Transition Plan –
Performance Based Navigation –
Implementation in Spain

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TRANSITION PLAN – PBN – IMPLEMENTATION IN SPAIN

Executive Summary

Following the provisions of Regulation (EU) 2018/1048 (PBN IR), the Spanish Competent Authority (through CIDETMA[1]) has tasked ENAIRE to develop an airspace strategy and a supporting PBN implementation and transition plan to ensure regulatory compliance with the PBN IR. This plan will optimize the capacity and efficiency of the airspace without impacting on the safety.

This airspace concept, which is to meet all of the national objectives, will be supported by this Transition Plan with clear timescales to deliver the concept. The transition plan will consider the transition from current operations and ensure the connectivity of the ATS network throughout the airspace. In accordance with article 4 of the PBN IR, appropriate stakeholder consultation will be undertaken before issuing the final version of the plan to ensure a smooth transition during implementation. ENAIRE will present the transition plan for the transition to PBN to the Competent Authority (CIDETMA) for acceptance and confirmation once stakeholder consultation has been successfully undertaken. Following acceptance, it will be each ATM/ANS provider's task to manage the implementation to ensure that the agreed timelines are met. The Competent Authorities (in Spain, e.g. for civil aircraft, AESA) will be responsible for ensuring the stakeholders involved are appropriately certified and operationally approved.

However, it is ENAIRE's task to communicate with the stakeholders (airport operators, airlines, other ATM/ANS providers e.g. providing their services in adjacent airspace blocks and the Network Manager) to ensure that the airspace users are aware of planned changes and have enough time to equip/retrofit the correct equipment on board the aircraft. The DGAC PBN national working group will play a significant role in the diffusion of the plan contents. Moreover, all civil ATM/ANS providers will develop appropriate ATM/ANS training material, which shall be approved by AESA prior to use.

The national airspace concept and implementation plan will be cognisant of the national safety and environmental policies and will demonstrate that the new airspace concept is as safe as current operations are, if not safer, through rigorous safety assessments.

The final document, when fully complete, will describe the proposed airspace changes to meet regulatory requirements and the State's strategic intent, i.e. the air navigation strategy implicitly or explicitly defined by that State's regulations. The State commitment to this plan will be clearly indicated by CIDETMA approving the finalised document.

Annually, and whenever deemed necessary by the parts, ENAIRE will submit a report to CIDETMA[2] updating the progress status of the works of each of the projects covered by this Transition Plan. In the event of significant deviations from this last reported Plan, the appropriate justifications will be given in that report.

First edition of this transition plan was consolidated the 14th of May 2020. Regular updates to ensure that the applicability of the content is maintained are contemplated and remain registered in the 'document history' table. This version corresponds to the consolidated third edition of the document.

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[1] An inter-ministerial commission formed by representatives of the Ministries of *Defence* and *Transport* (from DGAC, AESA and EMA) which undertakes coordination and advice to both Departments and the Government, in relation with policy of airspace and its implementation, among other functions. In previous editions of this plan this commission was designated as CIDEFO.

[2] In particular, to the working group related to Air Navigation (PNA).

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Document history

Edition	Date	Summary of changes
1.0	14/05/2020	First version of the document
2.0	31/12/2021	Changes related to PCP IR derogation. Reference added to coordination process with the Network Manager. Update of rationalization objectives and strategy. Annex B update with more detailed rationalization plans. Annexes G (PBN SID/STAR implementation) & H (Non-PBN IR scenarios) added. General update of the content: Changes from stakeholder's consultations, new national strategic goals, deployment progress, etc.
2.1	25/03/2022	A new process was added in the Executive Summary related to the recurring report submitted to CIDETMA every six months.
3.0	27/03/2023	New version addressing (1) agreed corrections and corrective actions for EASA findings resolution and (2) NM feedback content suggestions. • LEHC and LEMI scenarios moved from Annex H to Annexes F & G. • PBN IR AUR.PBN.2005 derogation cases further detailed. • Inclusion of information regarding sensors for RNAV 1 SID/STAR. • New Annex I with more information about the consulting process with NM and rest of stakeholders. • Clarifications for 3D minima absence in LESU added. • Minor text corrections and changes.
3.1	26/04/2023	Update in implementation status and figures, and consultation process details. Version submitted to CIDETMA for the assessment process and the final approval of the plan (completed in the first half of June).

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1 Statement of Compliance - Intention Policy

ENAIRE undertakes to develop, by mandate of the Spanish Competent Authority and in coordination with all other civil ATM/ANS providers in Spain, a national airspace concept and an associated PBN transition plan to meet the national objectives as detailed by the State. This concept and its transition plan will follow the high-level principles elaborated by the State and will comply with both European and national regulatory requirements, particularly as regards Commission Implementing Regulation (EU) No 2018/1048 (PBN IR) [11] laying down airspace usage requirements and operating procedures concerning performance-based navigation.

The PBN transition will also comply with objectives formulated by ICAO in the Global Air Navigation Plan (GANP) and resolution 37-11, and will be aligned with the national objectives for Spain, defined in the "*Política y Marco Estratégico de Referencia para la Implantación en España de la Navegación Basada en las Prestaciones (PBN)*" [20] and approved by CIDETMA.

The national airspace concept will be developed to ensure efficient and cohesive flows of traffic and provide opportunities to safely improve capacity whilst meeting environmental commitments. This transition plan has been developed to ensure that the airspace concept is achieved in a timely fashion and ensure that the State meets its specified goals.

Throughout the development and deployment of the national airspace concept, ENAIRE will ensure that performance targets are clearly defined and met and that the future airspace changes are at least as safe as current operations are, if not safer. Furthermore, through the involvement of the stakeholders, ENAIRE will ensure that the concept and plan are balanced and delivered in coordinated timeframe.

The current Transition plan will ensure that the evolution from today's operations to tomorrow's environment is communicated, coordinated and executed in the most efficient and cost beneficial way.

2 Statement of Compliance – ATM/ANS providers different from ENAIRE

Commission Implementing Regulation (EU) No 2018/1048 applies to all certified civil ATM/ANS providers based in Spain. However, since such providers (apart from ENAIRE) manage a small proportion of the total Spanish Airspace, the Competent Authority has agreed that a single national PBN transition plan be developed by ENAIRE, to which other civil ANSPs will adhere once their specific transition measures have been addressed.

In order that the national PBN transition plan meets the requirements of all civil ATM/ANS providers, ENAIRE has submitted to them the draft edition of this document, and will submit any future modifications to it, for review and approval. Any transition plan version will not be considered valid by the Competent Authority unless all Spanish civil ATM/ANS providers have approved its contents.

With respect to the ATM/ANS services provided by the Spanish military, PBN implementations, at least in those military aerodromes open to the public, will be carried out as far as resources permit.

Finally, to ensure the "buy-in" from other relevant ATM/ANS providers outside Spain, ENAIRE shall consult in a transparent manner both the NM and those providers of ATM/ANS that provide their services in adjacent airspace blocks, on the draft transition plan and the draft of any significant updates thereof. Their views will be taken into account where appropriate. The NM feedback to the Spanish PBN Transition Plan is collected in the ERNIP database.

Refer to Annex I for more detailed information about the consultation process.

3 Compliance Methodology - Outline

ENAIRE will consider the national objectives set out by the State and EU Regulatory requirements and derive a set of operational requirements to fulfil the strategic goals. These operational requirements will form the basis of the national airspace concept, which ENAIRE, in coordination with other civil ATM/ANS providers, will provide to the State for acceptance (see section 5). Once mutual agreement on the airspace concept has been achieved, ENAIRE will develop the transition plan to deliver the operational requirements. ENAIRE will draw together an implementation team consisting of all involved stakeholders to then develop a set of implementation objectives to achieve the operational requirements.

These objectives will be prioritised to ensure that a timely and coordinated set of successful implementations will deliver the future airspace concept; the prioritisation will form the basis of the transition plan. Each individual objective will require a team of involved stakeholders to manage the implementation. It will be at this granularity that specific performance targets will be set, and safety demonstrated in accordance with the national safety policy which is implicitly or explicitly defined by national regulations. The careful coordination of the implementation objectives will ensure that the connectivity through the airspace and at its boundaries is maintained, and that the airspace users will have an efficient, cost beneficial set of flows within the national airspace.

In general terms, and in accordance with the State and EU Regulatory requirements, conventional navigation procedures or non-PBN IR-compliant performance-based navigation procedures will be maintained until 1 June 2030. Beyond that date, the Spanish civil air navigation providers, in accordance with rationalization objectives, will retain a network of conventional navigation aids, as part of a contingency Minimum Operational Network, capable of providing navigation services and support conventional procedures (or PBN procedures not in accordance with AUR.PBN.2005) where, for unexpected reasons beyond their control, GNSS or other methods used for performance-based navigation are no longer available, and to support operations by non PBN capable State aircraft.

4 Analysis

4.1 Drivers for Change

As remarked in the European ATM Master Plan Level 1, air traffic growth increased constantly in Europe until 2019 and this trend was forecasted to continue in the long term. The irruption of the COVID crisis, however, resulted in a drastic drop in traffic figures during 2020, which started to slowly recover in 2021.

Notwithstanding the above, the recovery of air transport is expected to occur in the short to medium term reaching, in Spain, the 2019 figures in 2023 at the latest (according to the STATFOR forecasts).

The defined PBN implementation is targeted to optimise the overall safety, capacity and efficiency of flight operations in Spain thanks to:

- Improvement of the operational safety, reducing the likelihood of Controlled Flight Into Terrain (CFIT), by adding vertical guidance in scenarios previously lacking from such guidance (e.g. only with non-precision approaches, or when any ILS is not in operation).

- Reduction in the overall delay of the ATM system, by providing the users with alternative routes with similar flight distances.

- Improvement of the management and fluency of the air traffic and of the air traffic controller workload thanks to the availability of predictable and repeatable paths and to applications such as linear holding or simplified air traffic sequencing.

- Increased aerodrome accessibility due to the reduction of the approach operational minima in non-precision approach runways or in precision approach runways when any ILS is not in operation.

- Flexibility to design airspace and associated route and procedures according to operational needs, thereby optimizing the airspace management.

- Reduction of reliance on and investment in conventional navigation aids and their maintenance costs.

- Mitigation of the environmental impact:

    - Noise abatement in populated areas close to the airports:

        - The greater precision in the horizontal navigation and the radius-to-fix legs provide predictable and repeatable flight paths avoiding sensible areas (albeit this may not be possible in high-density scenarios).

        - The flexibility in the flight procedures design allows increasing the number of them available for the aircraft, so that traffic (and noise) is more evenly distributed.

    - Reduction of the fuel burn emissions:

        - The flexibility to design flight procedures allows for shorter routes and therefore, for lesser aircraft fuel consumption.

4.1.1 PBN Implementation Phases

From 6 June 2030, an exclusive use of PBN is envisaged, with intermediate objectives as follows:

Operation & Applicability	03 DEC 2020	25 JAN 2024	06 JUN 2030
RNP APCH at IREs without Precision Approach (PA) (except those in LEMD, LEBL, LEPA/LESJ).	X		
RNP APCH at all IREs (with PA), including IREs at LEMD, LEBL and LEPA/LESJ.		X	
RNAV 1 or RNP 1(+ RF) available SID and STAR - one per RE		X	
RNAV 1 or RNP 1 + RF for all available SID and STARs			X
RNAV 5 ATS Routes (excl. SIDs/STARs) at and above FL150	X		
RNAV 5 ATS Routes (excl. SIDs/STARs) below FL150		X	
Rotorcraft RNP 0.3 (or RNAV 1/RNP1(+RF)) SID/STAR - one per RE		X	
Rotorcraft RNP 0.3 (or RNAV 1/RNP1(+RF)) for all SID/STAR			X
Rotorcraft RNP 0.3 or RNAV 1 / RNP 1 ATS Routes (excl. SID/STARs) below FL150		X	

Table 1 PBN Implementation Objectives

- Implement, until 3 December 2020, at instrument runway ends served by non-precision approach procedures –except those in the former PCP aerodromes Madrid (LEMD), Barcelona (LEBL) and Palma de Mallorca (LEPA/LESJ) -, RNP APCH procedures down to LNAV, LNAV/VNAV and LPV minima and, where required due to traffic density or traffic complexity, radius to fix legs.
- Implement, until 25 January 2024, at instrument runway ends served by precision approach procedures and all runway ends at Madrid, Barcelona and Palma de Mallorca aerodromes, RNP APCH procedures down to LNAV, LNAV/VNAV and LPV minima and, where required due to traffic density or traffic complexity, radius to fix legs.
- Implement, until 25 January 2024, RNAV 1 or RNP 1 procedures in one existing SID or STAR route[3].
- Implement, until 6 June 2030, RNAV 1 or RNP 1 procedures in all the existing SID and STAR routes. Cancel other SID/STAR for other uses than contingency procedures.
- Implement, until 3 December 2020, RNAV 5 procedures in all ATS routes at or above FL150.
- Implement, until 25 January 2024, RNAV 5 procedures in all ATS routes used for en-route operations below FL150.
- Implement, until 25 January 2024, for rotorcraft operations, RNP 0.3, RNAV 1 or RNP 1 procedures in one existing SID or STAR route[4].
- Implement, until 6 June 2030, for rotorcraft operations, RNP 0.3, RNAV 1 or RNP 1 procedures in all the existing SID, STAR and ATS routes.

[3] In case both SID and STAR routes are established per RE, one SID and one STAR RNAV 1 or RNP 1 procedure shall be implemented per RE.
[4] In case both SID and STAR routes are established per RE, one SID and one STAR RNP 0.3, RNAV 1 or RNP 1 procedure shall be implemented per RE.

- Implement, until 25 January 2024, for rotorcraft operations, RNP 0.3, RNAV 1 or RNP 1 procedures in all existing ATS routes below FL150.

