

Airspace Usage Requirements

UK Acceptable Means of Compliance and Guidance
Material

for

Regulation (EU) No. 1332/2011 as retained (and
amended in UK domestic law) under the European
(Withdrawal) Act 2018: Airspace Usage Requirements
and Operating Procedures for Airborne Collision
Avoidance

Regulation (EU) No 2018/1048 as retained (and
amended in UK domestic law) under the European
(Withdrawal) Act 2018: Airspace Usage Requirements
and Operating Procedures concerning Performance-
Based Navigation

LIST OF REVISIONS

Published	Reason For revision
January 2021	UK AMC and GM (form of EASA and GM Current and applicable on 31 December 2020, adopted by CAA on 1 January 2021 GM1 AUR.PBN.2005 (1) & (3) deleted as relate to EGNOS and SBAS neither of which now apply to the UK

Note from the editor

This document contains acceptable means of compliance and guidance material adopted by the UK CAA. The reference number indicates the Article or paragraph in the corresponding Regulation which it relates to.

All references to Regulations are to the UK law bearing that title or number, being EU retained law as retained (and amended by UK domestic law) pursuant to the European Union (Withdrawal) Act 2018.

Acceptable means of compliance

Guidance material

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Annex I

Acceptable Means of Compliance and Guidance Material to Commission Regulation (EU) No 1332/2011

AMC1 AUR.ACAS.1010 ACAS II Training

The ACAS II operational procedures and training programmes established by the operator should take into account the procedures contained in:

- (a) ICAO PANS-OPS, Volume I¹ Flight Procedures, Attachment A (ACAS Training Guidelines for Pilots) and Attachment B (ACAS High Vertical Rate Encounters) to Part III, Section 3, Chapter 3; and
- (b) ICAO PANS-ATM² Chapters 12 and 15, in regard to ACAS phraseology and applicable procedures.

¹ ICAO Doc 8168 - PANS-OPS (Procedures for Air Navigation Services-Aircraft Operations), Volume I - Flight Procedures — Sixth edition amendment 9.

² ICAO Doc 4444 - PANS-ATM (Procedures for Air Navigation Services-Air Traffic Management) — Sixteenth edition amendment 9.
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Annex II

Guidance Material to Commission Implementing Regulation (EU) 2018/1048

GM1 Article 5 Exclusive use of PBN

One of the benefits of PBN is that it allows to decommission more costly or less performing equipment. As PBN allows vertical guidance through RNP APCH procedures down to LNAV/VNAV or LPV minima, this applies, in particular, to a number of the remaining NDB and VOR facilities used for approach, which could be decommissioned by 6 June 2030 as per Article 7(2)(a). However, the implementation of PBN approaches does not currently permit the replacement of landing systems where minima below 200 ft are required, such as those enabled by CAT II or CAT III operations. Therefore, it is expected that CAT II and CAT III landing systems, primarily predicated on ILS, will remain in service unaffected by this Regulation.

Article 5 precludes the use of instrument approach procedures, other than those predicated on PBN, as per AUR.PBN.2005. As regards CAT I approaches predicated on ILS and MLS, they may in many cases be replaced by SBAS approaches that can be operated down to CAT I precision approach minima. There could be locations at which SBAS approaches cannot offer CAT I minima, so existing instrument approach procedures based on ILS, GLS or MLS may be retained.

Additionally, it should be noted that when designing the contingency measures foreseen under Article 6, providers of ATM/ANS may decide to retain also a network of CAT I landing systems using, for instance, ILS as a backup. As regards this contingency infrastructure, more information is provided in GM1 Article 6.

GM1 Article 6 Contingency measures

EVALUATION OF THE CONTINGENCY INFRASTRUCTURE

As part of the contingency navigation environment, a minimum network of ground-based NAVAIDs should be retained for the purpose of providing alternative means of navigation to the PBN operations stipulated in AUR.PBN.2005. These remaining ground-based NAVAIDs, e.g. VOR, DME, ILS, MLS, may enable conventional navigation or, alternatively, support less performing PBN applications. The performance necessary during a contingency depends on the evaluation performed by the providers of ATM/ANS. In this regard, it is advisable that this infrastructure should be commensurate with the impact of PBN-related failure modes (e.g. as a consequence of local or wide-area GNSS outages), to ensure safety and an appropriate level of service based on local conditions.

In addition, it is recommended that the surveillance and communication systems be evaluated with regard to their exposure to GNSS and other failure modes and the ability to support the contingency measures, e.g. provision of ATS vectoring. When taking such measures, it should be borne in mind that the ADS-B reported position also depends on the position determined by GNSS, so ATS surveillance services, like vectoring, may need to draw upon other means of surveillance, whereby aircraft position is not determined on board, e.g. secondary surveillance radar (SSR).

