removing the OPS-related material from AMC 20-xx and leaving therein only airworthiness-related provisions. Hence, references to multiple paragraphs of the Air OPS Regulation and the related AMC/GM are not deemed useful. |

**3 Proposed amendments — 3.15 Draft Decision (AMC 20-5)** p. 134

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| comment | *176* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 16 page # 134<br>**Extract:**<br>This AMC explains …. but not the only means, to obtain Agency airworthiness approval for ~~RNP~~ RNAV 10 ~~operations~~.<br>**Comment:**<br>The word « operations » after RNAV 10 should not be removed (like in the title for example)<br>**Requested Change:** |

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| | This AMC explains …. but not the only means, to obtain Agency airworthiness approval for RNAV 10 operations. |
| response | *Accepted*<br>The word 'operations' remains in the resulting text at the end of paragraph 1 of AMC 20-12A. |

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| comment | *185* ❖ comment by: *Dassault Aviation*<br>Dassault-Aviation comment 18 page # 128 and 134<br>**Extract:**<br>3 REFERENCE DOCUMENTS<br>**Comment:**<br>References to IR Air Ops are not present in AMC 20-4 and AMC 20-12; is it on purpose?<br>**Requested Change:**<br>Add the adequate references to IR Air Ops in AMC 20-4 and AMC 20-12 if necessary |
| response | *Not accepted*<br>See the response to comment No 185. |

**3 Proposed amendments — 3.16 Draft Decision (AMC 20-12)** p. 134-138

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| comment | *63* comment by: *Garmin International*<br>Section 1 includes "RNP 10 in fact did not include requirements for on-board performance monitoring and alerting." Suggest either removing the phrase "in fact" or changing the beginning of the sentence to "RNP 10, in fact, did not …" |
| response | *Accepted*<br>Taking the comment into account, 'in fact' has been removed. |

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| comment | *64* comment by: *Garmin International*<br>Section 1 includes "This AMC is mainly based on the FAA Order 8400.12A 'Required Navigation Performance 10 (RNP-10) Operational Approval', issued 9th February 1998. FAA Order 8400.12A …" Order 8400.12A is no longer current. Order 8400.12C issued 9th November 2011 is current. Suggest replacing all "8400.12A" references with "8400.12C" throughout AMC 20-12A.<br>Additionally, for your consideration, FAA AFS-470 is in the process of drafting AC 90-105A and intends to move the content of Order 8400.12C into AC 90-105A Appendix 7. |
| response | *Accepted*<br>The resulting text of AMC 20-12A now refers to FAA Order 8400.12C of November 2011. Further FAA material, if published, will be taken into account in the context of RMT.0519 & RMT.0520 (i.e. Subpart C of CS-ACNS). |

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| comment | *65* comment by: *Garmin International* |

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| | Section 2.2.3 includes “AC 20-130A”. AC 20-130 was cancelled by FAA AC 20-138B (and now 20-138C). Suggest removing “AC 20-130A” to be consistent with the current FAA guidance. |
| response | *Accepted*<br>The reference to AC 20-130 has been deleted. |

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| comment | *66* comment by: *Garmin International*<br>Section 2.2.3 includes “AC 20-138 Airworthiness Approval of NAVSTAR Global Positioning System (GPS) for use as a VFR and IFR Supplemental Navigation System”. Suggest revising to “AC 20-138() Airworthiness Approval of Positioning and Navigation Systems” to be consistent with the current FAA guidance. |
| response | *Accepted*<br>The reference has been corrected to refer to the last version of the FAA AC, through the '()' symbol. |

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| comment | *67* comment by: *Garmin International*<br>Section 2.2.5 references DO-229B. DO-229D is current. Suggest revising to DO-229D. |
| response | *Accepted*<br>The reference has been corrected. |

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| comment | *68* comment by: *Garmin International*<br>Section 4.1 includes several references to specific Order 8400.12A paragraphs. Since 8400.12C is now the current Order, suggest checking that these references are still correct. |
| response | *Accepted*<br>The references to paragraphs of FAA Order 8400.12C have been checked and amended. |

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| comment | *69* comment by: *Garmin International*<br>The Section 4.3 title and first sentence both reference “RNP-10”. Suggest revising to “RNAV 10” to be consistent with changes made in other preceding sections. |
| response | *Accepted*<br>The term ‘RNAV 10’ has been used throughout the resulting text of AMC 20-12A. |