- In accordance with EASA soft law in support of Commission Regulation (EU) No 965/2012 (EASA Air Operations)[5], at least one approach procedure not based on GNSS will be available in each aerodrome or in its alternate in the event of loss of GNSS capability.

4.1.2 Rationalization Objectives

The goal is to retain only the minimal network of ground-based navigation aids that:

- Provide the necessary operational coverage for those stakeholders that do not conduct PBN operations and support contingency (both PBN and non-PBN) operations prior to 2030.

- Support contingency (both PBN and non-PBN) operations beyond 2030.

- Adequately serve the Spanish State aircraft.

Taking into account the positioning sources enabling to support the different PBN operations laid down in Regulation (EU) No 2018/1048, as stated in the PBN Manual [1], the following rationalization objectives are proposed by 6 June 2030:

- **Decommissioning of all the NDBs** as they neither support PBN operations, nor are foreseen to support contingency conventional procedures, except where no other alternative is available due to constraints in user fleet, financial, terrain or safety limitations [4].

- **Decommissioning of VOR** up to a number able to support a Minimum Operational Network (MON VOR[6]). A reduction of circa 25% until 2035 is initially targeted, based on the current level of detail of the PBN implementation planning, the progress in the definition of the GNSS contingency reversion scenario(s) and the coordination with all the involved stakeholders. Further reductions shall be assessed as PBN implementation is made effective in the short and medium term. Long term PBN implementation planning will also be taken into account as its level of definition grows. The MON VOR will support a reversionary VOR/DME RNAV 5 capability whenever GNSS is no longer available in those areas where DME/DME RNAV 5 is not considered redundant enough and the level of 'RNAV 5 VOR/DME only' is not negligible. Additionally, it will serve non-PBN capable aircraft in en-route, SID/STAR and/or approaches during the transition period until 2030. Beyond that date, it will provide reversionary contingency navigation capability in case of GNSS outages - including mainly support to ILS initial/missed approach segments, but also VOR/DME approaches and SID/STAR in specific scenarios (terrain constraints not enabling an acceptable DME/DME coverage and/or no radar assistance capabilities) and a minimum conventional ATS routes network (for use mainly by non-equipped State aircraft).

- **Optimization of the DME network** as reversionary navaid infrastructure to comply with the performance requirements of RNAV 5 and RNAV 1 navigation specifications whenever GNSS is no longer available. In some cases, this may imply the increase of the DME network to support RNAV 5 and RNAV 1 applications and/or contingency conventional procedures.

- **Assess the decommissioning of ILS CAT I** where SBAS/GBAS CAT I procedures are published.

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[5] Specifically: AMC1 CAT.OP.MPA.182, AMC1 NCC.OP.153, GM1 NCO.OP.142 and AMC1 SPO.OP.152.

[6] VOR/MON relates to the minimum number of VORs needed in the airspace to support both normal and reversion operations.

- **Review the need for certain ILS CAT II/III** once GBAS CAT II/III procedures are available (e.g. maintaining one ILS per runway direction). The ILS can be used as contingency for GNSS threats (e.g. interference, constellation outage) combined with VOR and/or DME.

Although currently, the GNSS positioning source for PBN is based on a single-frequency single-constellation, GPS L1, in the future, it will be based on dual-frequency multi-constellations (DFMC) GNSS systems. The DFMC GNSS ConOps [23] foresees that the timeline for the introduction of DFMC GNSS operations starts in the 2025-2028 timeframe, i.e., before the planned transition to an exclusive PBN environment.

4.1.3 PBN Implementation Environmental Objectives

Two of the most significant environmental impacts associated with aviation are aircraft noise and CO2 emissions. A significant means of reducing noise levels is the adoption of more precise arrival and departure flight profiles; reductions in greenhouse gas emissions are achieved through the delivery of more efficient route structures, reductions in delay, and more efficient operational practices. PBN enables a more precise routing of aircraft, enabling greater opportunities to improve the Spanish civil ATM/ANS providers' environmental record in both fields.

Regarding the management of aircraft noise, this is achieved through the introduction of multiple flight paths for noise relief. Such techniques are to be applied wherever feasible, taking into account local circumstances and preferences. Communities will experience benefits when PBN routes are designed to prioritize the overflight of non-residential areas (e.g., agricultural, commercial, or industrial lands).

However, the redistribution of noise impacts between different areas caused by changes to arrival and departure routes and the increased precision of Performance-based Navigation may create disruption for some communities living under flight paths. It is sometimes possible to design alternate routes through an area to provide predictable respite for affected communities, provided this does not impact safety or compromise airspace capacity. Throughout the PBN planning and design process during the transition towards full PBN navigation in 2030, early and frequent engagement will take place with communities to improve the awareness and knowledge of PBN, to reinforce the benefits of the concept, and to understand local issues or restrictions.

More specifically, PBN is a key enabler to achieve the fuel burn and noise reduction goals set in the national environmental strategy, as well as other European and global requirements, and by ENAIRE's environmental strategy, as defined by the *Plan de Vuelo 2025* (PV2025). PBN, for instance, will contribute to achieve Spain's national horizontal flight efficiency objective for 2025 (a 3,08% KEA[7]).

4.2 Pre-PBN IR scenario

4.2.1 Overview of the Existing Navigation Procedures

- Oceanic en-route operations, maintenance of the RNAV/RNP 10 routes (the designation of the airworthiness and operational approval as well as airspace/route designation remains "RNP 10" in order to retain the validity of the present publications and extensive approvals) currently published in the EUR-SAM corridor within FIR/UIR Canarias.

- Continental en-route operations. All airways above FL145 are categorised as RNAV 5 (Multi-sensor) as a consequence of the Spanish Airspace Harmonization Plan. This is intended to comply with the in-force version of Regulation (EU) 923/2012and those resolutions arising out of the Harmonisation project under the auspices

[7] Key performance environment indicator based on actual trajectory (KEA). This value is included in Spain Performance Plan for RP3 (ESPP3).

of the SW FAB airspace block (Spain-Portugal), as well as to align the Spanish airspace with EUROCONTROL recommendations. An AIC in force [16] informs about the Spanish Airspace Harmonization Plan.

- Terminal operations. There are still a few RNAV 5 STARs and SIDs that need to be replaced by RNAV 1 procedures. Several RNAV 1 SID and STARs are already published in several TMAs, some of them restricted to a single sensor (DME/DME or GNSS), some of them not. For the time being, there are no RNP 1 SIDs or STARs.

- RNP APCH. There are several published RNP APCH procedures. These procedures are typically published to the three minima (LPV, LNAV/VNAV and LNAV), except for some of them, which only feature two, or even one, minima. This is due to either:

  - An excessively difficult terrain/obstacle environment or environmental restrictions.

  - Temporary lack of appropriate EGNOS performances.

  See Annex F for a complete list of PBN.AUR.2005 (1) derogations.

  LPV procedures have been designed according to either APV SBAS or SBAS CAT I ICAO PANS-OPS criteria.

- PA. Currently based on ILS CAT I and CAT II/III, GBAS CAT I and SBAS CAT I (already mentioned in the previous bullet).

4.2.2 Overview of the Supporting Navigation Infrastructure

The Spanish navaid network that provides support to en-route, terminal, approach and aerodrome guidance for traffic flying in the Spanish airspace is composed of DME, ILS, NDB, DVOR/CVOR, and CAT I GBAS Ground Subsystem.

Based on this navaid network, conventional and satellite navigation services are provided (GBAS services and support for the SBAS performance service). Refer to Appendix A for the detail of the current supporting navigation infrastructure.

4.3 Additional Drivers

- Prioritisation of those aerodromes requiring the resolution of existing operational constraints, even when this implies greater complexity in the deployment process.

- The demands of the airspace users/aerodrome operators shall be taken into account as far as possible. Aircraft operational capability expected in the affected airspace /aerodromes is taken into account.

- Implementation of RNP APCH procedures in visual runways (currently not affected by the PBN IR) that are planned to be instrumentalized (thereby becoming PBN IR scenarios) or in which national Regulations (Real Decreto 862/2009 [24] and Real Decreto 1180/2018) [25], among others) may allow the implementation of instrument approach procedures.

- Full restructuring of some high density TMAs.

- Implementation of transition procedures (TRAN) to final approach, as those published e.g. in AIP AD 2 for LEBL airport.

5 National Airspace Concept

The national airspace concept is implemented by ENAIRE through its strategic *Plan de Vuelo 2025* ("2025 Flight Plan"), Airspace Harmonization Plans and adherence to the State's PBN Policy and Strategy documents.

The ENAIRE (national) airspace concept is contained in several lower-level plans within the PV2025 framework, which are hereby synthetized:

- Reduction targets have been set in horizontal route inefficiencies (i.e. indirect routings), fuel burn and CO2 emissions by 2020.

- The airspace measures which are foreseen to contribute to the set objectives include:

    - New direct and more efficient ATS routes.

    - Flexible Use of Airspace: permanent military zones to become temporary, new routes outside of military airspace.

    - Direct route segments (DCT) and Free Route implementation in Spanish Airspace.

    - New, more efficient PBN SID, STAR and instrument approach procedures, according to both regulatory requirements and commercial airspace users' demands.

    - Alternative SID, STARs, and instrumental approaches so as to maintain airport accessibility in case of a single ground navaid failure.

    - Streamlined airspace classification, already achieved en-route (2019). TMA and CTA harmonization projects started in late 2019 and have continued afterwards.

    - CDA implementation in major TMAs after coordination with relevant airspace users.

    - Holding time reductions by means of PBN-enabled independent parallel approaches (Madrid TMA) and PBN-enabled transitions to final approach (Barcelona TMA).

- Regarding PBN SID, STAR and instrument approach implementation, the main airspace concept relies on on-time PBN IR compliance. Additionally, the Spanish National PBN strategy establishes specific provisions for:

    - Use of PBN Oceanic/Remote specifications such as RNAV 10 / RNP 4 in the oceanic sector of the Canarias FIR/UIR.

    - Early addition of GNSS as valid sensor for already promulgated DME/DME-only RNAV 1 SIDs/STARs.

    - RNP APCH and/or RNP AR APCH implementation in scenarios outside the scope of the PBN IR.

    - Conditions under which EGNOS coverage is considered adequate enough to start LPV approach procedures implementation.

    - ILS and GBAS CAT I precision approach maintenance, the first ones as part of the contingency measures identified in the PBN IR's Article 6.

    - State aircraft conventional navigation service needs.

6 Transition Arrangements

6.1 Analysis of the Operational Impact of GNSS Disruption Events

GNSS and its augmentations are vulnerable to some types of external disruptions, e.g. radio frequency interference and space weather phenomena. If GNSS services became unusable, considerable impact can be expected, especially after 2030, given that GNSS is to become central to PBN, and is also used for some Communication and Surveillance applications (e.g. time stamping and ADS-B surveillance, respectively). Such vulnerability must be mitigated either by requiring GNSS systems to be more resilient and robust, or by depending on contingency procedures which in turn may rely on alternative positioning sources and/or Communication/Surveillance that ensure GNSS reversion in order to maintain an acceptable level of safety [18].

Since GNSS cannot be trusted yet as sole mitigation for disruptions, contingency procedures are needed in the case of GNSS being unusable, which could be due to an outage or GNSS being unreliable, and PBN procedures cannot be followed by other means.

Each operating environment, particularly as regards terminal operations, is distinctly different. This fact is related to the uniqueness of each airport and its geography, and greatly influenced by cultural decision-making processes and historical legacy. Contingency procedures will be tailored for every particular operating environment, which can also be distinctive as regards the combination of C-N-S enablers, ATM tools available, fleet capability or the navaid infrastructure available for PBN operations. At operational level, pilots and controllers need to have unambiguous and simple procedures to deal with the situation when GNSS becomes unusable.

6.1.1 Airspace User Perspective

The on-board avionics determines whether GNSS is unusable or not. On board avionics may vary considerably in their positioning 'logic' and the way they alert the flight crew. Whilst some FMS (Flight Management System) may announce e.g. 'GPS primary lost' when GNSS is no longer usable, other FMS will leave the flight crew ignorant of the GNSS status, if the navigation system as a whole is able to maintain RNP operations.

If GNSS fails, most systems with alternative navigation means, would step down to IRU (inertial) with radio updating (e.g. DME/DME) or ask for vectoring if navigation becomes impossible. In those avionics with interfaces where the pilot is informed that GNSS is lost, the pilot will be likely to communicate this to ATC (depending on company procedure) even if the aircraft is capable of navigating and achieving the required performance.

This difference in avionics suites and pilot procedures is something that needs to be managed when ATM/ANS providers develop their local contingency operations and also when these are developed for the Network. It is important to remember that when GNSS becomes unusable, this can affect multiple systems including navigation and communication (e.g. message timing) and some surveillance and other systems e.g. ADS-B, TAWS.

6.1.2 ATS Perspective

In their training, ATCOs are required to be familiar with contingency procedures developed for their units. Contingency procedures shall be defined to cater for the cases in which GNSS becomes unusable and PBN procedures cannot be followed by other means.

The controller may notice aircraft deviating from the track centreline, or receive pilot reports regarding e.g., "GPS Primary Lost" or report that the aircraft is "Unable RNP".

Wherever PBN procedures are in place, the ATCO should know whether GNSS is usable, including the scale and duration of the period when it is not usable. Some areas of un-usability are localised e.g. in the direct vicinity of an approach flight path, whilst others can cover areas of different sizes, and in extreme cases, very wide areas.

Several scenarios may be defined to assess the impact of GNSS disruptions, for instance:

- GNSS Unusable over an extended area. In general, these events have been considered an operational nuisance without significant impact so far, however, when losing some CNS capabilities (especially over water), safety margins may be reduced, and additional problems could increase risk.

- GNSS Unusable 'locally' - such as experienced by major European TMAs. Even 'unusable' status of short duration could cause the interruption of all RNP APCH use and possibly cause diversions.

