International Civil Aviation Organization

Thirteenth Meeting of The Performance Based Navigation Implementation Coordination Group (PBNICG/13)

(Bangkok, Thailand, 14-16 October 2026)

Agenda Item 5: Review PBN Implementation and Operational Guidance Document

ADVANCED RNP NAVIGATION SPECIFICATION INCONSISTENCY IN ICAO DOCUMENTS PANS-OPS (DOC 8168) AND PBN MANUAL (DOC 9613)

(Presented by Pakistan)

SUMMARY

This paper highlights the inconsistency in the framework of PBN Navigation Specification "Advanced RNP" as contained in Performance Based Navigation Manual (ICAO Doc 9613) and Procedure for Air Navigation Services -Aircraft Operations PANS-OPS (ICAO Doc 8168 – VOL I & II). It also identifies the need for updating PANS-OPS Volume I & II to align with the PBN Manual and allow practical implementation of the Navigation Specification in the industry.

1. INTRODUCTION

1.1 Performance Based Navigation (PBN) has emerged as solution to number of challenges the aviation community was facing including airspace capacity, enhanced safety, airports accessibility, environmental issues etc. Since the original PBN concept publication in 2008, the concept has been continuously evolving, and number of changes have been introduced. This includes new navigation specifications as well as advanced functionalities and their uses.

1.2 Advanced RNP (A-RNP) was initially developed as a future navigation specification, which would incorporate requirements and options for the potential development of multiple application concepts, including scalability of the RNP value. However, in the context of the continued refinement, the Advanced RNP was aligned in PBN Manual 5th Edition (2023) with the updated requirements of DO-236()/ED-75(). The requirement for scalable RNP value has also been removed for the navigation specification which was earlier included in Doc 9613 PBN Manual 4th edition (2013).

1.3 It has been observed that the Advanced RNP navigation specification has been refined in 5th Edition of PBN Manual; however, the ICAO framework contained in Procedure for Air Navigation Service – Aircraft operations (PANS-OPS) is still not consistent with the modalities described in PBN Manual for Advanced RNP navigation specification. It is of high importance that design criteria for RNP Navigation Specification "Advanced RNP" should be made consistent with the updated framework of this navigation specification as described in PBN Manual well in time before common use of the navigation specification by the States.

2. DISCUSSION

PBN Manual (Doc 9613) Evolution

2.1 Advanced RNP (A-RNP) was initially developed and included in PBN Manual (4th Edition) as a new Navigation specification. It provided specific criteria to qualify aircraft for operations on RNP ATS routes, SIDs, STARs as well as approaches. As a future navigation specification, its span covered oceanic, enroute, terminal area and approach operations, significantly reducing the number of individual assessments associated with multiple, existing navigation specifications, to only those aspects of operator criteria or operational examination that are not covered by the A-RNP qualification or operator approval. The application of navigation specification by flight phase as incorporated in PBN Manual (4th Edition) is depicted below:

Table II-A-1-1. Application of navigation specification by flight phase

Part Chapter	Navigation specification	Flight phase							
		En-route oceanic/remote	En-route continental	Arrival	Approach				DEP
					Initial	Intermediate	Final	Missed[1]	
B, Ch.1	RNAV 10	10							
B, Ch.2	RNAV 5[2]		5	5					
B, Ch.3	RNAV 2		2	2					2
B, Ch.3	RNAV 1		1	1	1	1		1	1
C, Ch.1	RNP 4	4							
C, Ch.2	RNP 2	2	2						
C, Ch.3	RNP 1[3]			1	1	1		1	1
C, Ch.4	Advanced RNP (A-RNP)[4]	2[5]	2 or 1	1	1	1	0.3	1	1
C, Ch.5	RNP APCH[6]				1	1	0.3[7]	1	

2.2 During the refinement of the PBN concept, several changes have been incorporated in PBN Manual 5th Edition (2023). In the context of Advanced RNP navigation specification, the major points are appended below:

- Final approach segment no longer considered a part of A-RNP (excluded VNAV);
- Scalability requirements replaced by use of RNP value of 0.3 NM for terminal operations outside final approach segment.
- Fixed Radius Transition (FRT), which was required earlier, is now optional functionality.

2.3 Accordingly, application of navigation specification by flight phase as incorporated in PBN Manual (5th Edition) was updated as depicted below:

Table II-A-1-1. Navigation specification, flight phase, navigation application, and associated RNAV/RNP value (lateral navigation accuracy) (NM)

Part, chapter	Navigation specification	Navigation application, flight phase and RNAV/RNP value (NM)							
		ATS or user-defined routeing		Arrival procedures	Approach procedures				Departure procedures
		En-route oceanic/remote	En-route continental	Arrival	Initial	Intermediate	Final	Missed[1]	Departure
C, Ch.2	RNP 2	2[3]	2						
C, Ch.3	RNP 1[7]			1	1	1		1	1
C, Ch.4	Advanced RNP (A-RNP)	2[3]	2 or 1	0.3	0.3	0.3		1[9]	0.3

PANS-OPS Volume I (Doc 8168)

2.4 PANS-OPS Volume I (Doc 8168) Part II Section 5 of the document cover approach procedures. In the context of possible PBN Navigation Specification for approach operations described in Para 1.3.3, it covers Advanced RNP as a navigation specification which is no longer applicable.