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| comment | *70* comment by: *Garmin International*<br>Section 4.3 includes the phrase “The FAA Order explains, in paragraph 12d”. Since 8400.12C is now the current Order, suggest checking that this reference is still correct. |
| response | *Accepted*<br>The reference has been changed to paragraph 13d of FAA Order 8400.12C. |

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| comment | *71* comment by: *Garmin International*<br>Section 4.3.1 includes "The AFM will state RNP levels that have been demonstrated." Suggest changing "RNP" to "RNAV" or "RNAV and/or RNP". |
| response | *Accepted.*<br>The wording of the resulting text has been changed accordingly. |

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| comment | *72* comment by: *Garmin International*<br>Section 4.3.2.(b) includes "…in accordance with FAA Notice 8110.60[12]" while Footnote 12 states: "Notice 8110.60 is recognised by AMC 20-5. The material is now incorprated in AC 20-138A as Appendix 1."<br>NPA 2013-25 section 3.15 states "The proposal is to delete AMC 20-5 entirely."<br>Consequently, the first sentence in Footnote 12 will no longer be applicable since AMC 20-5 will no longer exist. Furthermore, FAA Notice 8110.60 is no longer current and has been incorporated into AC 20-138() Appendix 1.<br>Suggest revising Section 4.3.2.(b) to "…in accordance with FAA AC 20-138() Appendix 1" and removing Footnote 12. |
| response | *Accepted*<br>The reference has been changed to 'Appendix 1 to FAA 20-138()'. |

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| comment | *73* comment by: *Garmin International*<br>Section 4.3.2.(b) includes "These aircraft are considered to meet the RNP-10 requirements without time limitations." Suggest change "RNP-10" to "RNAV 10" to be consistent with changes made in other preceding sections. |
| response | *Accepted*<br>The wording has been changed accordingly. |

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| comment | *74* comment by: *Garmin International*<br>Section 4.3.2.(c) references "AC 20-130A". AC 20-130A is obsolete. Suggest changing this to "AC 20-138()". |
| response | *Accepted*<br>The reference has been changed to 'FAA AC 20-138()'. |

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| comment | *89* comment by: *Virgin Atlantic*<br>Ref AMC20-12A: Why does this not reference the current FAA Order 8400.12C in both the "Purpose" narrative and "Related Guidance Material" sections given that this is the current version of the order and 12A was cancelled in 2010? |
| response | *Accepted* |

The references have been changed, mostly those to AC 20-138() whose current last edition is C, and to Order 8400.12C.

**3 Proposed amendments — 3.17 Draft Decision (AMC 20-26A)** p. 139-145

comment

*75* comment by: *Garmin International*

Section 2.2.3 includes “AC 20-129”, “AC 20-130( )”, and AC 25-4. All of these ACs were cancelled by FAA AC 20-138B (and now 20-138C). Suggest removing these ACs to be consistent with the current FAA guidance.
Similarly, AC 90-97 was cancelled by AC 90-105. Suggest removing AC 90-97 and possibly replacing it with AC 90-105 to be consistent with the current FAA guidance.
Similarly, Order 8260.52 was cancelled by 8260.58. 8260.52 is now 8260.58 Volume 5. Suggest revising to be consistent with the current FAA guidance.
The title of AC 90-101A should be “Approval Guidance for RNP Procedures with AR”.
AC 20-153 is now AC 20-153A. Suggest changing to “AC 20-153( )”
Additionally, suggest checking all of AMC 20-26A and changing the following references as necessary:

- AC 20-129 -> AC 20-138( )
- AC 20-130 -> AC 20-138( )
- AC 25-4 -> AC 20-138( )
- AC 90-97 -> AC 90-105
- Order 8260.52 -> Order 8260.58 Volume 5
- AC 20-153 -> AC 20-153( )

response

*Noted*

See the response to comment 53.

comment

*76* comment by: *Garmin International*

AC 20-138C Appendix 2 paragraph A2-7.d. states:
“As a minimum, data suppliers must have an LOA for processing navigation data in accordance with AC 20-153. An LOA recognizes the data supplier as one whose data quality, integrity, and quality management practices are consistent with the criteria of DO-200A. The aircraft operator’s supplier (e.g., FMS manufacturer) must have a Type 2 LOA. Those entities providing data to the aircraft operator’s supplier likewise must possess either a Type 1 or Type 2 LOA.”
Since FAA has determined that database integrity in accordance with DO-200A is necessary to obtain RNP AR airworthiness approval, it is unclear why section 8.2 Database Integrity is being deleted from AMC 20-26A.

response

*Partially accepted.*

Paragraph 8.2 has been reintroduced in the resulting text of AMC 20-26A; it indeed refers to DO-200A, as requested by the comment.