- GNSS is Unusable over a 'Wide Area for a medium duration (e.g. between 2 hours and 1-2 days) in medium/high density airspace. This kind of scenario could affect traffic throughput, e.g. by preventing access for aircraft with GNSS as the only PBN position sensor, and seriously impact upon business continuity, i.e. the ANSP's capacity to sustain operations.

- GNSS is Unusable over a Wide Area for an Extended Duration (e.g. > 1 week). Whether or not to continue operations in the event of a GNSS constellation being unusable for the long term would probably result from a national strategic decision by the Spanish Government.

In determining the 'right' scenario for the contingency operations to be developed**, the whole package of contingency procedures for the entire ATM operation shall be taken into account.** Contingency scenarios will be developed for different types of operating environments to permit operations to continue safely.

6.1.3 Process for Contingency Scenario Development

In the development of an Airspace Concept, the enablers available to support the airspace design will be identified, together with the constraints to be mitigated and the assumptions to be made. The design schema will need to cater for normal and contingency operations with contingency procedures to match. The Airspace Concept is a total package and considering only optimistic operating scenarios is not enough. Non-Normal operations will be envisaged and accounted for; therefore, Contingency operations should be planned as part of the Airspace Concept.

6.1.4 CNS Infrastructure Perspective

Effective positioning coverage should be made available along the flight paths for both nominal and contingency operations.

Ground-based Navaids will provide for GNSS reversion: a cost-effective ground-based infrastructure providing adequate redundancy must be available in the event of a GNSS outage to meet the levels of safety (and business continuity) required during this kind of disruptions. Consequently,

- Ground-based Navaid Infrastructure optimisation and decommissioning provides opportunities to streamline and potentially save costs.

- Ground-based Navaid Infrastructure investment decisions are affected, as are equipment life cycles which impact upon maintenance and replacement schedules.

The evolution from terrestrial-only to PBN navigation infrastructure will be accompanied by the development of corresponding operational reversion scenarios. Operational requirements must be balanced with the achievement of reasonable costs, while ensuring safety. In particular, coverage requirements at low altitude can be associated with significant facility costs. Leveraging airspace user capabilities, such as INS, as well as other CNS capabilities (surveillance and communication service coverage and associated ATC capabilities) will be considered to the maximum extent practicable, including common mode failures. Where it may not be possible to cater to all airspace user equipage levels, some airspace users may become subject to operational restrictions.

6.2 General Strategy on Navaid Infrastructure Optimization

The rationalization of the legacy navigation infrastructure will combine:

- **A top-down process** where the implementation of PBN and GNSS within volumes of airspace results in navigation aids being made totally redundant so they could simply be switched off once the airspace users find it acceptable. This perspective is driven only by airspace efficiency criteria, without taking into account the lifecycle of the navaids.

- **A bottom-up approach** considering the end of each navigation aid's economic life, which permits assessing whether an opportunity exists to consider if a limited PBN implementation is more cost-effective than replacement of the navigation aid.

  This analysis will also take into account other uses of the infrastructure beyond those promulgated in the AIP (e.g., to meet the needs of State operators, to support aircraft operators' contingency procedures, etc.). This strategy will require consistency with a top-down view.

  The replacement cost opportunity only presents itself if the navigation aid is fully depreciated and replacement is considered: it therefore arises on a 20-25-year cycle. In order to realize any cost-saving, rationalization opportunities will be identified, and the necessary route changes planned and implemented to enable the facilities to be decommissioned at the end of their lifetime.

In planning for the rationalization of navigation infrastructure, all stakeholders' needs, and operational uses of the infrastructure will be considered. This will include military instrument flight procedures, aircraft operational contingency procedures (such as engine failure on take-off) and uses for VOR-based separations in procedural airspace or general aviation.

As depicted by EUROCONTROL in the European Navaid Infrastructure Planning Handbook including Minimum Operational Network (MON) [19], the global strategy is to:

a) Rationalize NDB and VOR and associated procedures.

b) Align rationalization planning with equipment life cycles and PBN implementation planning.

c) Replace approaches without vertical guidance with vertically guided approaches.

d) Where a terrestrial navigation reversion capability is required, evolve the existing DME infrastructure towards providing a PBN infrastructure complementary to GNSS.

e) Provide a residual capability based on VOR (or VOR/DME, if possible) to cater to airspace users not equipped with suitable DME/DME avionics, where required; and

f) Enable each region to develop an implementation strategy for these systems in line with the global strategy.

ICAO roadmap for the infrastructure rationalisation planning is presented in the 2016-2030 Global Air Navigation Plan (ICAO Doc 9750) [2]:

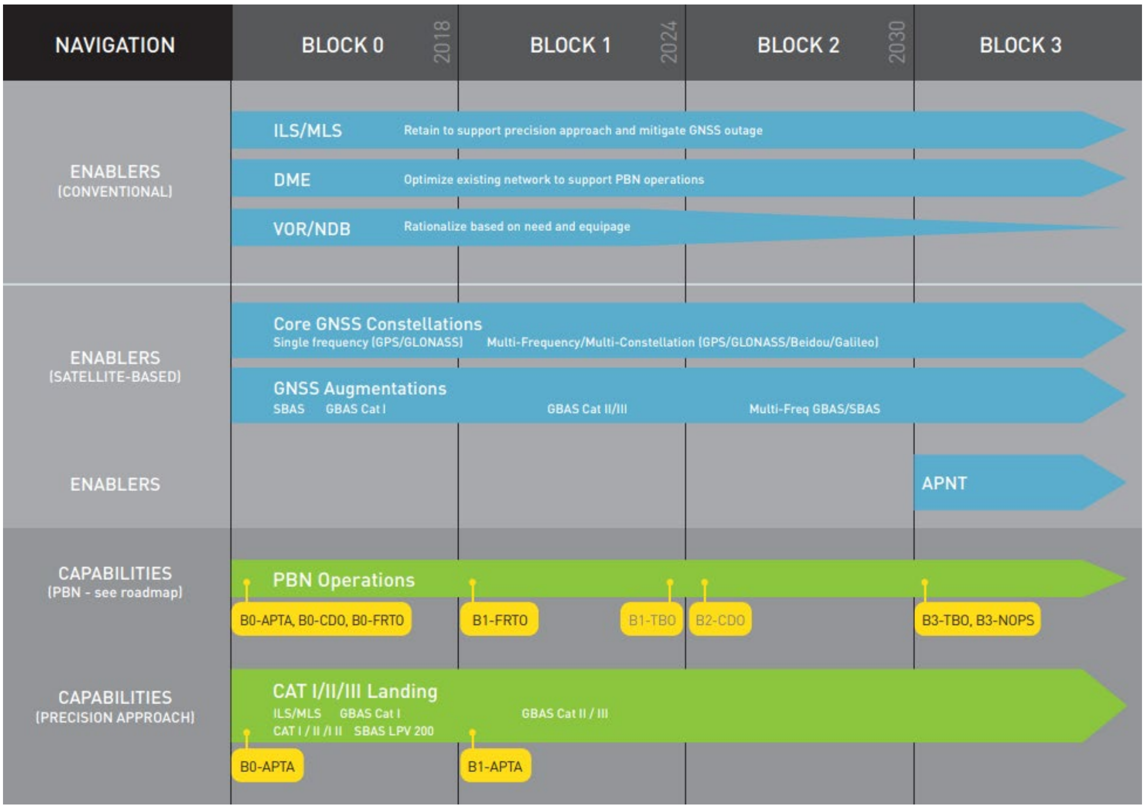

Figure 1 Navigation Systems Roadmap

A strategy for the rationalisation of conventional radio navigation aids and evolution toward supporting PBN is presented by ICAO in Attachment H to Annex 10 Volume I SARPs [4]. Additional considerations may be found in section 7.14 of ICAO Doc. 9849 (GNSS Manual) [17].

6.3 National Rationalization/Optimization Strategy per Navaid

6.3.1 NDB Rationalization Strategy

NDBs serve no role in PBN operations except as a means for position crosschecking and general situational awareness. These minor roles will not lead to the requirement to retain NDB facilities. Except where no other alternative is available due to constraints in user fleet, financial, terrain or safety limitations:

a) the use of NDBs as en-route navigation aids or terminal area markers is generally obsolete.

b) NDBs used to support SID/STAR will be replaced by RNAV waypoints (VOR/DME fixes can be considered as a temporary/transitional solution).

c) NDBs used as locators to assist in ILS intercept operations will be replaced by RNAV waypoints (Use of VOR/DME can be considered as a temporary/transitional solution).

d) the use of NDB to support missed approach operations is to be discouraged except where local safety cases specifically require an NDB non-GNSS missed approach capability; and

e) NDBs used as a non-precision approach aid will be withdrawn, taking the opportunity offered by the implementation of Assembly Resolution 37-11.

In the NDB rationalisation studies, the PBN implementation roadmap and the navaids life cycle are taken into account in an approach where the most dispensable navaids are identified. They consist of:

- Scenario characterization:
    - Existing ATS routes, SID/STAR and instrument approach procedures, with consideration of the PBN based ones.
    - Fleet capabilities: Existing and target PBN capabilities (the information of the existing capabilities is taken from the declared flight plans by means of the EUROCONTROL's CNS dashboard tool).
    - Number, type and layout of navaids in ATS routes, SID, STARs and IACs.
- Analysis of the operational impact resulting from decommissioning a particular NDB (assuming the target PBN implementation is already in place), studying how it supports each of the ATS routes, SID, STAR and IAP and which navaids become critical with its decommissioning.

6.3.2 VOR Rationalization Strategy

No new stand-alone VOR facilities (e.g. at new locations) will be implemented. However, VORs may be retained to serve the following residual operational purposes:

a) As a reversionary navigation capability (for example, for general aviation operations in order to assist in avoiding airspace infringements);

b) To provide navigation, cross-checking and situational awareness, especially for terminal area operations (pilot MSA awareness, avoiding premature automatic flight control system arming for ILS intercept, aircraft operational contingency procedures, such as engine failure on take-off, missed approaches, if required by local safety cases), in particular in areas where low altitude DME/DME coverage is limited. Specifically, the use of VOR/DME to provide RNAV 5 is not recommended.

c) For VOR/DME inertial updating where DME/DME updating is not available.

d) For non-precision approaches, as long as users are not equipped for RNP approaches and if no other suitable means of precision approach is available.

e) For conventional SID/STAR to serve non-PBN-capable aircraft.

f) For supporting a minimum contingency conventional ATS routes network.

g) As required to support the operations of State aircraft; and

h) To support procedural separation (as detailed in Doc 4444).

In accordance with ICAO strategy for VOR rationalisation, the retained VOR/DME facilities will mainly be the ones collocated with DME – (D)VOR/DME- versus VOR standalone facilities in order to provide DME-based RNAV capabilities.

The intention is to address first those scenarios with several VOR facilities used for approach and SID/STAR, where there is coverage overlapping.

In the VOR rationalisation studies, the same method specified for the NDB studies is followed, taking into account the different role assigned to this type of station during the transition period and the scenario following 2030.

6.3.3 DME Optimization Strategy

DME infrastructure update will be driven by the following factors:

a) Where a terrestrial navigation reversion capability is required, a DME network capable of supporting DME/DME navigation will be provided, where possible.

b) The DME network design will consider cost-savings opportunities whenever possible, such as the withdrawal from a site if an associated VOR is removed, or the possibility to efficiently set up new DME stand-alone sites where other ANSP CNS assets are located.

c) The DME network design will attempt to fill any gaps and provide coverage to as low altitudes as operationally useful without leading to excessive new facilities investments.

d) If satisfactory DME/DME coverage cannot be achieved, States will consider requiring INS equipage from airspace users to bridge gaps in coverage.

e) Civil ANSPs will take maximum advantage of cross-border and military facilities (TACAN), provided the necessary agreements can be put in place; and

f) The frequency assignment of new DME stations will avoid the GNSS L5/E5 band (1 164 – 1 215 MHz) in areas of high DME station density, if possible.

In accordance with ICAO strategy for the evolution of the DME infrastructure, rationalization planning for VOR should be used as an input to the evolution planning for DME.

In some situations, the provision of DME/DME navigation is not possible or practical, such as at very low altitudes or in low-DME coverage environments (terrain-constrained areas, islands, oceanic and remote zones). It should also be noted that some FMS exclude the use of ILS-associated DMEs. As a consequence, it is not possible to ensure consistent DME/DME service to all DME/DME-equipped users based on ILS-associated DMEs, and thus those facilities cannot be used to provide such service.

Optimisation is done on the basis of simulation studies of DME/DME coverage.

7 PBN Transition Roadmap

Table 2 and Table 3 below show the relevant timescales for the PBN implementation objectives (RNP APCH and RNAV 1 / RNP 1 respectively) defined in section 4.1.1. In these tables:

- The “Target # END” column provides the number of PBN implementations to be accomplished.

- The "Baseline Availability 26/04/2023" provides the number of PBN implementations accomplished as of 26/04/2023.

- The deadlines provided in the "PBN IR (until dd/mm/yy)" columns correspond with those of the milestones defined in the PBN IR. These columns provide the number of PBN implementations to accomplish in the period between the milestone represented in each column and the previous one.

Milestones in Table 2:

- 03/12/2020 is the date when RNP APCH procedures (LNAV, LNAV/VNAV and LPV) should be implemented for all runway ends without PA according to the PBN IR, except in LEMD, LEBL and LEPA/LESJ because they were part of the PCP regulation (now derogated by CP1 regulation).

  As this date has already been overcome, the number of RWY ends that were covered until then are now merged with the data of the 'baseline availability' column.

- 25/01/2024 is the date when RNP APCH procedures (LNAV, LNAV/VNAV and LPV) should be implemented for all PA runway ends according to the PBN IR, and in all RWYs in LEMD, LEBL and LEPA/LESJ.