⁴ 'Procedural control' means air traffic control service provided by using information derived from sources other than an ATS surveillance system.

As regards the evaluation of safety during contingency modes, Commission Implementing Regulation (EU) 2017/373 requires that providers of ATM/ANS carry out and document the necessary safety (support) assessment(s) to cover the scope of the change, including the supporting communication and surveillance functions under failure conditions, as per ATS.OR.205 and ATM/ANS.OR.C.005.

In the event of PBN-related failure modes, providers' contingency measures may include notification to the Network Manager of the application of the appropriate contingency measures in order to minimise a potential reduction in capacity at network level.

GM2 Article 6 Contingency measures

GNSS FAILURES

As the envisioned PBN operations are primarily predicated on GNSS, and although the robustness of GNSS is expected to be improved through the use of multi-frequency and multi-constellation technologies, a contingency mode based on purely non-GNSS technologies would be considered desirable. This could be achieved, for instance, through the provision of ILS CAT I precision approaches at certain aerodromes and a network made up of DME and VOR to ensure a minimum coverage within terminal and en route airspace.

In those instances where aircraft are unable to have recourse to a reversionary NAVAID infrastructure, ATS providers should consider other measures to ensure safe operations. Other contingency measures could include provision of tactical vectors using the available ATS surveillance information and the notification of traffic restrictions, including to the Network Manager, when necessary.

GM1 AUR.PBN.2005 Routes and procedures

Instrument approach procedures and designated ATS routes (e.g. SIDs/STARs) predicated on PBN require the use of an available NAVAID infrastructure (space- and/or ground-based) capable of supporting the performance requirements of the navigation specification.

The PBN routes and approach procedures should primarily conform to the following:

- (a) ICAO Annex 4, 'Aeronautical Charts', 2009, 11th Edition, Amendment 59;
- (b) ICAO Annex 11, 'Air Traffic Services', 2016, 14th Edition, Amendment 50-A;
- (c) ICAO Document 8168 OPS/611 'Procedures for Air Navigation Services: Aircraft Operations' (PANS-OPS), Volume II, 2014, 6th Edition, Amendment 7;
- (d) ICAO Document 4444 ATM/501, 'Procedures for Air Navigation Services: Air Traffic Management' (PANS-ATM), 2007, 16th Edition, Amendment 7-A;
- (e) ICAO Document 9905 AN/471 'Required Navigation Performance Authorization Required (RNP AR) Procedure Design Manual, 2016, 2nd Edition; and
- (f) ICAO Annex 10, Volume I, 'Radio Navigation Aids', as specified in Annex VIII to Commission Implementing Regulation (EU) 2017/373.

In addition to the above references, further information related to the design and implementation can be found in the following manuals:

- (a) ICAO Document 9613 AN/937, 'Performance-based Navigation (PBN) Manual', 2013, 4th Edition;
- (b) ICAO Document 9992 AN/494, 'Manual on the Use of PBN in Airspace Design', 2013, 1st Edition;

- (c) ICAO Document 9426 AN/924, 'Air Traffic Services Planning Manual', 1984, 1st Edition, Amendment 4;
- (d) ICAO Document 9906 AN/472, 'Quality Assurance Manual for Flight Procedure Design', Volumes 1–3, 2009/2010, 1st Edition, Amendment 1;
- (e) ICAO Document 9906 AN/472, 'Quality Assurance Manual for Flight Procedure Design', Volumes 5-6, 2012, 1st Edition;
- (f) ICAO Document 9689 AN/953, 'Manual on Airspace Planning Methodology for determination of separation minima', 1998, 1st Edition, Amendment 1;
- (g) ICAO Document 9643, 'Manual on Simultaneous Operations on Parallel or Near-Parallel Instrument Runways (SOIR)', 2004, 1st Edition;
- (h) ICAO Document 8697, 'Aeronautical Chart Manual', 2016, 3rd Edition; and
- (i) ICAO EUR Doc 025, RNP APCH Guidance Material, 2012, 1st Edition.

To mitigate the environmental impact, it is recommended that consideration be given to the information included in the following references:

- (a) ICAO Document 9931 AN/476, 'Continuous Descent Operations (CDO) Manual', 2010, 1st Edition; and
- (b) ICAO Document 9993 AN/495, 'Continuous Climb Operations (CCO) Manual', 2013, 1st Edition.