The certification of data providers is covered by RMT.0593 & RMT.0594 (Part-DAT) and therefore not in the scope of AMC 20-xx.

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| comment | *177* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 17 page # 140<br>**Extract:**<br>2 SCOPE<br>This material provides airworthiness approval criteria related to RNAV systems with lateral navigation (LNAV) and BRAO-VNAV capabilities, intended to be used under Instrument Flight Rules, including Instrument Meteorological Conditions, in designated European airspace blocks where RNP Authorisation Required (AR) operations have been implemented per a decision of the competent aviation authorities. It addresses general certification requirements, including functional requirements, accuracy, integrity, continuity of function, and system limitations.<br>**Comment:**<br>Typing error<br>**Requested Change:**<br>This material provides airworthiness approval criteria related to RNAV systems with lateral navigation (LNAV) and BARO-VNAV capabilities |
| response | *Accepted*<br><br>The typing error in paragraph 2 of the resulting text of AMC 20-26A has been corrected. |

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| comment | *178* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 19 page # 143<br>**Extract:**<br>are consistent with the relevant parts of ICAO Doc 8168 PANS OPS and ICAO PBN RNP AR Procedure Design Manual;<br>**Comment:**<br>Number of ICAO Doc missing<br>**Requested Change:**<br>are consistent with the relevant parts of ICAO Doc 8168 PANS OPS and ICAO Doc 9905 PBN RNP AR Procedure Design Manual. |
| response | *Accepted*<br><br>The Doc number has been inserted. |

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| comment | *179* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 20 page # 144<br>**Extract:**<br>6.1.3 RNP System Performance<br>It will be for the competent Authority, responsible for the approval of the procedure, to assess the RNP level for the considered operation in accordance with the Flight Operations Safety Assessment (FOSA) ~~see APPENDIX 5.~~<br>**Comment:**<br>Where can one find the FOSA if it is no more in APPENDIX 5?<br>**Requested Change:**<br>Indicate the location of FOSA |

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| response | *Accepted*<br><br>The reference to GM1 SPA.PBN.105(c) has been inserted in paragraph 6.1.3 of the resulting text of AMC 20-26A. |

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| comment | *183* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 24 page # 140, 147 and 153<br>**Extract:**<br>AMC 20-26A, 20-27A and AMC 20-28A<br>3. SCOPE<br>This AMC … under Instrument Flight Rules, including Instrument Meteorological Conditions<br>**Comment:**<br>IMC relates to operational and not airworthiness considerations. Consequently, they should be removed from AMCs and be kept in operational regulation.<br>**Requested Change:**<br>This AMC includes … under Instrument Flight Rules. |
| response | *Noted*<br><br>See the response to comment 53. |

**3 Proposed amendments — 3.18 Draft Decision (AMC 20-27A)** p. 146-151

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| comment | *77* comment by: *Garmin International*<br><br>General comment. It doesn't appear that proposed AMC 20-27A has been combined with EASA CM-AS-002 Clarifications to AMC 20-27, whose purpose is to "provide specific guidance, within the context of AMC 20-27, on:<br>• General applicability and intended use of AMC 20-27;<br>• The use of SBAS/GNSS geometric altitude as a source of altitude for approaches to LNAV/VNAV minima;<br>• Provisioning of steering and monitoring signals with angular vertical deviations as opposed to the linear deviations assumed in AMC 20-27;<br>• Acceptance of previous demonstration of compliance with FAA AC 20-129 for credit for AMC 20-27 airworthiness and operational approval."<br>Suggest that AMC 20-27A include the appropriate material from EASA CM-AS-002 so that there is a single source for airworthiness approval guidance for RNP APCH. |
| response | *Noted*<br><br>See the response to comment 53. |

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| comment | *78* comment by: *Garmin International*<br><br>The title includes "AMC 20-27~~AB~~". It is not clear why the "A" is a strikethrough character and the "B" is highlighted. Suggest changing to "AMC 20-27A". |
| response | *Not accepted*<br><br>AMC20-27A has been introduced by Amendment 10 to AMC 20. Please refer to ED Decision |

2013/026/R of 12 September 2013.