RWY END	2D/3D	RNP APCH Minima	Target # END	Baseline Availability (26/04/2023)	PBN IR (until 25/01/24)
NPA	2D	LNAV	26	16	10
PA	2D	LNAV	52	19	33
NPA	3D	LNAV/VNAV	22	13	9
PA	3D	LNAV/VNAV	50	18	32
NPA	3D	LPV	22	12	10
PA	3D	LPV	52	18	34

Table 2 RNP APCH implementation Timescales

A more detailed description of the implementation timescales is included in the Annex F of this same document.

Milestones in Table 3:

- 25/01/2024 is the date when at least one RNAV 1 / RNP 1 procedure should be implemented for all runway ends where conventional SIDs/STARs were already published, according to the PBN IR.

RWY CLASS	SID/STAR RNAV1/RNP1	Target # END	Baseline Availability (26/04/2023)		PBN IR (until 25/01/24)		PBN IR (until 06/06/30)	
			First[1]	Full[2]	First	Full	First	Full
NPA/-[3]/VIS IFRDEP[4]	SID	37	15	5	22	1	-	31
PA	SID	48	20	7	28	5	-	36
NPA/-/VIS IFRDEP/VIS[5]	STAR	27	7	-	20	1	-	26
PA	STAR	52	22	11	30	6	-	35

1. Year of first deployment of RNAV1/RNP1 STAR/SID (Non-dependent of quantity of procedures).
2. Year in which RNAV1/RNP1 STAR/SID exclusivity is reached (Exceptions for contingency are considered).
3. Represents RWY ends not usable for landing, neither instrumental nor visual.
4. Represents RWY ends usable for instrument take-off and visual landing but not for instrumental landing.
5. Represents RWY ends usable only for visual take-off and visual landing.

Table 3 RNAV 1 / RNP 1 Implementation Timescales

No rotorcraft specific SIDs, STARs or ATS Routes, as per PBN.AUR.2005 (7), are foreseen to be implemented in Spain for the time being.

All ATS routes at or above FL150 in Spain are already based on RNAV 5 specification. All ATS routes below FL150 are planned to have RNAV 5 procedures prior to 25/01/2024.

Annex A. Detail of the Current Supporting Navigation Infrastructure

Based on the radionavigation aids database managed by ENAIRE on 26/04/2023, this is the list of stations that are published in the national AIP (AIRAC 04/23, AMDT 366/23):

- En route / SID / STAR / Approach navigation:
  - 84 (D)VOR:
    - 68 DVOR/DME (62 owned by ENAIRE, 3 by the Spanish military and 3 by a private owner).
    - 16 VOR/DME (14 owned by ENAIRE, 1 by the Spanish military and 1 by a third country).
  - 51 NDB/LOCATOR:
    - 39 NDB (25 owned by AENA, 9 by ENAIRE and 5 by the Spanish military).
    - 12 LOCATOR (All owned by AENA).
  - 154 DME:
    - 66 DVOR/DME
    - 18 VOR/DME
    - 64 ILS/DME
    - 6 DME
  - 65 ILS facilities (All owned by Aena):
    - 64 ILS/DME
      - CAT I: 47
      - CAT II: 2
      - CAT II/III: 3
      - CAT III: 12
    - 1 ILS CAT I
  - 2 VOR/TACAN.
  - 13 TACAN (All owned by the Spanish military).
- Usage of constellations and augmentation systems:
  - 1 NAVSTAR GPS Constellation
  - 1 EGNOS Augmentation System (ESSP) with NAVSTAR GPS
  - 1 GBAS CAT I Augmentation System (ENAIRE) with NAVSTAR GPS

Annex B. Navaids Rationalization/Optimization Study

The information included in this Annex is meant to present Spain's ground-based navaid rationalization/optimization plan at high level. More detailed information and specific plans for individual navaids are included and periodically updated in the GNI (Ground-based Navigation Infrastructure) Map Tool of EUROCONTROL.

- **NDB/LOCATOR**

The objective is the total decommissioning of these navaids as far as possible. Since the year 2019, 7 stations have already been retired from service. For the remaining 51 stations, the status of the planning on 26/04/2023 can be summarized as follows:

- Not planned for decommissioning: **4 stations**. Due to either being the only navaid in an island, lack of available space or being considered essential for flight instruction purposes, their decommissioning is not contemplated yet.

- Not addressable: **5 stations**, all of them installed in military airbases (either restricted or open to civil traffic). All of these will be included in the 'Not planned' or 'Planned' category after coordination with the Spanish military.

- Planned for decommissioning: **42 stations**. The progressive evolution of PBN implementation allows the disposal of these stations until 2031. Current decommissioning dates may shift according to PBN implementation plan changes, especially those expected for 2031, which could probably be brought forward.

  The following figures represent the evolution of the progress of NDB stations' decommissioning, as well as the number of them expected to be addressed per year:

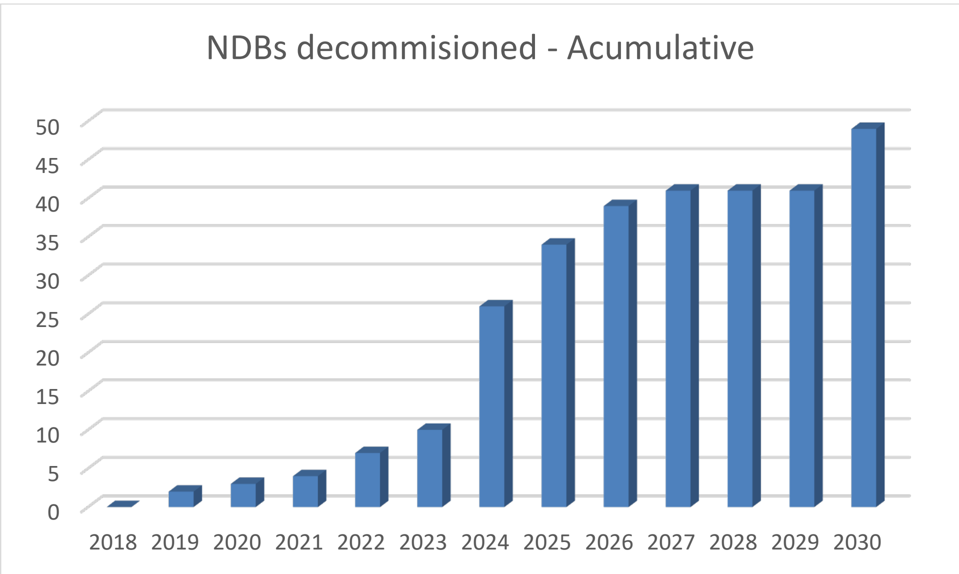

Figure 2 NDB decommissioning progress

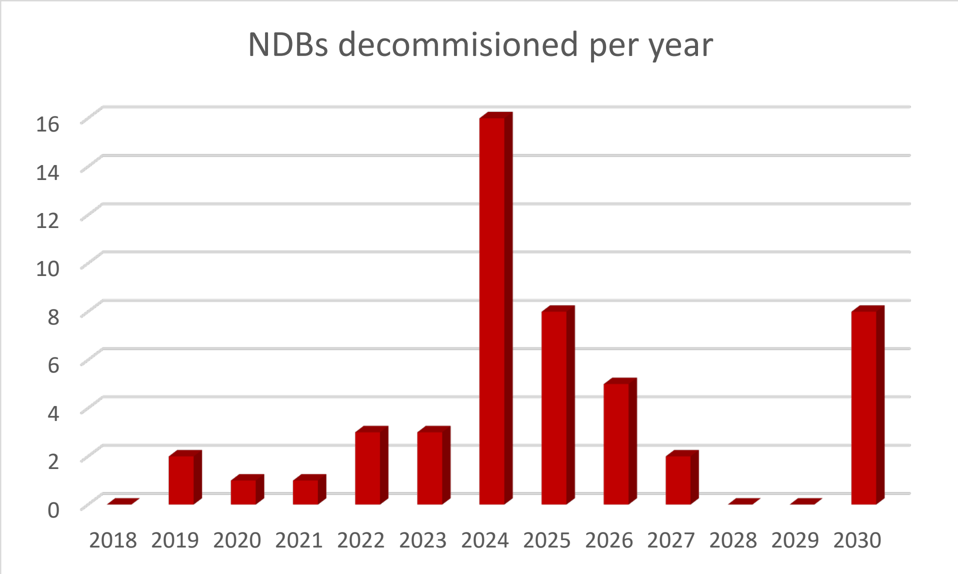

Figure 3 NDB decommissioned per year

- **(D)VOR**

The main goal concerning (D)VOR stations is optimization and reduction in the total number maintaining a minimum operational network (MON VOR).

Whereas guidelines for the definition of the 'MON' have already been established, there is still on-going work concerning the establishment of a harmonized approach at European level, and a few relevant questions to be solved. For this reason, the Spanish (D)VOR decommissioning plan still remains to be developed in detail. Nevertheless, the work performed until the 26th of April of 2023 has made possible to obtain a series of conclusions. The 84 existing stations can be classified as follows:

- MON VOR: 42 stations. Can be separated in two groups depending on the main reason for them remaining.
    - Key for navigation support and/or new installations: 35 **stations.** This category gathers all those (D)VORs identified as fundamental for the navigation service, considering the criteria for the VOR MON definition applied so far. It contains as well those stations that have been recently renovated/deployed or will be renovated prior to the PBN implementation plans, which makes their decommissioning impossible from an economical point of view.
    - Not addressable: 7 **stations.** Not property of Spanish civil public entities. If plans about their decommissioning are provided by their owners, their inclusion in other categories will be assessed.
- Candidate to MON VOR: 15 **stations**. All these stations have in common that they will be, once the planned NDB decommissionings are carried out, the only navaids (ILS, DME and/or GBAS aside) providing service to an aerodrome. While it is possible to transition this kind of scenario to a full PBN one (SID/STAR RNAV 1 with DME/DME as reversion sensor or radar assistance service, and RNP APCH + ILS with initial/intermediate/missed approach segments based in PBN), this may not always be

feasible, depending on the influence of factors that are yet to be fully assessed (e.g. new DME stations' deployment, GNSS contingency scenarios in each aerodrome after 2030, etc.).

Therefore, considering that these stations could be needed for SID/STAR and or APCH support, they may eventually form part of the MON VOR. Each individual case will be sorted out as progress is made on the assessment of the factors previously mentioned.

- On-going steps for decommission: 27 **stations**. Not complying with the characteristics of the previous categories, the stations here considered are currently being assessed for their decommission. Individual studies are necessary for taking a final decision in each case.

The analysis for the rationalization of (D)VOR and the development of the MON VOR will keep going on, with the objective of growing in level of detail and being able to incorporate specific dates in the next versions of this plan.

- **DME**

Evaluation of the RNAV 1 service coverage at State level as GNSS RNAV 1 back-up. Number of stations will be adjusted according to the result of this evaluation.

- **ILS**

  - ILS (CAT I)

Start assessing their decommission around 2025.

  - ILS CAT II/III

Review the need for certain stations around 2035 with looks to GBAS CAT II/III deployment scenarios (this activity is not driven by the PBN IR).

Annex C. Exemptions in the PBN Implementation Transition

They are related to aircraft and their PBN capabilities to accept continued operations of aircraft with lower navigation capabilities for as long as operationally feasible.

Exemptions could be related to a certain aircraft group and to a certain period. Some examples presented by EUROCONTROL navigation support team:

- Where an operator has failed to obtain their PBN approval before a certain date due to circumstances beyond their control, the NSA (AESA) may grant a temporary exemption to an operator requesting it subject to certain conditions being satisfied (aircraft modification is planned, an aircraft modification approval, either an amended Type Certificate (TC) or Supplemental Type Certificate (STC) is pending or the aircraft is suitably equipped but an operational approval for PBN is pending.

- **Short term**: RNAV 1 mandate for IFR traffic in all TMAs with temporary exemption propeller aircraft - **Medium term**: RNAV 1 mandate all IFR traffic in all TMAs (no exemptions propeller aircraft)

- TMA implementation roadmap: short-term perspective RNAV 1 is introduced to facilitate IFR traffic in all TMA is with considerable international traffic with a temporary exemption for GA and domestic air traffic to follow conventional routes.

- State aircraft equipage requirements and associated exemptions: State aircraft using the aerodromes will be granted a general exemption from the mandate, although aircraft that routinely use the civil ATS structure as GAT, shall be certificated to equivalent standards of performance in relation to accuracy, integrity, continuity and most importantly, are interoperable with respect to aircraft functionality and the ability to conduct required operations.

- An exemption from the mandate issued at the discretion of the NSA and coordinated with ATC will be available for certain operations e.g., humanitarian disaster relief, one-off maintenance or positioning flights or emergency flights. Flights with the aerodrome of departure and aerodrome of destination being the same are exempted from the mandate.

