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Title	Revision of operational approval criteria for performance-based navigation (PBN)
NPA Number	NPA 2013-25

UK CAA (European.Affairs@caa.co.uk) has placed **18** unique comments on this NPA:

Cmt	Segment description	Pag	Comment	Attachm
124	2.5 Overview of the affected provisions and proposed amendments — 2.5.19 Annex V to Commission Regulation (EU) No 965/2012 (Part SPA)	24 - 26	<p>Page No: 24</p> <p>Paragraph No: Subpart B – Performance-based navigation (PBN) operations.</p> <p>Comment: The text in this paragraph suggests that this is opening the door for “public RNP AR” procedures, as once an operator is approved for RNP AR, they can operate on any such procedure unless in the case that an airport is classified as a CAT C airport. One reason that an approach procedure is AR is possibly due to terrain and this may automatically make the airport CAT C. However the bigger issue is the non-standard RNP AR procedures that exist and continue to be promulgated in certain States.</p> <p>In essence there are different flavours of RNP AR:</p> <p>Non-standard RNP AR (aka RNP AR-like) alludes to procedures that either deviate significantly from ICAO Doc 9905 design criteria or are tailored specifically for one operator and/or aircraft Make/Model/Serial Number (M/M/S) (and avionics)), or some subset of the RNP AR-qualified fleet but not in a manner consistent with options provided by ICAO Doc 9905. The special approach RNP AR-like procedures in the U.S. are an example of the former, as would be the RNAV (RNP) procedures at Quito and Queenstown. The CASA/Australia Multi-Variant Design (MVD) procedures would be an example of the latter.</p> <p>There should be distinct control mechanisms (approvals, navigation data access, AIP, etc.) for both types of operations, especially because most, if not all, are titled in a similar manner.</p> <p>So the issue here is how is an operator to understand which is which.</p> <p>UK CAA suggests that before EASA embraces the “Public” RNP AR Approach procedures, that there is coordination with FAA and a clear agreement of which procedures fall into this category even if it means EASA holding a register of what it considers as “Public”.</p> <p>Justification: Potential confusion of whether an RNP AR Approach conforms to “Public” criteria and how this is depicted.</p>	

125	3 Proposed amendments — 3.1 Draft Opinion	33 - 61	<p>Page No: 43</p> <p>Paragraph No: B. Specific requirements for the aeroplane category – Flight Test Tolerance, sub-paragraph 4.</p> <p>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.</p> <p>The same comment applies to Page 47, C. Specific requirements for the helicopter category – Flight Test Tolerance, sub-paragraph 4.</p> <p>Justification: Alignment with ICAO PBN Manual Doc 9613.</p> <p>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.</p>	
126	3 Proposed amendments — 3.1 Draft Opinion	33 - 61	<p>Page No: 53</p> <p>Paragraph No: CAT.OP.MPA.175 Flight Preparation</p> <p>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.</p> <p>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.</p> <p>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.</p>	
127	3 Proposed amendments — 3.1 Draft Opinion	33 - 61	<p>Page No: 53</p> <p>Paragraph No: CAT.OP.MPA.185 Planning minima for IFR flights</p> <p>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</p>	

			<p>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.</p> <p>This comment applies throughout the NPA wherever the CAT.OP.MPA.185 text is repeated.</p> <p>Justification: Consistency/harmonisation with FAA and a wider consideration of the factors influencing an alternative approach, rather than just focusing on GNSS.</p> <p>Proposed Text: UK CAA suggests replicate the following wording contained in FAA AC 90-105 (which may not necessarily be included in Planning minima) :</p> <p>“(8) The operator’s contingency procedures need to address at least the following conditions:</p> <p>(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);</p> <p>(b) Loss of navigation signal-in-space (loss or degradation of external signal) and;</p> <p>(c) The pilot must ensure the capability to navigate and land at an alternate if loss of RNP approach capability occurs.”</p>	
128	3 Proposed amendments — 3.1 Draft Opinion	33 - 61	<p>Page No: 54</p> <p>Paragraph No: SPA.PBN.100 PBN Operations</p> <p>Comment: The UK CAA disagrees with the NPA proposal of removing certain PBN specifications from SPA. Whilst there is a strong case for removing the core basic PBN specifications from SPA, there is also reasoning to keep certain others within it.</p> <p>RNAV 10, RNP 4 and RNP 2 are all oceanic/remote specifications (although it is acknowledged that RNP 2 could be applied in a domestic continental airspace concept). As such they are typically associated with airspace approvals i.e., the navigation specification is only one aspect of an approval before entering a particular airspace. The Communication, Surveillance and ATM aspects including specific contingencies such as turn-back all have to be addressed by the operator and invariably the requirements are captured in Regional Supplementary Procedures ICAO Doc 7030. Therefore it makes practical sense to keep the PBN approval tied to the specific airspace approval and not have it free-standing. An operator/pilot with an RNP 4 endorsement on an</p>	

instrument rating is not necessarily authorised for entry into RNP 4 airspace.