So now the edition letter of AMC 20-27 shall be increased to B.

comment *79* comment by: *Garmin International*

Section 4.2.3 includes “AC 25-4”, “AC 20-129”, and “AC 20-130A”. All of these ACs were cancelled by FAA AC 20-138B (and now 20-138C). Suggest removing these ACs to be consistent with the current FAA guidance.
AC 20-153 is now AC 20-153A. Suggest changing to “AC 20-153( )”
Additionally, suggest checking all of AMC 20-27A and changing the following references as necessary:

- AC 25-4 -> AC 20-138( )
- AC 20-129 -> AC 20-138( )
- AC 20-130A -> AC 20-138( )
- AC 20-153 -> AC 20-153( )

response *Noted*

See the response to comment 53.

comment *80* comment by: *Garmin International*

Section 4.2.4 includes TSO-C129( ), which has been cancelled and superseded by TSO-C196. Suggest adding a reference to TSO-C196 since the use of TSO-C129( ) equipment is still appropriate.
This comment also should be considered for AMC 20-4A, AMC 20-12A, and AMC 20-26A.

response *Noted*

See the response to comment 53.

comment *81* comment by: *Garmin International*

Section 4.2.5 should include a reference to DO-316 Minimum Operational Performance Standards for Global Positioning System/Aircraft Based Augmentation System Airborne Equipment as the MOPS for TSO-C196.
This comment also should be considered for AMC 20-4A, AMC 20-12A, and AMC 20-26A.

response *Noted*

See the response to comment 53.

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| comment | *180* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 21 page # 146<br>**Extract:**<br>AMC 20-27~~A~~B Airworthiness Approval ~~and Operational Criteria~~ for RNP APPROACH (RNP APCH) ~~Operations~~ Including APV BARO-VNAV ~~Operations~~<br>**Comment:**<br>Keep the word "operations" as it is in other AMCs title<br>**Requested Change:**<br>Replace by "AMC 20-27B Airworthiness Approval for RNP APPROACH (RNP APCH) Operations Including APV BARO-VNAV Operations". |
| response | *Accepted*<br><br>The word 'operations' has been inserted in the resulting text. |

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| comment | *181* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 22 page # 146<br>**Extract:**<br>1. PURPOSE<br>This AMC addresses RNP APCH operation without vertical guidance (Non Precision Approach operation)<br>**Comment:**<br>The ICAO PBN manual Ed 4 clearly separates Instrument Approach Procedures (NPA, APV, PA) from Instrument Approach Operations (2D, 3D). Hence a NPA should not be considered as an operation but as a procedure and the wording should take into account the new ICAO taxonomy: 2D/3D<br>**Requested Change:**<br>This AMC addresses RNP APCH operation without vertical guidance (2D operation) |
| response | *Accepted*<br><br>The requested change has been incorporated. |

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| comment | *182* comment by: *Dassault Aviation*<br><br>Dassault-Aviation comment 23 page # 147<br>**Extract:**<br>2. BACKGROUND<br>It addresses general certification considerations of stand-alone and multi-sensor systems on-board aircraft, including their functional requirements, accuracy, integrity, continuity of function, and limitations, together with operational considerations.<br>**Comment:**<br>Operational considerations are supposed to be removed from the AMCs (see AMC 20-28 chap 2 for example)<br>**Requested Change:**<br>It addresses general certification considerations of stand-alone and multi-sensor systems on-board aircraft, including their functional requirements, accuracy, integrity, continuity of function, and limitations. |

response | *Accepted*

The editorial improvement has been introduced as suggested (i.e. deletion of mention of operational aspects).

comment | *183* ❖ comment by: *Dassault Aviation*

Dassault-Aviation comment 24 page # 140, 147 and 153
**Extract:**
AMC 20-26A, 20-27A and AMC 20-28A
3. SCOPE
This AMC … under Instrument Flight Rules, including Instrument Meteorological Conditions
**Comment:**
IMC relates to operational and not airworthiness considerations. Consequently, they should be removed from AMCs and be kept in operational regulation.
**Requested Change:**
This AMC includes … under Instrument Flight Rules.

response | *Noted*

See the response to comment 53.

