

RA 1380 - Performance Based Navigation

Rationale

The drive for improved operating efficiency has resulted in the development of the International Civil Aviation Organization (ICAO) Performance Based Navigation (PBN)^{1, 2, 3} concept. This concept ► utilizes traditional navigation beacons and navigation fixing solutions fusing with Global Navigation Satellite System (GNSS) to provide Area Navigation (RNAV) and Required Navigation Performance (RNP), ◀ and aims to ensure global interoperability through the standardisation of PBN system performance through internationally agreed specifications. Without appropriate governance of PBN, access to certain procedures may be restricted. In order to fully exploit airspace worldwide there is a requirement to comply with the appropriate PBN standards either through equipage or the demonstration of equivalence.

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Definitions

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1. ► **RNAV**. RNAV is a navigation method that permits Aircraft operation on any desired flight path using ground and space based or on board navigation aids. This allows efficiencies over legacy direct Track navigation where the Aircraft was required to Track between ground based navigation aids as waypoints on a route.
2. **RNP**. RNP is RNAV with the support of on board performance monitoring and alerting.
3. **PBN**. The PBN concept specifies that Air System RNAV and RNP system performance requirements are defined in terms of accuracy, integrity, continuity and functionality. It enables Aircraft to fly flexible, accurate and repeatable 2-dimensional and 3-dimensional flight paths. PBN encompasses both RNAV and RNP navigation specifications.
4. **Navigation Specifications (Nav Spec)**. Nav Specs are a set of Air System and Aircrew requirements needed to support PBN operations within a defined airspace. Nav Specs define lateral navigation accuracy in terms of Total System Error (TSE). For example, RNAV 10 / RNP 10, where the lateral TSE must be within 10 NM for at least 95% of the total flight time. These Nav Specs allow Certification of Air Systems for PBN operations based on their navigation system performance rather than equipment requirements. ◀

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1380(1) Aviation Duty Holders (ADHs) and Accountable Managers (Military Flying) (AM(MFs)) **shall** ensure that for PBN operations, the ►◀ Air Systems ►within their Area of Responsibility (AoR) are certified to the required Navigation Specification. ◀

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5. UK military registered Air Systems that ►◀ use the civil Air Traffic Service (ATS) Structure as General Air Traffic **should** comply with or demonstrate equivalence to civil PBN regulatory requirements and standards of performance ►with respect to Air System functionality and the ability to conduct required PBN operations ◀ such as: ►
 - a. Accuracy;
 - b. Integrity;

¹ Refer to RA 2120 – Pilots' Instrument Rating Scheme.

² Refer to RA 2380 – Performance Based Navigation Operations.

³ Refer to RA 3295 – Required Navigation Performance Approach – Controller Responsibilities.

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- c. **Continuity.** ◀

PBN Approval Process

6. Senior Responsible ▶ **Owners** ◀ (SROs), Operating Duty Holders (ODHs) and AM(MF)s **should** include PBN specifications and Systems (across all Defence Lines of Development (DLod)) in their Air System Safety Cases (ASSC)⁴.
7. ODHs and AM(MF)s **should**:
- Ensure Air Systems within their AoR achieve the performance required by the RNAV / RNP specifications to be encountered (ie against the RNAV / RNP specifications demanded by particular airspace controlling authorities) through provision of appropriate orders, instructions and Minimum Equipment List (where used);
 - Ensure data for use with PBN Systems is assured to appropriate standards⁵, and ensure that appropriate processes exist for the handling, updating⁶ and Configuration Management of electronic navigation data;
 - Ensure Aircrew are qualified and Competent both in the operation of PBN Systems and in any other relevant procedures needed to achieve the performance required by the RNAV / RNP specifications to be encountered;
 - Ensure that Aircrew are qualified against the particular specifications required for operation in specific airspace;
 - When required, assert compliance to civil authorities⁷ against stipulated specifications;
 - ▶ **PBN Approval will be granted via the Release To Service (RTS), Military Permit To Fly (MPTF), Ops Manuals and local orders.** ◀
8. AM(MF)s **should** be in possession of the appropriate Contractor Flying Approved Organization Scheme (CFAOS)⁸ Approval prior to conducting PBN operations.
9. UK military registered Air Systems **should not** conduct RNP Authorization Required Approaches (AR APCH).

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10. ▶ **The Nav Spec Certification required by Air Systems conducting PBN Ops will be designated for the airspace to be used or the Aerodrome procedure to be flown. Certification will be achieved when the Air System's navigation performance in terms of accuracy, integrity and continuity is assessed as equivalent to civil standards.** ◀
11. Specific Approval is required for RNP 0.3 (for helicopters) and RNP AR APCH for all Air Systems, in accordance with Part-SPA of European Union Commission Regulation Number 965/2012▶ ◀ as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018 (UK (EU) Reg No 965/2012▶⁹◀).▶ ◀
12. ▶ ◀
13. PBN creates requirements for Airworthiness Certification¹⁰ and Operational¹¹ Approval to use RNAV / RNP Systems on routes / airspace notified for a given PBN application. RNAV / RNP System functionality as well as its navigation accuracy in a

⁴ Refer to RA 1205 – Air System Safety Cases.