It is also proposed to keep the whole of Advanced RNP in Part SPA - at least for the time being.

The concerns in removing the oceanic/remote and Advanced RNP PBN specifications from Part SPA is linked to how the principles of this NPA i.e., a move away from specific approvals will be handled at the NCC, NCO and SPO level. It is recognised that the situation with Commercial Air Transport (CAT) is different and for which basic oversight is retained.

For the majority of NCC, NCO and SPO operators, they will only ever need the core basic PBN specifications, namely: RNAV 5, RNAV 1 and RNAV 2, RNP APCH and RNP 1 and eventually Advanced RNP. As a first step it is proposed that SPA retains the oceanic/remote PBN specifications and also the whole of Advanced RNP until at least the principles and processes associated with having NCC, NCO and SPO pilots trained for PBN, has been allowed to be introduced across the EU and maturity demonstrated. It is easier to move more PBN specifications out of SPA at a later date, but very difficult to put them back in.

Concerning Advanced RNP, apart from the option of Time of Arrival Control (TOAC is still TBD in the PBN Manual and industry standards) there are two additional factors that need to be considered; the fact that RF is a minimum standard in Advanced RNP and the option of scalability from RNP 1 to RNP 0.3. Until such time as we (as an industry) have more experience with RF, it is prudent to make this a specific approval – especially for transitions to ILS approach. Making Advanced RNP a specific approval (at least for the time being) allows capture of the required RF function and optional scalability and FRT functions to be bundled. In the meantime it would not prevent RNP 1 authorisation from being granted.

It should be noted that advanced RNP will likely be deployed in en-route airspace after the introduction of this NPA and therefore the core basic PBN specifications should meet short term operational demands.

It should also be noted that RF and indeed FRT can be associated with RNP as options and consideration should be given to how these functions are to be trained for and authorised. With the exception of advanced training devices, most cannot replicate the function and indeed, RF is not widely available outside of air transport category aircraft and high-end panel mount equipment where flight-director/autopilot is a standard installation on the aircraft.

UK CAA suggests that the NPA should be reviewed to retain RNAV 10, RNP 4 and RNP 2 oceanic/remote as specific approvals and to retain Advanced RNP (for the time being) as requiring an SPA approval.

			<p>Justification: Authorisation for oceanic/remote PBN specifications are better granted with their specific airspace approvals, which once granted can be recognised wherever that oceanic/remote application has common requirements.</p> <p>Advanced RNP has specific capabilities (apart from TOAC) that make it (at least today) as a candidate for SPA treatment. These include, RF as a minimum and scalability as an option – the latter is not addressed anywhere in the NPA. It is considered to be prudent to consider keeping Advanced RNP within SPA until the principles of this NPA have been demonstrated as mature across the training and operating organisations.</p> <p>It should be noted that this aspect of industry readiness and ability to step up to training for PBN should also be addressed in the RIA. None of this is proven yet.</p>	
129	3 Proposed amendments — 3.2 Draft Decision (CS-FSTD(A))	62 - 63	<p>Page No: 62 and 63</p> <p>Paragraph No: Table of Functions and Subjective Tests</p> <p>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.</p> <p>Justification: For completeness.</p>	
130	3 Proposed amendments — 3.6 Draft Decision (AMC/GM to Annex I to AIR-OPS)	72 - 73	<p>Page No: 72</p> <p>Paragraph No: GM1 Annex 1 Definitions</p> <p>Comment: There appears to be some definitions missing. Examples are 'RNP' and 'Lateral Navigation'.</p> <p>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.</p> <p>Justification: For clarity and completeness.</p>	
131	3 Proposed amendments — 3.6 Draft Decision (AMC/GM to Annex I to AIR-OPS)	72 - 73	<p>Page No: 73</p> <p>Paragraph No: GM2 Annex 1 Definitions - Abbreviations and Acronyms</p> <p>Comment: The list does not appear to be complete e.g., FRT, TSE, PDE, NSE, OBPMA (On-board Performance Monitoring and Alerting).</p> <p>UK CAA recommends that the ICAO PBN Manual Doc 9613</p>	