**3 Proposed amendments — 3.19 Draft Decision (AMC 20-28)** p. 152-155

comment | *49* comment by: *Airbus Helicopters*

*Location*
Last sentence in page 152.
*Comment*
"*The FAS of such approaches may be intercepted by an approach transition (e.g. Precision Area Navigation (P-RNAV) or initial and intermediate segments of an RNP APCH approach) or through vectoring (e.g. interception of the extended FAS)*."
P-RNAV acronym is no longer in use.
*Rationale for comment*
Consistency with present wording.
*Recommendation*
Change "*P-RNAV*" to "*RNAV 1*".

response | *Accepted*

The reference to RNAV 1 has been introduced in paragraph 2 of the resulting text of AMC 20-28A.

comment | *82* comment by: *Garmin International*

Section 4.2.3 includes “AC 20-130A”, which was cancelled by FAA AC 20-138B (and now 20-138C). Suggest removing this AC to be consistent with the current FAA guidance.
AC 20-153 is now AC 20-153A. Suggest changing to “AC 20-153( )”
Additionally, suggest checking all of AMC 20-28A and changing the following references as necessary:

- AC 20-130A -> AC 20-138( )
- AC 20-153 -> AC 20-153( )

response

*Accepted*

The references have been changed as suggested.

comment

*183* ❖ comment by: *Dassault Aviation*

Dassault-Aviation comment 24 page # 140, 147 and 153
**Extract:**
AMC 20-26A, 20-27A and AMC 20-28A
3. SCOPE
This AMC … under Instrument Flight Rules, including Instrument Meteorological Conditions
**Comment:**
IMC relates to operational and not airworthiness considerations. Consequently, they should be removed from AMCs and be kept in operational regulation.
**Requested Change:** This AMC includes … under Instrument Flight Rules.

response

*Noted*

See the response to comment 53.

**4 Regulatory Impact Assessment (RIA) — 4.1 Issues to be addressed** p. 156-166

comment

*20* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

RIA: The proposed rules constitute a major change for many stake holders and the economical impact of the proposal needs to be assessed thoroughly. The RIA does not show any figures or estimated costs for various stakeholders e.g. investments costs on necessary upgrades of aircrafts and simulators that is used by ATO´s. Furthermore the RIA does not present any detailed information about the impact of the administrative burden that is transferred from operators to ATO´s and pilots with an instrument rating.
The present Part SPA PBN rules require an approval when operating in an airspace requiring a PBN specification (except for B-RNAV/RNAV5). If you operate in airspace not requiring a PBN specification you do not need a SPA PBN approval. The set of proposed rules transfers the “optional application” of PBN rules (airspace related) into general requirements for pilots with an IR. Eventually this transfer has to be made at some point, but the impact has to be assessed and described in more detail.

response

*Not accepted*

No other stakeholder raised such an objection. Furthermore, regardless of the possible PBN requirements for certain airspace volumes, the number of published PBN instrument

procedures is constantly increasing. The administrative burden for aircraft operators to follow these procedures should hence be reduced. The vast majority of respondents to NPA 2013-25 supported the principle.