Annex D. References

Id	Reference Document
[1]	ICAO Doc 9613 - Performance Based Navigation (PBN) Manual 4th edition, 2013.
[2]	ICAO Doc 9750 – 2016-2030 Global Air Navigation Plan 6th edition, 2020.
[3]	ICAO Doc 10022 – Assembly Resolutions in Force (as of 4 October 2013).
[4]	ICAO Annex 10 Volume I – Radionavigation Aids – 7th edition, 2018.
[5]	Regulation (EC) N° 549/2004 of the European Parliament and of the Council of 10 March 2004 laying down the framework for the creation of the single European sky (the framework Regulation)
[6]	Regulation (EC) N° 550/2004 of the European Parliament and of the Council of 10 March 2004 on the provision of air navigation services in the single European sky (the service provision Regulation)
[7]	Regulation (EC) N° 551/2004 of the European Parliament and of the Council of 10 March 2004 on the organisation and use of the airspace in the single European sky (the airspace Regulation)
[8]	Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency (EASA Basic Regulation).
[9]	Commission Regulation (EC) 2150/2005 - Common Rules for the Flexible Use of Airspace,
[10]	Commission Implementing Regulation (EU) N° 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation (SERA)
[11]	Commission Implementing Regulation (EU) No 2018/1048 of 18 July 2018 laying down airspace usage requirements and operating procedures concerning performance-based navigation.
[12]	Commission Implementing Regulation (EU) 2017/373 of 1 March 2017, laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight.
[13]	EUROCONTROL European PBN Route Spacing Handbook (PBN Handbook No 3), v.1.a (10 FEB 2021)
[14]	EUROCONTROL European Airspace Concept Handbook for PBN implementation (PBN handbook No 1) (Edition 4 published April 2021)
[15]	European ATM Master Plan Executive View, 2020 edition
[16]	Spanish AIC 04/19, Airspace Harmonization Plan, 31/01/2019
[17]	ICAO Doc 9849 - GNSS Manual. 3rd edition, 2017
[18]	EUROCONTROL, European GNSS Contingency/Reversion Handbook for PBN Operations (PBN Handbook No 6), Draft Ed. 1 (Q1 2020)
[19]	EUROCONTROL, European Navaid Infrastructure Planning Handbook including Minimum Operational Network (MON) (PBN Handbook No 4), Edition 1, 05 MAY 2021.
[20]	DGAC, *Política y Marco Estratégico de Referencia para la Implantación en España de la "Navegación Basada en las Prestaciones (PBN)" Edition 30 October 2020.*
[21]	S2020 PJ.14-01-01 D2.1.020 CNS Evolution Roadmap & Strategy v2
[22]	EUROCONTROL, European PBN Implementation and Transition Planning Handbook (PBN handbook No 5), Edition 2, 2021.
[23]	ICAO, Dual-Frequency Multi-Constellation GNSS CONOPS, 27/04/2018
[24]	*Real Decreto 862/2009, de 14 de mayo, por el que se aprueban las normas técnicas de diseño y operación de aeródromos de uso público y se regula la certificación de los aeropuertos de competencia del Estado.*
[25]	*Real Decreto 1180/2018, de 21 de septiembre, por el que se desarrolla el Reglamento del aire y disposiciones operativas comunes para los servicios y procedimientos de navegación aérea.*

Id	Reference Document
[26]	Directiva 02/22 "*Implantación de las operaciones de navegación PBN (Performance Based Navigation) en el Ejército del Aire*" [Restricted, not available for consultation. The scope and derived implementation are still under development]

Annex E. Acronyms

Term	Definition
2D	2-dimensional
3D	3-dimensional
AD	Aerodrome
ADS-B	Automatic Dependent Surveillance- Broadcast
AESA	*Agencia Estatal de Seguridad Aérea*
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AMC	Acceptable Means of Compliance
ANS	Air Navigation Services
ANSP	Air Navigation Service Provider
APCH	Approach
ATC	Air Traffic Control
ATCO	Air Traffic Controller
ATM	Air Traffic Management
ATS	Air Traffic Services
C	Communications
CAT	Category
CAT	Commercial Air Transport Operations (EASA)
CFIT	Controlled Flight Into Terrain
CIDEFO	*Comisión Interministerial entre Defensa y Fomento*
CIDETMA	*Comisión Interministerial entre Defensa y Transporte, Movilidad y Agenda Urbana*
CNS	Communication, Navigation & Surveillance
CVOR	Conventional VHF Omnidirectional Range
DFMC	Dual Frequency Multi Constellation
DGAC	*Dirección General de Aviación Civil*
DME	Distance Measuring Equipment
DVOR	Doppler VHF Omnidirectional Range
EASA	European Union Aviation Safety Agency
EGNOS	European Geostationary Navigation Overlay Service
EMA	*Estado Mayor del Aire*
EU	European Union
EUR	European
FIR	Flight Information Region
FL	Flight Level
FMS	Flight Management System
GA	General Aviation
GAT	General Air Traffic
GBAS	Ground Based Augmentation System
GNSS	Global Satellite Navigation System
GPS	Global Positioning System

Term	Definition
IAC	Instrument Approach Chart
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INS	Inertial System
IR	Implementing Rule
IRE	Instrument Runway End
IRU	Inertial Reference Unit
L	Locator
LNAV	Lateral Navigation
LPV	Lateral Precision with Vertical Guidance
MCC	Mission Control Center
MON	Minimum Operational Network
MSA	Minimum Safe Altitude
N	Navigation
NCC	Non-Commercial operations with Complex motor-powered aircraft (EASA)
NCO	Non-Commercial operations with Other than complex-motor-powered aircraft (EASA)
NDB	Non-Directional Beacon
NPA	Non-Precision Approach
NSA	National Supervisory Authority
OP	Operations
PA	Precision Approach
PBN	Performance Based Navigation
PCP	Pilot Common Project
RF	Radius to Fix
RIMS	Ranging Integrity Monitoring Stations
RNAV	Area Navigation
RNP	Required Navigation Performance
RWY	Runway
S	Surveillance
SAM	South American
SARPs	Standards And Recommended Practices
SBAS	Satellite Based Augmentation System
SID	Standard Instrument Departure
SPO	Specialized Operations (EASA)
STAR	Standard Instrument Arrival Route
STC	Supplemental Type Certificate
TACAN	Tactical Air Navigation System
TAWS	Terrain Avoidance and Warning System
TC	Type Certificate

Term	Definition
TMA	Terminal Maneuvering Area
TRAN	Transition to Final Approach
VIS	Visual
VNAV	Vertical Navigation
VOR	Very-High Frequency (VHF) Omni-directional Radio Range
VSS	Visual Segment Surfaces

Annex F. Detailed timescales for RNP APCH implementation

The objective of this Annex is to provide a more detailed description of the RNP APCH implementation timescales, referring to the specific runway ends, instead of just presenting a general number. The table only includes scenarios to which the PBN IR applies and is derived from the same planning that supports Table 2. ENAIRE is also carrying on and planning implementations in scenarios out of the scope of the PBN IR wherever significant PBN operational benefits are deemed achievable (See Scenarios to which the PBN IR is not applicable).

Those cells that state 'IMPOSSIBLE' refer to cases in which the implementation has been evaluated as not feasible, due to reasons related to the characteristics of each specific environment and out of the control of the agents responsible of the implementation (e.g. difficult terrain, VSS penetration, local GNSS system performance still not appropriate).

IATA CODE	ICAO CODE	AIRPORT	CLASS	RUNWAY	LNAV Status	LNAV Year	LNAV/VNAV Status	LNAV/VNAV Year	LPV Status	LPV Year
FUE	GCFV	FUERTEVENTURA	PA	01	IMPLEMENTED	2018	IMPLEMENTED	2018	PLANNED	2024
FUE	GCFV	FUERTEVENTURA	PA	19	IMPLEMENTED	2018	IMPLEMENTED	2018	PLANNED	2024
SPC	GCLA	LA PALMA	NPA	18	IMPLEMENTED	2022	IMPOSSIBLE (1)	-	IMPOSSIBLE (1)	-
SPC	GCLA	LA PALMA	NPA	36	IMPLEMENTED	2022	IMPLEMENTED	2022	IMPLEMENTED	2022
LPA	GCLP	GRAN CANARIA	PA	03L	PLANNED	2023	PLANNED	2023	PLANNED	2023
LPA	GCLP	GRAN CANARIA	NPA	03R	PLANNED	2023	PLANNED	2023	PLANNED	2023
LPA	GCLP	GRAN CANARIA	NPA	21L	PLANNED	2023	PLANNED	2023	PLANNED	2023
LPA	GCLP	GRAN CANARIA	PA	21R	PLANNED	2023	PLANNED	2023	PLANNED	2023
ACE	GCRR	LANZAROTE	PA	03	IMPLEMENTED	2019	IMPLEMENTED	2019	IMPLEMENTED	2019
ACE	GCRR	LANZAROTE	NPA	21	IMPLEMENTED	2022	IMPOSSIBLE (1)	-	IMPOSSIBLE (1)	-
TFS	GCTS	TENERIFE SUR/REINA SOFIA	PA	07	PLANNED	2023	PLANNED	2023	PLANNED	2023
TFS	GCTS	TENERIFE SUR/REINA SOFIA	PA	25	PLANNED	2023	PLANNED	2023	PLANNED	2023
TFN	GCXO	TENERIFE NORTE	PA	12	PLANNED	2024	PLANNED	2024	PLANNED	2024

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IATA CODE	ICAO CODE	AIRPORT	CLASS	RUNWAY	LNAV Status	LNAV Year	LNAV/VNAV Status	LNAV/VNAV Year	LPV Status	LPV Year
TFN	GCXO	TENERIFE NORTE	PA	30	PLANNED	2024	PLANNED	2024	PLANNED	2024
ALC	LEAL	ALICANTE	PA	10	PLANNED	2025	PLANNED	2025	PLANNED	2025
ALC	LEAL	ALICANTE	NPA	28	PLANNED	2023	PLANNED	2023	PLANNED	2023
LEI	LEAM	ALMERIA	NPA	07	IMPLEMENTED	2017	IMPLEMENTED	2017	IMPLEMENTED	2017
LEI	LEAM	ALMERIA	PA	25	IMPLEMENTED	2015	IMPLEMENTED	2015	IMPLEMENTED	2017
OVD	LEAS	ASTURIAS	NPA	11	PLANNED	2023	PLANNED	2023	PLANNED	2023
OVD	LEAS	ASTURIAS	PA	29	PLANNED	2023	PLANNED	2023	PLANNED	2023
BIO	LEBB	BILBAO	PA	12	PLANNED	2024	PLANNED	2024	PLANNED	2024
BIO	LEBB	BILBAO	PA	30	PLANNED	2024	PLANNED	2024	PLANNED	2024
RGS	LEBG	BURGOS	NPA	04	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
RGS	LEBG	BURGOS	NPA	22	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
BCN	LEBL	BARCELONA	PA	02	IMPLEMENTED	2021	IMPLEMENTED	2021	IMPLEMENTED	2021
BCN	LEBL	BARCELONA	PA	06L	IMPLEMENTED	2021	IMPLEMENTED	2021	IMPLEMENTED	2021
BCN	LEBL	BARCELONA	PA	06R	IMPLEMENTED	2021	IMPLEMENTED	2021	IMPLEMENTED	2021
BCN	LEBL	BARCELONA	PA	24L	IMPLEMENTED	2021	IMPLEMENTED	2021	IMPLEMENTED	2021
BCN	LEBL	BARCELONA	PA	24R	IMPLEMENTED	2021	IMPLEMENTED	2021	IMPLEMENTED	2021
CDT	LECH	CASTELLON	PA	06	PLANNED	2024	PLANNED	2024	PLANNED	2024
CDT	LECH	CASTELLON	NPA	24	IMPLEMENTED	2022	IMPLEMENTED	2022	IMPLEMENTED	2022
LCG	LECO	A CORUÑA	NPA	03	IMPLEMENTED	2019	IMPOSSIBLE (1)	-	IMPOSSIBLE (1)	-
LCG	LECO	A CORUNA	PA	21	PLANNED	2024	PLANNED	2024	PLANNED	2024
ILD	LEDA	LLEIDA/ALGUAIRE	NPA	13	IMPLEMENTED	2022	IMPLEMENTED	2022	IMPLEMENTED	2022
ILD	LEDA	LLEIDA/ALGUAIRE	PA	31	PLANNED	2024	PLANNED	2024	PLANNED	2024
GRO	LEGE	GIRONA	NPA	01	IMPLEMENTED	2022	IMPLEMENTED	2022	IMPLEMENTED	2022

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IATA CODE	ICAO CODE	AIRPORT	CLASS	RUNWAY	LNAV Status	LNAV Year	LNAV/VNAV Status	LNAV/VNAV Year	LPV Status	LPV Year
GRO	LEGE	GIRONA	PA	19	PLANNED	2024	PLANNED	2024	PLANNED	2024
GRX	LEGR	FEDERICO GARCIA LORCA/GRANADA-JAEN	PA	09	PLANNED	2024	PLANNED	2024	PLANNED	2024
HSK	LEHC	HUESCA/PIRINEOS	NPA	12R	PLANNED	2024	PLANNED	2024	PLANNED	2024
HSK	LEHC	HUESCA/PRINEOS	NPA	30L	PLANNED	2024	PLANNED	2024	PLANNED	2024
IBZ	LEIB	IBIZA	PA	06	PLANNED	2024	PLANNED	2024	PLANNED	2024
IBZ	LEIB	IBIZA	PA	24	PLANNED	2024	PLANNED	2024	PLANNED	2024
XRY	LEJR	JEREZ	NPA	02	IMPLEMENTED	2021	IMPLEMENTED	2021	IMPLEMENTED	2021
XRY	LEJR	JEREZ	PA	20	PLANNED	2024	PLANNED	2024	PLANNED	2024
MAD	LEMD	MADRID/BARAJAS	PA	18L	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
MAD	LEMD	MADRID/BARAJAS	PA	18R	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
MAD	LEMD	MADRID/BARAJAS	PA	32L	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
MAD	LEMD	MADRID/BARAJAS	PA	32R	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
AGP	LEMG	MALAGA/COSTA DEL SOL	PA	12	PLANNED	2023	PLANNED	2023	PLANNED	2023
AGP	LEMG	MALAGA/COSTA DEL SOL	PA	13	PLANNED	2023	PLANNED	2023	PLANNED	2023
AGP	LEMG	MALAGA/COSTA DEL SOL	PA	31	PLANNED	2023	PLANNED	2023	PLANNED	2023
MAH	LEMH	MENORCA	PA	01	PLANNED	2024	PLANNED	2024	PLANNED	2024
MAH	LEMH	MENORCA	PA	19	PLANNED	2024	PLANNED	2024	PLANNED	2024
RMU	LEMI	MURCIA/REGION DE MURCIA	PA	23	PLANNED	2024	PLANNED	2024	PLANNED	2024
RMU	LEMI	MURCIA/REGION DE MURCIA	NPA	05	PLANNED	2024	PLANNED	2024	PLANNED	2024
PMI	LEPA	PALMA DE MALLORCA	PA	06L	PLANNED	2024	IMPOSSIBLE (1)	-	IMPLEMENTED	2018
PMI	LEPA	PALMA DE MALLORCA	NPA	06R	PLANNED	2024	PLANNED	2024	PLANNED	2024