2.5 It may also be noted that Amendment 11 of PANS-OPS Volume I was approved by the Council on 28 March 2024 with applicability date of 28 November 2024 while the PBN Manual was published earlier in 2023. The alignment of document with current PBN framework has also not been included in Amendment 12 issued vide State Letter AN 11/19-26/44 dated 19 May 2026.

PANS-OPS Volume II (Doc 8168)

2.6 PANS-OPS Volume II Part III Section 1 Para 1.1.4(g) is referred which describe the Advanced RNP as reproduced below:

> *"Advanced RNP (**A-RNP**):* used to support RNP operations in en-route continental airspace and on SIDs, STARs and approach procedures. ARNP requirements include the following values for navigation accuracy: 0.3 NM in final approach; 1 or 2 NM in en-route continental; and navigational accuracy of 1 NM in SIDs, STARs, initial/intermediate approaches and missed approaches. Optional requirements include applications for oceanic / remote airspace and an incremental option which allows any navigational accuracy value between 1.0 NM and 0.3 NM, in 0.1 NM increments, in all terminal flight phases outside final approach. Obstacle clearance criteria are detailed in Part III, Section 1, Chapter 2, and Section 3, Chapters 1, 2, 3, 4, 7 and 8."

2.7 It also reproduces Table II-A-1-1 of earlier version of PBN Manual in the same chapter with specifications inconsistent with the PBN Manual 5th Edition.

Part III — Section 1, Chapter 1 *III-1-1-3*

Table III-1-1-1. Navigation specification per flight phase

	Flight Phase							
				Approach				
	Oceanic/Remote	*En-route*	*Arrival*	*Initial*	*Intermediate*	*Final*	*Missed*[1]	*Departure*
RNAV 10	10							
RNAV 5		5	5[2]					
RNP 4	4							
RNP 2	2	2						
RNAV 2		2	2					2
Advanced RNP[3]	2	2 or 1	1 – 0.3	1 - 0.3	1 - 0.3	0.3	1 - 0.3	1 - 0.3
RNP 1			1	1	1		1	1

Notes:

1. *RNP requirements do not apply to initial and intermediate missed approach segments.*
2. *RNAV 5 may be used for initial parts of STARs outside 30 NM from the ARP.*
3. *Advanced RNP core requirements are limited to RNP 1 in all flight phases except final approach (RNP 0.3) and RNP 2 in oceanic/remote and en-route continental. A scaleability option will allow accuracy values between 0.3 and 1.0, in 0.1 NM increments, in all flight phases except oceanic/remote/en-route continental (RNP 1 and RNP 2) and final approach (RNP 0.3).*
4. *Part A and B refer to the* Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II, Part C, Chapter 5, Part A* — RNP APCH operations down to LNAV and LNAV/VNAV minima *and Part B* — RNP APCH operations down to LP and LPV minima, *respectively."*

2.8 Based on the wrong RNP values used which are not consistent with PBN manual, area semi-width calculations in Part III, Section 1, in Para 2.2.3 also become incorrect. It also reflects the use of Advanced RNP in final segment while under the updated concept of Advanced RNP navigation specification, the use of this navigation specification in the final approach segment is forbidden.

2.9 Again, amendment 10 of PANS-OPS Volume II was approved by the Council on 28 March 2024 with applicability date of 28 November 2024 while the PBN Manual was published earlier in 2023. The alignment of document with current PBN framework has also not been included in Amendment 11 issued vide State Letter AN 11/19-26/44 dated 19 May 2026.

Performance Based Navigation Operational Authorization Manual (Doc 9997)

2.10 The timely update of the provision of Advanced RNP Navigation Specification to ensure consistency with PBN Manual in PBN Operational Authorization Manual 3rd Edition 2024 is acknowledged.

CONCLUSION

2.11 The navigation specification "Advanced RNP" has been refined and the required RNP values and other modalities were updated in the PBN Manual (Doc 9613) 5th edition for consistency with relevant industry standards in 2023. However, the use of "Advanced RNP" and relevant design criteria as described in PANS-OPS Volume I & II is not consistent with the updated modalities of "Advanced RNP" navigation specification as prescribed in latest version of PBN Manual. This inconsistency may lead to the misuse of Navigation Specification leading to concerns about safety and efficiency.

3. ACTION REQUIRED BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) deliberate on the requirements of consistency of navigation specification in ICAO PANS-OPS (Doc 8168) with PBN Manual to ensure correct application of design criteria; and

c) consider referring the matter to ICAO for further deliberation and resolution.

– – – – – – – – – – – – –