⁵ To meet international / national requirement or as demanded by airspace providers.

⁶ Refer to RA 1030 – Defence Aeronautical Information Management.

⁷ Declaration of Compliance is articulated through the Flight Plan.

⁸ Refer to RA 1028 – Contractor Flying Approved Organization Scheme ▶ ◀.

⁹ ▶ <https://www.legislation.gov.uk/eur/2012/965/contents> and <https://www.caa.co.uk/regulations/aviation-safety/basic-regulation-the-implementing-rules-and-uk-cao-amc-gm-cs/air-operations/>. ◀

¹⁰ Refer to RA 5810 – Military Type Certificate (MRP Part 21 Subpart B); ▶ ◀ RA 1305 – Military Permit To Fly (In-Service), (Special Case Flying) and (Single Task); ▶ ◀ RA 5880 – Military Permit To Fly (Development) (MRP Part 21 Subpart P); and RA 1160 – The Defence Air Environment Operating Framework.

¹¹ 'Operational' is used in the context of this RA because the term 'PBN Operational Approval' is used specifically by ICAO and the ▶ **UK** ◀ Civil Aviation Authority (CAA).

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given Navigational Aid (NAVAID) infrastructure environment must comply with the requirements stipulated for the routes / airspace.

14. When the relevant PBN Approval process has been completed then the respective UK military registered Air System can be considered as having achieved equivalence to PBN Operational Approval¹² in the civilian domain.

15. When the appropriate RTS / MPTF, supporting documentation, ASSC, and CFAOS Approval are in place; ODHs / AM(MF)s may assert compliance¹³ to civil authorities.

16. Defence Airspace and Air Traffic Management (DAATM) is the focal point for PBN policy. DAATM will also provide guidance on forthcoming changes to legislation to the Capability areas and MAA through the International Aviation Regulation and Compliance (IARC) Community of Interest.

17. The ICAO PBN Manual (ICAO Doc 9613) defines PBN (RNAV / RNP) navigation specifications and performance requirements (technical and operational criteria). The manual also details: Air System requirements and operating procedures; specific Aircrew knowledge and training where applicable; any requirements for control of navigation databases and oversight of operators; and provides practical guidance to States, regulatory authorities, air navigation service providers, manufacturers and airspace users on how to implement RNAV / RNP applications. The manual comprises two volumes: Volume I contains, amongst other things, guidance on airborne RNAV / RNP Systems and aeronautical data processes; Volume II provides the direct support for implementing RNAV and RNP navigation applications.

18. Further guidance on PBN policy, Approval and processes may be found in the following:

- a. ICAO PBN Operational Approval Manual (ICAO Doc 9997);
- b. CAA / Irish Aviation Authority Policy for the Application of PBN in UK / Irish Airspace¹⁴;
- c. UK (EU) Reg No 965/2012 ▶ ◀;
- d. <https://www.easa.europa.eu/document-library/general-publications/easy-access-rules-air-operations>;
- e. ▶ Assimilated UK PBN Regulation (EU) 1048/2018;
- f. CAA CS-ACNS¹⁵;
- g. <https://www.caa.co.uk/uk-regulations/aviation-safety/basic-regulation-the-implementing-rules-and-uk-cao-amc-gm-cs/air-operations/>. ◀

19. Identification of which PBN Approval is required depends on:

- a. What access to airspace, ATS routes, terminal airspace procedures and Instrument Approach procedures is required;
- b. The airspace requirement which will dictate the necessary performance (accuracy / integrity / continuity) and functionality required;
- c. And the navigation infrastructure (sensors) upon which the performance is based.

20. ADHs and AM(MF)s can refer to the relevant paragraphs ▶ and Annexes (including IV, V and VI) in UK Reg (EU) 965/2012 Air Operations¹⁶ ◀ and complete a PBN compliance matrix against these latest ▶ UK CAA ◀ flight operational requirements.

¹² Against stipulated RNAV / RNP specifications.

¹³ Compliance must be determined against each relevant navigation specification; compliance with one does not automatically imply compliance with another.

¹⁴ ▶ <https://www.caa.co.uk/our-work/publications/documents/content/dap-policy-112/> ◀, Dated 21 Oct 2011.

¹⁵ ▶ [https://regulatorylibrary.caa.co.uk/cs/Content/PDF Files/Initial Airworthiness Adopted CS-ACNS Issue 4.pdf](https://regulatorylibrary.caa.co.uk/cs/Content/PDF%20Files/Initial%20Airworthiness%20Adopted%20CS-ACNS%20Issue%204.pdf). ◀

¹⁶ Refer to ▶ ◀ [Air Operations Regulation 965/2012](https://www.caa.co.uk/uk-regulations/aviation-safety/basic-regulation-the-implementing-rules-and-uk-cao-amc-gm-cs/air-operations/).

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