ENAIRE

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IATA CODE	ICAO CODE	AIRPORT	CLASS	RUNWAY	LNAV Status	LNAV Year	LNAV/VNAV Status	LNAV/VNAV Year	LPV Status	LPV Year
PMI	LEPA	PALMA DE MALLORCA	PA	24L	IMPLEMENTED	2018	IMPLEMENTED	2018	IMPLEMENTED	2018
PMI	LEPA	PALMA DE MALLORCA	PA	24R	IMPLEMENTED	2018	IMPLEMENTED	2018	IMPLEMENTED	2018
PNA	LEPP	PAMPLONA	PA	15	PLANNED	2024	PLANNED	2024	PLANNED	2024
PNA	LEPP	PAMPLONA	NPA	33	PLANNED	2023	IMPOSSIBLE (1)	-	IMPOSSIBLE (1)	-
RJL	LERJ	LOGROÑO	NPA	11	IMPLEMENTED	2023	IMPLEMENTED	2023	IMPLEMENTED	2023
RJL	LERJ	LOGROÑO	PA	29	PLANNED	2024	PLANNED	2024	PLANNED	2024
REU	LERS	REUS	NPA	07	IMPLEMENTED	2022	IMPLEMENTED	2022	IMPLEMENTED	2022
REU	LERS	REUS	PA	25	PLANNED	2024	PLANNED	2024	PLANNED	2024
EAS	LESO	SAN SEBASTIAN	NPA	22	IMPLEMENTED	2021	IMPLEMENTED	2021	PLANNED	2024
SCQ	LEST	SANTIAGO	PA	17	PLANNED	2024	PLANNED	2024	PLANNED	2024
SCQ	LEST	SANTIAGO	PA	35	PLANNED	2024	PLANNED	2024	PLANNED	2024
VLC	LEVC	VALENCIA/MANISES	PA	12	IMPLEMENTED	2018	IMPOSSIBLE (1)	-	IMPLEMENTED	2018
VLC	LEVC	VALENCIA/MANISES	PA	30	IMPLEMENTED	2018	IMPLEMENTED	2018	IMPLEMENTED	2018
VIT	LEVT	VITORIA/FORONDA	PA	04	PLANNED	2023	PLANNED	2023	PLANNED	2023
VIT	LEVT	VITORIA/FORONDA	NPA	22	PLANNED	2023	PLANNED	2023	PLANNED	2023
VGO	LEVX	VIGO	NPA	01	IMPLEMENTED	2019	IMPLEMENTED	2019	IMPLEMENTED	2019
VGO	LEVX	VIGO	PA	19	IMPLEMENTED	2019	IMPLEMENTED	2019	IMPLEMENTED	2019
SDR	LEXJ	SANTANDER	NPA	11	IMPLEMENTED	2013	IMPLEMENTED	2013	IMPLEMENTED	2013
SDR	LEXJ	SANTANDER	PA	29	IMPLEMENTED	2013	IMPLEMENTED	2013	IMPLEMENTED	2013
SVQ	LEZL	SEVILLA	PA	09	PLANNED	2024	PLANNED	2024	PLANNED	2024
SVQ	LEZL	SEVILLA	PA	27	PLANNED	2024	PLANNED	2024	PLANNED	2024

Note: Barcelona, Madrid and Palma de Mallorca are former PCP airports, specific implementation dates apply.

Derogation codes

The following code (inserted in the table above) explain the derogations made in certain scenarios to the provisions of PBN.AUR.2005 (1).

(1.) PBN.AUR.2005 (2). Excessively difficult terrain/obstacle conditions (includes unacceptable VSS penetrations as per ICAO Doc. 8168 PANS-OPS Volume II).

Derogation cases details

- **GCLA RWY 18 3D minima**: The prolongation of the runway direction to the North, within the distance needed for the final approach segment, finds high altitude terrain on its way (over 2000 ft, compared to near to sea level situation of the airport). The misalignment needed for achieving obstacle protection exceeds the maximum allowed by ICAO Doc 8168 for RNP APCH 3D minima promulgation.

- **GCRR RWY 21 3D minima**: The orientation of the only runway of the aerodrome provokes straight-in operations to RWY 21 to overflight the island, in a direction with presence of rich terrain all along until the opposite shore. Close to aligned options suffer from VSS penetration, while misaligned options that avoid it exceed the maximum angle allowed by ICAO Doc 8168 for RNP APCH 3D minima promulgation.

- **LECO RWY 03 3D minima**: The prolongation of the runway direction to the South has close presence of considerable elevations of terrain (+800 ft over threshold within the first 5 NM) that make impossible deploying safe straight approaches. The misalignment needed for finding a suitable approach direction exceeds the maximum allowed by ICAO Doc 8168 for RNP APCH 3D minima.

- **LEPA RWY 06L LNAV/VNAV minimum**: VSS penetration by non-removable obstacles.

- **LEPP RWY 33 3D minima**: The prolongation of the runway direction to the South-east has close presence of high mountainous terrain that make impossible deploying straight approaches. The misalignment needed for finding a suitable approach direction exceeds the maximum allowed by ICAO Doc 8168 for RNP APCH 3D minima

- **LEVC RWY 12 LNAV/VNAV minimum**: VSS penetration by terrain and non-removable obstacles.

Annex G. Detailed timescales for PBN SID/STAR implementation

The objective of this Annex is to provide a more detailed description of the PBN SID/STAR implementation timescales, referring to the specific runway ends, instead of just presenting a general number. The table only includes scenarios to which the PBN IR applies and is derived from the same planning that supports Table 3. ENAIRE is also carrying on and planning implementations in scenarios out of the scope of the PBN IR wherever significant PBN operational benefits are deemed achievable.

All the implementation cases that are stated as 'IMPOSSIBLE', are due to one of the next two specific conditions:

1) The RWY end is not usable for landing, and therefore, STAR implementation is not possible (Barcelona).

2) The airport's runway configuration makes the RWY end not usable for landing or arrival (Madrid).

IATA CODE	ICAO CODE	AIRPORT	CLASS	RWY	STAR					SID				
					RNAV1/RNP1 STAR Status[1]	RF	Alt. Const.[2]	Year		RNAV1/RNP1 SID Status	Year		RF	Alt. Const.[2]
								First[3]	Full[4]		First[3]	Full[4]		
FUE	GCFV	FUERTEVENTURA	PA	01	PARTIAL IMPL.	N/A	N/A	2014	2030	PARTIAL IMPL.	2014	2030	N/A	N/A
FUE	GCFV	FUERTEVENTURA	PA	19	PARTIAL IMPL.	N/A	N/A	2014	2030	PARTIAL IMPL.	2014	2030	N/A	N/A
VDE	GCHI	EL HIERRO	VIS IFRDEP[5]	16	NOT APPLICABLE	N/A	N/A	-	-	PLANNED	2023	2030	N/A	N/A
SPC	GCLA	LA PALMA	NPA	18	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
SPC	GCLA	LA PALMA	NPA	36	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
LPA	GCLP	GRAN CANARIA	PA	03L	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
LPA	GCLP	GRAN CANARIA	NPA	03R	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
LPA	GCLP	GRAN CANARIA	NPA	21L	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
LPA	GCLP	GRAN CANARIA	PA	21R	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
ACE	GCRR	LANZAROTE	PA	03	PARTIAL IMPL.	N/A	N/A	2014	2030	PARTIAL IMPL.	2014	2030	N/A	N/A
ACE	GCRR	LANZAROTE	NPA	21	PARTIAL IMPL.	N/A	N/A	2014	2030	PARTIAL IMPL.	2014	2030	N/A	N/A

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IATA CODE	ICAO CODE	AIRPORT	CLASS	RWY	STAR					SID				
					RNAV1/RNP1 STAR Status[1]	RF	Alt. Const.[2]	Year		RNAV1/RNP1 SID Status	Year		RF	Alt. Const.[2]
								First[3]	Full[4]		First[3]	Full[4]		
TFS	GCTS	TENERIFE SUR/REINA SOFIA	PA	07	PLANNED	N/A	N/A	2023	2023	PLANNED	2023	2023	N/A	N/A
TFS	GCTS	TENERIFE SUR/REINA SOFIA	PA	25	PLANNED	N/A	N/A	2023	2023	PLANNED	2023	2023	N/A	N/A
TFN	GCXO	TENERIFE NORTE	PA	12	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
TFN	GCXO	TENERIFE NORTE	PA	30	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
ALC	LEAL	ALICANTE	PA	10	PLANNED	N/A	N/A	2025	2025	PLANNED	2025	2025	N/A	N/A
ALC	LEAL	ALICANTE	NPA	28	PLANNED	N/A	N/A	2025	2025	PLANNED	2025	2025	N/A	N/A
LEI	LEAM	ALMERIA	NPA	07	PARTIAL IMPL.	N/A	N/A	2017	2030	PARTIAL IMPL	2017	2030	N/A	N/A
LEI	LEAM	ALMERIA	PA	25	PARTIAL IMPL.	N/A	N/A	2017	2030	PARTIAL IMPL	2017	2030	N/A	N/A
OVD	LEAS	ASTURIAS	NPA	11	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
OVD	LEAS	ASTURIAS	PA	29	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
BIO	LEBB	BILBAO	PA	12	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
BIO	LEBB	BILBAO	PA	30	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
BIO	LEBB	BILBAO	VIS IFRDEP	10	NOT APPLICABLE	N/A	N/A	-	-	PLANNED	2024	2030	N/A	N/A
BIO	LEBB	BILBAO	VIS IFRDEP	28	NOT APPLICABLE	N/A	N/A	-	-	PLANNED	2024	2030	N/A	N/A
RGS	LEBG	BURGOS	NPA	04	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
RGS	LEBG	BURGOS	NPA	22	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
BCN	LEBL	BARCELONA	PA	02	FULL IMPL.	N/A	N/A	2018	2023	FULL IMPL.	2023	2023	N/A	N/A
BCN	LEBL	BARCELONA	-[6]	20	IMPOSSIBLE	N/A	N/A	-	-	FULL IMPL.	2008	2023	N/A	N/A
BCN	LEBL	BARCELONA	PA	06L	FULL IMPL.	N/A	N/A	2018	2023	FULL IMPL.	2017	2023	N/A	N/A
BCN	LEBL	BARCELONA	PA	06R	FULL IMPL.	N/A	N/A	2018	2023	FULL IMPL.	2017	2023	N/A	N/A

TRANSITION PLAN – PBN – IMPLEMENTATION IN SPAIN

IATA CODE	ICAO CODE	AIRPORT	CLASS	RWY	STAR					SID				
					RNAV1/RNP1 STAR Status[1]	RF	Alt. Const.[2]	Year First[3]	Year Full[4]	RNAV1/RNP1 SID Status	Year First[3]	Year Full[4]	RF	Alt. Const.[2]
BCN	LEBL	BARCELONA	PA	24L	FULL IMPL.	N/A	N/A	2009	2023	FULL IMPL.	2008	2023	N/A	N/A
BCN	LEBL	BARCELONA	PA	24R	FULL IMPL.	N/A	N/A	2009	2023	FULL IMPL.	2008	2023	N/A	N/A
CDT	LECH	CASTELLON	PA	06	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
CDT	LECH	CASTELLON	NPA	24	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
LCG	LECO	A CORUÑA	NPA	03	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
LCG	LECO	A CORUNA	PA	21	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
ILD	LEDA	LLEIDA/ALGUAIRE	NPA	13	PLANNED	N/A	N/A	2024	2030	PARTIAL IMPL.	2023	2030	N/A	N/A
ILD	LEDA	LLEIDA/ALGUAIRE	PA	31	PLANNED	N/A	N/A	2024	2030	PARTIAL IMPL.	2023	2030	N/A	N/A
GRO	LEGE	GIRONA	NPA	01	PLANNED	N/A	N/A	2024	2030	PARTIAL IMPL.	2023	2030	N/A	N/A
GRO	LEGE	GIRONA	PA	19	PLANNED	N/A	N/A	2024	2030	PARTIAL IMPL.	2023	2030	N/A	N/A
GRX	LEGR	FEDERICO GARCIA LORCA/GRANADA-JAEN	PA	09	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
GRX	LEGR	FEDERICO GARCIA LORCA/GRANADA-JAEN	VIS IFRDEP	27	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
HSK	LEHC	HUESCA/PIRINEOS	NPA	12R	NOT APPLICABLE	N/A	N/A	-	-	PLANNED	2024	2030	N/A	N/A
HSK	LEHC	HUESCA/PIRINEOS	NPA	30L	NOT APPLICABLE	N/A	N/A	-	-	PLANNED	2024	2030	N/A	N/A
IBZ	LEIB	IBIZA	PA	06	FULL IMPL.	N/A	N/A	2017	2017	FULL IMPL.	2017	2017	N/A	N/A
IBZ	LEIB	IBIZA	PA	24	FULL IMPL.	N/A	N/A	2017	2017	FULL IMPL.	2017	2017	N/A	N/A
XRY	LEJR	JEREZ	NPA	02	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
XRY	LEJR	JEREZ	PA	20	PLANNED	N/A	N/A	2024	2030	PARTIAL IMPL.	2011	2030	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	PA	18L	FULL IMPL.	N/A	N/A	2019	2019	IMPOSSIBLE	-	-	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	PA	18R	FULL IMPL.	N/A	N/A	2019	2019	IMPOSSIBLE	-	-	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	PA	32L	FULL IMPL.	N/A	N/A	2023	2023	IMPOSSIBLE	-	-	N/A	N/A