			<p>and the ICAO PBN Operational Approval Manual Doc 9997 should be reviewed for completeness of Abbreviations and Acronyms.</p> <p>Justification: For clarity and completeness.</p>
132	3 Proposed amendments — 3.7 Draft Decision (AMC/GM to Part ARO)	74	<p>Page No: 74</p> <p>Paragraph No: GM2.ARO.OPS.230 Specific approval of RNP AR APCH</p> <p>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.</p> <p>UK CAA recommends the points mentioned above should be included as a numbered list.</p> <p>Justification: For clarity and completeness.</p>
133	3 Proposed amendments — 3.9 Draft Decision (AMC/GM to Part CAT)	77 - 85	<p>Page No: 77</p> <p>Paragraph No: AMC1 CAT.OP.MPA.127 Performance-based navigation - Monitoring and Verification paragraph (a)</p> <p>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.</p> <p>Justification: Clarification of when navigation position gross-error checks are required.</p> <p>Proposed Text: Amend text in 5th sub-paragraph to read: “Standard Operating Procedures should include cross-checks, where required.”</p>
134	3 Proposed amendments — 3.10 Draft	86 - 103	<p>Page No: 86/87</p>

	Decision (AMC/GM to Part SPA)		<p>Paragraph No: GM1 SPA.PBN.100 PBN Operations and Table 1</p> <p>Comment: See UK CAA comment on SPA.PBN.100 PBN Operations (page 54) concerning retaining oceanic/remote specifications and Advanced RNP in SPA.</p> <p>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</p> <p>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.</p> <p>UK CAA suggests table 1 should be amended in accordance with the ICAO PBN Manual Vol II Part A tables.</p> <p>Justification: For clarity and completeness.</p>	
135	3 Proposed amendments — 3.10 Draft Decision (AMC/GM to Part SPA)	86 - 103	<p>Page No: 94</p> <p>Paragraph No: GM1 SPA.PBN.105 (c) Flight operational safety assessment</p> <p>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.</p> <p>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.</p> <p>Justification: The text is misleading as written.</p>	
136	3 Proposed amendments — 3.10 Draft Decision (AMC/GM to Part SPA)	86 - 103	<p>Page No: 100</p> <p>Paragraph No: AMC2 SPA.PBN.105(d) Flight Considerations sub-paragraph (j) Temperature compensation</p> <p>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.</p> <p>UK CAA recommends the references should be updated to "EUROCAE ED-75C/RTCA DO-236C".</p> <p>Justification: To reflect more up to date references.</p>	

137	3 Proposed amendments — 3.12 Draft Decision (AMC/GM to Part NCO)	112 - 119	<p>Page No: 112</p> <p>Paragraph No: AMC1 NCO.GEN.105 Pilot-in-command responsibilities and authority</p> <p>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.</p>	
138	3 Proposed amendments — 3.12 Draft Decision (AMC/GM to Part NCO)	112 - 119	<p>Page No: 113</p> <p>Paragraph No: GM1 NCO.OP.117 Performance-based navigation – aeroplanes and helicopters - Monitoring and Verification paragraph (a)</p> <p>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.</p> <p>Justification: Clarification of when navigation position gross-error checks are required</p> <p>Proposed Text: Amend text in 5th sub-paragraph to read: “Standard Procedures should include cross-checks, where required.”</p>	
139	3 Proposed amendments — 3.13 Draft Decision (AMC/GM to Part SPO)	120 - 127	<p>Page No: 120</p> <p>Paragraph No: AMC1 SPO.GEN.107 Pilot-in-command responsibilities and authority</p> <p>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.</p>	
140	3 Proposed amendments — 3.13 Draft Decision (AMC/GM to Part SPO)	120 - 127	<p>Page No: 121</p> <p>Paragraph No: GM1 SPO.OP.117 Performance-based navigation – aeroplanes and helicopters - Monitoring and Verification paragraph (a)</p> <p>Comment: In the 5th sub-paragraph the term “where</p>	

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141	3 Proposed amendments — 3.14 Draft Decision (AMC 20-4)	128 - 133	<p>Page No: 129</p> <p>Paragraph No: AMC 20-4 - Reference Documents</p> <p>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.</p> <p>Justification: Editorial.</p>	