**4 Regulatory Impact Assessment (RIA) — 4.5 Issue 1: For which PBN types is safely possible to remove SPA?** p. 167-177

comment *50* comment by: *Airbus Helicopters*

**Major comment**
*Location*: Whole RIA for issue 1.
*Comment*
Behind option 0 (Do nothing), only 2 options have been considered. The following intermediate between option 1 and option 2 would have been relevant to consider:
*Maintain specific approval (SPA) for RNP AR APCH and some cases for advanced RNP and eliminate the obligation for SPA for all other PBN types (including RNP 0.3).*
In the safety impact analysis (§ 4.5.2.1), option 2 description mentions only RNP-AR as highly increasing the safety risks due to the lack of special approval process by the regulator. This implicitly recognizes that safety issues mainly concern RNP-AR, not RNP 0.3 operations.
In the environmental impact analysis (§4.5.2.2), it is mentioned that option 2 would be more beneficial than option 1 especially for helicopters. This is true and advocates the need to address helicopters separately from aeroplanes in the RIA. RNP 0.3 specification has been established especially for Low Level IFR helicopter operations. One of the objectives is to ease, thanks to reduced routes widths compared to RNP-1, the integration of Low Level IFR routes in noise sensitive environments.
In the social impact analysis (§ 4.5.2.3), it is mentioned that option 2 would be more beneficial than option 1 especially for helicopters. This is true and advocates the need to address helicopters separately from aeroplanes in the RIA. In the final comparison of options (§ 4.5.3), option 2 is rated highly negative in safety terms mainly because of SPA removal for RNP-AR, and this option is finally discarded. Conclusion would have been likely different if a fourth option introduced.
*Rationale for comment*
RNP 0.3 operations are much less complex than RNP-AR ones. Consequently, it is not worth to consider RNP 0.3 and RNP-AR in the same category for the safety impact assessment. It is also reminded that RNP-APCH LNAV includes an RNP 0.3 final approach segment whereas no SPA is required for RNP-APCH in option 2.
*Recommendation*
Reconsider the impact analysis by introducing the following option:
*Maintain specific approval (SPA) for RNP AR APCH and some cases for Advanced RNP and eliminate the obligation for SPA for all other PBN types (including RNP 0.3)*
Update the proposal for Part SPA accordingly.

response *Not accepted*

The RIA published in NPA 2013-25 will not be republished, since the vast majority of respondents had no objections to its conclusions.
The Agency, however, acknowledges that the case of RNP 0.3 helicopter operations may be significantly different from RNP AR APCH and, therefore, intends, in due time, to launch a specific new RMT, devoted to helicopter PBN.

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| comment | *85* comment by: *Boeing*<br><br>Page:170<br>Paragraph: *Table XX*<br>**The proposed text states:**<br>*"Table XX depicts therefore Option 2, in which the obligation for SPA would be removed for all PBN types included in the 4th edition of ICAO Doc 9613."*<br>**REQUESTED CHANGE:** "Table XX" should be changed to either **"Table 13"** or **"Table 14,"** depending on the desired numbering sequence.<br>**JUSTIFICATION:** Typographical error. |
| response | *Noted*<br><br>There was a typographical mistake. Nevertheless, the RIA will not be republished. |

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| comment | *188* comment by: *PPL/IR Europe*<br><br>The RIA analysis in 4.5 is of fundamental importance.<br>We support both the definition developed for Option 1 and the conclusion that this is the best option.<br>We find it encouraging that the Agency has been open to considering how increased regulation can be a barrier, rather than a benefit, to improving safety. |
| response | *Noted*<br><br>The support by PPL/IR Europe is noted with appreciation. |

**4 Regulatory Impact Assessment (RIA) — 4.8 Issue 4: Transition for pilots already instrument rated** p. 193-200

comment *107* comment by: *FAA*

| **Comment:** | **Reason:** | **Recommendation:** | **Safety Impact:** |
|---|---|---|---|
| Regarding "During the development of this NPA, the Rulemaking Group has sought data on PBN-related occurrences. While lessons learned and insights can be drawn from the results of that research, there is no evidence that flight crews are performing PBN operations inadequately" appears to indicate additional investigation would be appropriate. | Evidence is available regarding specific and systemic safety concerns. | With an understanding that access to some of this data can be difficult, FAA can provide relevant information about this topic related to operations in the U.S. and other States. | PBN operations do provide safety benefits and noted concern about negative effects of requiring unnecessary training is appropriate. However, an examination of incidents in other States might aid in hazard identification and risk mitigation. Related information is available on SKYbrary, specifically concerning recent CAST safety enhancements (SEs). FAA can provide |

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| | | | additional relevant information upon request. |

response *Noted*

The Agency staff responsible for safety analysis is in constant contact with FAA to exchange data and to improve the quality of the reports on safety occurrences. The safety of PBN operations will continue to be monitored by the Agency.

## 4.1. Attachments to comments

REMARKS NOTICE OF PROPOSED AMENDMENT (NPA) 2013-25.pdf
Attachment #1 to comment #118

Comments on NPA 2013.pdf
Attachment #2 to comment #1

REMARKS NOTICE OF PROPOSED AMENDMENT (NPA) 2013-25.pdf
Attachment #3 to comment #120