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IATA CODE	ICAO CODE	AIRPORT	CLASS	RWY	STAR					SID				
					RNAV1/RNP1 STAR Status[1]	RF	Alt. Const.[2]	Year		RNAV1/RNP1 SID Status	Year		RF	Alt. Const.[2]
								First[3]	Full[4]		First[3]	Full[4]		
MAD	LEMD	MADRID/BARAJAS	PA	32R	FULL IMPL.	N/A	N/A	2023	2023	IMPOSSIBLE	-	-	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	-	36L	IMPOSSIBLE	N/A	N/A	-	-	FULL IMPL.	2006	2022	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	-	36R	IMPOSSIBLE	N/A	N/A	-	-	FULL IMPL.	2006	2022	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	-	14L	IMPOSSIBLE	N/A	N/A	-	-	FULL IMPL.	2007	2022	N/A	N/A
MAD	LEMD	MADRID/BARAJAS	-	14R	IMPOSSIBLE	N/A	N/A	-	-	FULL IMPL.	2007	2022	N/A	N/A
AGP	LEMG	MALAGA/COSTA DEL SOL	PA	12	PLANNED	N/A	N/A	2023	2023	PLANNED	2023	2023	N/A	N/A
AGP	LEMG	MALAGA/COSTA DEL SOL	PA	13	PLANNED	N/A	N/A	2023	2023	PLANNED	2023	2023	N/A	N/A
AGP	LEMG	MALAGA/COSTA DEL SOL	PA	31	PLANNED	N/A	N/A	2023	2023	PLANNED	2023	2023	N/A	N/A
AGP	LEMG	MALAGA/COSTA DEL SOL	VIS IFRDEP	30	PLANNED	N/A	N/A	2023	2023	PLANNED	2023	2023	N/A	N/A
MAH	LEMH	MENORCA	PA	01	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
MAH	LEMH	MENORCA	PA	19	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
RMU	LEMI	MURCIA/REGION DE MURCIA	PA	23	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
RMU	LEMI	MURCIA/REGION DE MURCIA	NPA	05	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
PMI	LEPA	PALMA DE MALLORCA	PA	06L	PARTIAL IMPL.	N/A	N/A	2016	2030	PARTIAL IMPL.	2013	2030	N/A	N/A
PMI	LEPA	PALMA DE MALLORCA	NPA	06R	PARTIAL IMPL.	N/A	N/A	2016	2030	PARTIAL IMPL.	2013	2030	N/A	N/A
PMI	LEPA	PALMA DE MALLORCA	PA	24L	PARTIAL IMPL.	N/A	N/A	2017	2030	PLANNED	2024	2030	N/A	N/A
PMI	LEPA	PALMA DE MALLORCA	PA	24R	PARTIAL IMPL.	N/A	N/A	2017	2030	PLANNED	2024	2030	N/A	N/A
PNA	LEPP	PAMPLONA	PA	15	PLANNED	N/A	N/A	2023	2023	PARTIAL IMPL.	2009	2030	N/A	N/A
PNA	LEPP	PAMPLONA	NPA	33	PLANNED	N/A	N/A	2023	2030	PARTIAL IMPL.	2009	2030	N/A	N/A

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IATA CODE	ICAO CODE	AIRPORT	CLASS	RWY	STAR					SID				
					RNAV1/RNP1 STAR Status[1]	RF	Alt. Const.[2]	Year First[3]	Year Full[4]	RNAV1/RNP1 SID Status	Year First[3]	Year Full[4]	RF	Alt. Const.[2]
RJL	LERJ	LOGROÑO	NPA	11	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
RJL	LERJ	LOGROÑO	PA	29	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
REU	LERS	REUS	NPA	07	PARTIAL IMPL.	N/A	N/A	2023	2030	PARTIAL IMPL.	2023	2030	N/A	N/A
REU	LERS	REUS	PA	25	PARTIAL IMPL.	N/A	N/A	2023	2030	PARTIAL IMPL.	2023	2030	N/A	N/A
EAS	LESO	SAN SEBASTIAN	VIS IFRDEP	04	PARTIAL IMPL.	N/A	N/A	2021	2030	PARTIAL IMPL.	2021	2030	N/A	N/A
EAS	LESO	SAN SEBASTIAN	NPA	22	PARTIAL IMPL.	N/A	N/A	2021	2030	PARTIAL IMPL.	2021	2030	N/A	N/A
SCQ	LEST	SANTIAGO	PA	17	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
SCQ	LEST	SANTIAGO	PA	35	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
VLC	LEVC	VALENCIA/MANISES	PA	12	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
VLC	LEVC	VALENCIA/MANISES	PA	30	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
VIT	LEVT	VITORIA/FORONDA	PA	04	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
VIT	LEVT	VITORIA/FORONDA	NPA	22	PLANNED	N/A	N/A	2023	2030	PLANNED	2023	2030	N/A	N/A
VGO	LEVX	VIGO	NPA	01	PARTIAL IMPL.	N/A	N/A	2019	2030	PARTIAL IMPL.	2019	2030	N/A	N/A
VGO	LEVX	VIGO	PA	19	PARTIAL IMPL.	N/A	N/A	2019	2030	PARTIAL IMPL.	2019	2030	N/A	N/A
SDR	LEXJ	SANTANDER	NPA	11	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
SDR	LEXJ	SANTANDER	PA	29	PLANNED	N/A	N/A	2024	2030	PLANNED	2024	2030	N/A	N/A
SVQ	LEZL	SEVILLA	PA	09	PARTIAL IMPL.	N/A	N/A	2013	2030	PARTIAL IMPL.	2013	2030	N/A	N/A
SVQ	LEZL	SEVILLA	PA	27	PARTIAL IMPL.	N/A	N/A	2013	2030	PARTIAL IMPL.	2013	2030	N/A	N/A

1. Terminology clarifications: On 26 April 2023.
   - FULL IMPL.: Only RNAV1/RNP1 STAR/SID procedures deployed (Exceptions for contingency are considered).
   - PARTIAL IMPL.: At least one RNAV1/RNP1 STAR/SID procedure deployed, excluding 'FULL IMPL.' case.

- PLANNED: No RNAV1/RNP1 STAR/SID procedures deployed. There is planning for implementation.
- IMPOSSIBLE: SID/STAR deployment is not possible owing to excessive implementation difficulties.
- NOT APPLICABLE: Out of the scope of the PBN IR.

2. Operations along a vertical path and between two fixes and with the use of:
    - The 'AT', 'AT OR ABOVE' and/or 'AT OR BELOW', altitude constraints, and/or
    - The 'WINDOW' constraint.
3. Year of first deployment of RNAV1/RNP1 STAR/SID (Non-dependent of quantity of procedures).
4. Year in which RNAV1/RNP1 STAR/SID exclusivity is reached (Exceptions for contingency are considered).
5. VIS IFRDEP: Represents RWY ends usable for instrument take-off and visual landing but not for instrumental landing.
6. -: Represents RWY ends not usable for landing, neither instrumental nor visual.

RNAV 1 sensor support details

- This subsection provides information concerning the sensors used to support RNAV 1 deployed operations in Spain.
- Every other planned RNAV 1 deployment is always initially designed considering that it will be supported by all the contemplated capable sensors (GNSS, D/D, D/D/I), it is only after flight validation and the closure of the definitive designs that the final sensor situation is known.
- Hybrid procedures will be changed to full-PBN procedures when additional RNAV 1 deployments are performed in the involved scenarios. If not changed and kept, alternative full-PBN procedures will be deployed.
- All the scenarios with procedures that do not count with a 'secondary sensor' have, either conventional procedures as alternative or can count on radar vectoring. In all cases a safety assessment has been performed, taking into account the effects of the disruption of the primary sensor.

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Deployed procedures (26/04/2023)

AIRPORT	CLASS	RWY	RNAV 1 STAR			RNAV 1 SID		
			# Procedures	Primary sensor	Secondary sensor	# Procedures	Primary sensor	Secondary sensor
FUERTEVENTURA	PA	01	2	GNSS (100%)	- (Conventional procedures)	5 (2[1])	GNSS (60%) DME/DME (40%)	- (Conventional procedures)
FUERTEVENTURA	PA	19	2	GNSS (100%)	- (Conventional procedures)	3	GNSS (100%)	- (Conventional procedures)
LANZAROTE	PA	03	2	GNSS (100%)	- (Conventional procedures)	9 (3[1])	GNSS (67%) DME/DME (33%)	- (Conventional procedures)
LANZAROTE	NPA	21	2	GNSS (100%)	- (Conventional procedures)	6	GNSS (100%)	- (Conventional procedures)
ALMERIA	NPA	07	6	GNSS (100%)	- (Conventional procedures)	5	GNSS (100%)	- (Conventional procedures)
ALMERIA	PA	25	7	GNSS (100%)	- (Conventional procedures)	6[1]	GNSS (100%)	- (Conventional procedures)
BARCELONA	PA	02	17	GNSS (100%)	DME/DME (100%)	17	-	-
BARCELONA	-	20	-	-	-	28	GNSS (100%)	DME/DME (100%)
BARCELONA	PA	06L	20	GNSS (100%)	DME/DME (100%)	34	GNSS (100%)	DME/DME (100%)
BARCELONA	PA	06R	20	GNSS (100%)	DME/DME (100%)	22	GNSS (100%)	DME/DME (100%)
BARCELONA	PA	24L	19	GNSS (100%)	DME/DME (100%)	28	GNSS (100%)	DME/DME (100%)
BARCELONA	PA	24R	19	GNSS (100%)	DME/DME (100%)	28	GNSS (100%)	DME/DME (100%)
LLEIDA/ALGUAIRE	NPA	13	-	-	-	1	GNSS (100%)	DME/DME (100%)
LLEIDA/ALGUAIRE	PA	31	-	-	-	1	GNSS (100%)	DME/DME (100%)
GIRONA	NPA	02	-	-	-	1	GNSS (100%)	DME/DME (100%)
GIRONA	PA	20	-	-	-	1	GNSS (100%)	DME/DME (100%)
IBIZA	PA	06	12	GNSS (100%)	DME/DME (100%)	7	GNSS (100%)	DME/DME (100%)
IBIZA	PA	24	11	GNSS (100%)	DME/DME (100%)	7	GNSS (100%)	DME/DME (100%)
JEREZ	PA	20	-	-	-	3	DME/DME (100%)	- (Conventional procedures)

AIRPORT	CLASS	RWY	RNAV 1 STAR			RNAV 1 SID		
			# Procedures	Primary sensor	Secondary sensor	# Procedures	Primary sensor	Secondary sensor
MADRID/BARAJAS	PA	18L	12	GNSS (100%)	DME/DME (100%)	-	-	-
MADRID/BARAJAS	PA	18R	12	GNSS (100%)	DME/DME (100%)	-	-	-
MADRID/BARAJAS	PA	32L	11	GNSS (100%)	DME/DME (100%)	-	-	-
MADRID/BARAJAS	PA	32R	11	GNSS (100%)	DME/DME (100%)	-	-	-
MADRID/BARAJAS	-	36L	-	-	-	16	GNSS (100%)	DME/DME (100%)
MADRID/BARAJAS	-	36R	-	-	-	16	GNSS (100%)	DME/DME (100%)
MADRID/BARAJAS	-	14L	-	-	-	16	GNSS (100%)	DME/DME (100%)
MADRID/BARAJAS	-	14R	-	-	-	16	GNSS (100%)	DME/DME (100%)
PALMA DE MALLORCA	PA	06L	7	GNSS (100%)	DME/DME (100%)	5[1]	DME/DME (100%)	- (Conventional procedures)
PALMA DE MALLORCA	NPA	06R	7	GNSS (100%)	DME/DME (100%)	5[1]	DME/DME (100%)	- (Conventional procedures)
PALMA DE MALLORCA	PA	24L	5	GNSS (100%)	DME/DME (100%)	-	-	-
PALMA DE MALLORCA	PA	24R	5	GNSS (100%)	DME/DME (100%)	-	-	-
PAMPLONA	PA	15	-	-	-	6[1]	DME/DME (100%)	- (Conventional procedures)
PAMPLONA	NPA	33	-	-	-	4[1]	DME/DME (100%)	- (Conventional procedures)
REUS	NPA	07	2	GNSS (100%)	DME/DME (100%)	1	GNSS (100%)	DME/DME/IRU (100%)
REUS	PA	25	2	GNSS (100%)	DME/DME (100%)	1	GNSS (100%)	DME/DME/IRU (100%)
SAN SEBASTIAN	VIS IFRDEP	04	1	GNSS (100%)	DME/DME (100%)	1	GNSS (100%)	DME/DME (100%)
SAN SEBASTIAN	NPA	22	1	GNSS (100%)	DME/DME (100%)	1	GNSS (100%)	DME/DME/IRU (100%)
SANTIAGO	PA	35	1	GNSS (100%)	DME/DME (100%)	-	-	-

ENAIRE

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AIRPORT	CLASS	RWY	RNAV 1 STAR			RNAV 1 SID		
			# Procedures	Primary sensor	Secondary sensor	# Procedures	Primary sensor	Secondary sensor
VIGO	NPA	01	10	GNSS (100%)	- (Conventional procedures)	10	GNSS (100%)	- (Conventional procedures)
VIGO	PA	19	10	GNSS (100%)	- (Conventional procedures)	10	GNSS (100%)	- (Conventional procedures)
SEVILLA	PA	09	2	DME/DME (100%)	- (Conventional procedures)	1	GNSS (100%)	DME/DME (100%)
SEVILLA	PA	27	2	DME/DME (100%)	- (Conventional procedures)	3	GNSS (100%)	DME/DME (100%)

1. Hybrid procedure (initial segment based in conventional means)

Annex H. Scenarios to which the PBN IR is not applicable

The objective of this Annex is to provide a list of the scenarios in which the PBN IR does not apply, according to its current interpretation and scope. The runway ends/FATOs of these scenarios have therefore not been included in the previous annexes but are considered here in order to give a complete description of the PBN implementation planning status in Spain. As already mentioned in Annex F, implementations in this kind of scenarios are motivated by an identification of significant and achievable PBN operational benefits. The data included in this Annex is not reflected by the numbers represented in Table 2 either.

Those cells that state 'IMPOSSIBLE' refer to cases in which the implementation has been evaluated as not feasible, due to reasons related to the characteristics of each specific environment and out of the control of the agents responsible of the implementation (e.g. difficult terrain, VSS penetration, local GNSS system performance still not appropriate).

IATA CODE	ICAO CODE	AIRPORT/HELIPORT	CLASS	RUNWAY	RNP APCH status	SID/STAR RNAV 1/RNP 1 status
ABC	LEAB	Albacete	PA	09	INFO PENDING	INFO PENDING
ABC	LEAB	Albacete	PA	27	INFO PENDING	INFO PENDING
BJZ	LEBZ	Badajoz/Talavera La Real	PA	31	INFO PENDING	INFO PENDING
BJZ	LEBZ	Badajoz/Talavera La Real	NPA	13	PLANNED IN THE NEXT TWO YEARS	INFO PENDING
BIO	LEBB	Bilbao	VIS IFRDEP[1]	10	NO PLANS	See Annex G
BIO	LEBB	Bilbao	VIS IFRDEP	28	NO PLANS	See Annex G
ROZ	LERT	Cádiz/Rota	PA	10	INFO PENDING	INFO PENDING
ROZ	LERT	Cádiz/Rota	NPA	28	INFO PENDING	INFO PENDING
CQM	LERL	Ciudad Real	VIS[2]	10	INFO PENDING	INFO PENDING
CQM	LERL	Ciudad Real	VIS	28	INFO PENDING	INFO PENDING
ODB	LEBA	Córdoba	VIS	03	PLANNED: Three minima	PLANNED: Full RNAV 1 SID/STAR
ODB	LEBA	Córdoba	VIS	21	PLANNED: Three minima	PLANNED: Full RNAV 1 SID/STAR
VDE	GCHI	El Hierro	VIS IFRDEP	16	NO PLANS	See Annex G
VDE	GCHI	El Hierro	VIS	34	NO PLANS	NO PLANS
GRX	LEGR	Granada	VIS IFRDEP	27	PLANNED: LNAV minima	See Annex G

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IATA CODE	ICAO CODE	AIRPORT/HELIPORT	CLASS	RUNWAY	RNP APCH status	SID/STAR RNAV 1/RNP 1 status
-	LEGA	Granada/Armilla	NPA	36	INFO PENDING	INFO PENDING
-	LEGA	Granada/Armilla	VIS	18	INFO PENDING	INFO PENDING
HSK	LEHC	Huesca/Pirineos	VIS	30R	NO PLANS	NO PLANS
HSK	LEHC	Huesca/Pirineos	VIS	12L	NO PLANS	NO PLANS
GMZ	GCGM	La Gomera	VIS	09	PLANNED	PLANNED
GMZ	GCGM	La Gomera	VIS	27	PLANNED	PLANNED
LEN	LELN	León	PA	23	INFO PENDING	INFO PENDING
LEN	LELN	León	NPA	05	PLANNED IN THE NEXT TWO YEARS	INFO PENDING
ECV/MCV	LECU/LEVS	Madrid/Cuatro Vientos	VIS	09	INFO PENDING	INFO PENDING
ECV/MCV	LECU/LEVS	Madrid/Cuatro Vientos	VIS	27	INFO PENDING	INFO PENDING
GEQ	LEGT	Madrid/Getafe	PA	05	PLANNED	INFO PENDING
GEQ	LEGT	Madrid/Getafe	VIS IFRDEP	23	INFO PENDING	INFO PENDING
TOJ	LETO	Madrid/Torrejón	PA	22	INFO PENDING	INFO PENDING
TOJ	LETO	Madrid/Torrejón	VIS IFRDEP	04	INFO PENDING	INFO PENDING
-	LEPO	Mallorca/Pollensa	VIS/FATO	N/A	NO PLANS	NO PLANS
SBO	LESB	Mallorca/Son Bonet	VIS	05	NO PLANS	NO PLANS
SBO	LESB	Mallorca/Son Bonet	VIS	23	NO PLANS	NO PLANS
MLN	GEML	Melilla	VIS IFRDEP	33	NO PLANS	NO PLANS
MLN	GEML	Melilla	VIS IFRDEP	15	NO PLANS	NO PLANS
-	LERI	Murcia/Alcantarilla	VIS	07	INFO PENDING	INFO PENDING
-	LERI	Murcia/Alcantarilla	VIS IFRDEP	25	INFO PENDING	INFO PENDING
MJV	LELC	Murcia/San Javier	PA	23L	INFO PENDING	INFO PENDING
MJV	LELC	Murcia/San Javier	PA	05R	INFO PENDING	INFO PENDING

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IATA CODE	ICAO CODE	AIRPORT/HELIPORT	CLASS	RUNWAY	RNP APCH status	SID/STAR RNAV 1/RNP 1 status
MJV	LELC	Murcia/San Javier	VIS	23R	INFO PENDING	INFO PENDING
MJV	LELC	Murcia/San Javier	VIS	05L	INFO PENDING	INFO PENDING
QSA	LELL	Sabadell	VIS	13	NO PLANS	NO PLANS
QSA	LELL	Sabadell	VIS	31	NO PLANS	NO PLANS
SLM	LESA	Salamanca/Matacán	PA	21	INFO PENDING	INFO PENDING
SLM	LESA	Salamanca/Matacán	NPA	03	PLANNED IN THE NEXT TWO YEARS	INFO PENDING
EAS	LESO	San Sebastián	VIS IFRDEP	04	IMPLEMENTED: LNAV minimum	See Annex G
LEU	LESU	Seu D'Urgell	-[3]	21	IMPOSSIBLE	IMPLEMENTED: SID RNAV1; IMPOSSIBLE: STAR RNAV1
LEU	LESU	Seu D'Urgell	VIS	03	IMPLEMENTED: LNAV minimum IMPOSSIBLE: LNAV/VNAV and LPV minima AUR.PBN.2005 (2). Excessively difficult terrain/obstacle conditions due to the mountainous surroundings of the aerodrome.	IMPLEMENTED: STAR RNAV1; IMPOSSIBLE: SID RNAV1
OZP	LEMO	Sevilla/Morón	PA	20	INFO PENDING	INFO PENDING
OZP	LEMO	Sevilla/Morón	NPA	02	INFO PENDING	INFO PENDING
TEV	LETL	Teruel	VIS	18	INFO PENDING	INFO PENDING
TEV	LETL	Teruel	VIS	36	INFO PENDING	INFO PENDING
VLL	LEVD	Valladolid/Villanubla	PA	23	INFO PENDING	INFO PENDING
VLL	LEVD	Valladolid/Villanubla	NPA	05	PLANNED IN THE NEXT TWO YEARS	INFO PENDING
ZAZ	LEZG	Zaragoza	NPA	12R	PLANNED IN THE NEXT TWO YEARS	INFO PENDING
ZAZ	LEZG	Zaragoza	VIS IFRDEP	12L	INFO PENDING	INFO PENDING
ZAZ	LEZG	Zaragoza	PA	30R	INFO PENDING	INFO PENDING
ZAZ	LEZG	Zaragoza	NPA	30L	INFO PENDING	INFO PENDING
AEI	LEAG	(HEL) Algeciras	VIS	FATO 05	NO PLANS	NO PLANS

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IATA CODE	ICAO CODE	AIRPORT/HELIPORT	CLASS	RUNWAY	RNP APCH status	SID/STAR RNAV 1/RNP 1 status
AEI	LEAG	(HEL) Algeciras	VIS	FATO 23	NO PLANS	NO PLANS
JCU	GECE	(HEL) Ceuta	VIS	FATO 07	NO PLANS	NO PLANS
JCU	GECE	(HEL) Ceuta	VIS	FATO 25	NO PLANS	NO PLANS
-	LEAO	(HEL) Ciudad Real/Almagro	NPA	FATO 09	INFO PENDING	INFO PENDING
-	LEAO	(HEL) Ciudad Real/Almagro	NPA	FATO 27	INFO PENDING	INFO PENDING
-	LELO	(HEL) Logroño/Agoncillo	NPA	FATO 28	INFO PENDING	INFO PENDING
-	LELO	(HEL) Logroño/Agoncillo	VIS	FATO 10	INFO PENDING	INFO PENDING
-	LECV	(HEL) Madrid/Colmenar Viejo	VIS	FATO 03	INFO PENDING	INFO PENDING
-	LECV	(HEL) Madrid/Colmenar Viejo	VIS	FATO 21	INFO PENDING	INFO PENDING
-	LECV	(HEL) Madrid/Colmenar Viejo	NPA	FATO 2 (340º-160º)	INFO PENDING	INFO PENDING
-	GEHM	(HEL) Melilla	VIS	FATO 12	INFO PENDING	INFO PENDING
-	GEHM	(HEL) Melilla	NPA	FATO 30	INFO PENDING	INFO PENDING
-	LETA	(HEL) Serveis generals del Circuit de Catalunya	VIS	FATO 03	NO PLANS	NO PLANS
-	LETA	(HEL) Serveis generals del Circuit de Catalunya	VIS	FATO 21	NO PLANS	NO PLANS
-	LEEC	(HEL) Sevilla/El Copero	NPA	FATO 03	INFO PENDING	INFO PENDING
-	LEEC	(HEL) Sevilla/El Copero	VIS	FATO 21	INFO PENDING	INFO PENDING
-	GCXM	(HEL) Tenerife Norte/Los Rodeos	VIS	FATO 11H	INFO PENDING	INFO PENDING
-	GCXM	(HEL) Tenerife Norte/Los Rodeos	VIS	FATO 29H	INFO PENDING	INFO PENDING
-	LEBT	(HEL) Valencia/Bétera	NPA	FATO 09	INFO PENDING	INFO PENDING

IATA CODE	ICAO CODE	AIRPORT/HELIPORT	CLASS	RUNWAY	RNP APCH status	SID/STAR RNAV 1/RNP 1 status
-	LEBT	(HEL) Valencia/Bétera	VIS	FATO 27	INFO PENDING	INFO PENDING

1. VIS IFRDEP: Represents RWY ends usable for instrument take-off and visual landing but not for instrumental landing.
2. VIS: Represents RWY ends usable only for visual take-off and visual landing.
3. -: Represents RWY ends not usable for landing, neither instrumental nor visual.

Annex I. Consultation process

As explained in the first chapters of this document, in accordance with article 4 of the PBN IR, and due to ENAIRE being the sole Spanish ATM/ANS provider undertaking the development of the content, the following parties have been consulted on any version of the draft Transition Plan and any draft significant updates, and their views taken into account where appropriate:

- Civil ATM/ANS providers based in Spain: Saerco and Ferronats
- Pan-European ATM/ANS providers: ESSP.
- Spanish military.
- Network Manager.
- Authorities: DGAC, AESA.
- European organizations: CE, EUSPA.
- Spanish public organizations and law enforcement bodies: DGT, INTA, AEAT, Ertzaintza, Policía Nacional, Guardia Civil, Mossos d'Esquadra.
- Aerodrome operators: Aena, Aeroports de Catalunya, AEROCAS (Castellón), CRIA (Ciudad Real), PLATA (Teruel).
- Airspace users: Air Europa, Air France, Air Nostrum, Easyjet Airlines, Iberia, Iberia Express, Ryanair, TAP Portugal, Vueling Airlines, Babcock, Naysa, Wamos Air, Albastar, Binter Canarias, Gestair, SASEMAR, Swiftair,
- Representative organizations: IATA, ACETA, AECA, ALA. COPAC, RACE, AOPA, AEPAL.
- Providers of ATM/ANS that provide their services in adjacent airspace blocks: ASA Cabo Verde, DSNA, ENNA, ONDA, NATS, NAV Portugal, OACA.

The consultation processes undertaken, and their specific details are explained below:

1st consultation process

- Delivery of draft version 1.0 for revision:
    - General delivery: 15/11/2019
    - Delivery to adjacent ATM/ANS service providers: 19/12/2019
    - Delivery to NM: 02/04/2020
- Feedback received and resolution:
    - Aeroports de Catalunya, Ertzaintza, Iberia Express, KLM and Swiftair: Punctual doubts about the Transition Plan, which were answered with no further interaction.

- IATA: Punctual doubts about the Transition Plan were answered and a few minor text modifications were included.
- NM: Consultation about the targeted IREs and suggestions for improvement of the document. After discussion, the suggested changes were included in the Transition Plan, which led to the final content of its first version.

2nd consultation process

- Delivery of draft version 2.0 for revision:
  - Saerco and Ferronats: 15/10/2021
  - Authorities and Aerodrome operators: 18/11/2021
  - General delivery: 17/12/2021
- Feedback received and resolution:
  - Saerco, Ferronats, Aena, Guardia Civil: Punctual doubts about the Transition Plan, which were answered with no further interaction.
  - IATA, AESA: Punctual doubts about the Transition Plan were answered and a few minor text modifications were included.
  - NAV Portugal: Request for coordination for conventional navaids rationalization and conventional ATS routes planning. Fully agreed by ENAIRE's side.
  - NM:
    - Complete feedback sent concerning the compliance of the Transition Plan against the PBN IR requirements and content suggestions. ENAIRE sent back appropriate answers.
    - Both parties agreed organizing a bilateral meeting in which the feedback and the next steps concerning Spanish Transition Plan were addressed. As a consequence, second version of the document was deemed complete, and compromise for a new version allocating the received feedback was established.

3rd consultation process

- Delivery of draft version 3 for revision:
  - General delivery: 27/03/2023.
  - Delivery to EASA and NM: week 26 of 2023 (between 26/06/2023 and 30/06/2023)
- Feedback received and resolution:.

- NAV Portugal: Agreement with the concept and invitation for continued coordination.

- Aeropuerto Internacional Región de Murcia: Punctual doubts about the Transition Plan and suggestions for next version, which were answered with no further interaction.