(EU) 2018/1048 Art. 4

PBN Transition Plan NORWAY

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VERSJON	DATO	BESKRIVELSE	UTARBEIDET	KONTROLLERT	GODKJENT
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2.2	2023 – 06 – 22	For konsultasjon med Eurocontrol	CAALV	OSHJH, CARRI	BOASK
2.1	2023 – 05 – 15	For ekstern nasjonal konsultasjon	CAALV	OSHJH, CARRI	BOASK
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0.9.	11.09.2020	CAALV	For internal comments	For Comments
1.0	18.09.2020	CAALV, CAETA, CARRI, OSHJH	For consultation	For Approval
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1.9	30.11.2022		For Comments-version NCAA	Consultation
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2.1	15.05.2023	CAALV, CARRI, OSHJH	New revision with extended consultation	For Comments
2.2	21.06.2023	CAALV, CARRI, OSHJH	For Eurocontrol / N.M. consultation	For consultation
2.3.	13.07.2023	CAALV, CARRI, OSHJH	For APPROVAL by Luftfartstilsynet (N-CAA)	

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1 Introduction

1.1 Introduction & Executive summary

This document describes the transition into the PBN-environment for Norwegian Aerodrome Operators and ANSP's. The document is produced by the Avinor Group, consisting of Avinor ANS (i.e. the ATS provider) and Avinor (the CNS-, PD- and DAT- provider; and also Airport Operator). Information has been gathered and is presented as one document including all Norwegian airports that are published in the national AIP (which is produced by Avinor AS).

The transition as described in this document will follow applicable change management processes as required by EU 2017/373 and handled as "multi-actor change"; where Avinor ANS is the primary stakeholder coordinating the change management with involved other certified ANS suppliers (ie. Saerco) and the CNS-, PD-, DAT-supplier (Avinor AS).

Saerco was consulted prior to the first issue of the "PBN transition plan – Norway", and it was agreed that as the airports (ENCN and ENAL) would not be affected by decommissioning, there would be no need for further work on their behalf (i.e. change management). As this principle has not changed, and details regarding ENCN and ENAL has not changed in this revision, Saerco has not been further consulted for this revision.

It should be noted that since the "PBN Implementation project" was completed in 2017 (initiated in 2013); with RNP APCH implemented at all eligible runway ends; this document focuses on the transition related to decommissioning and rationalization of conventional navigation aids and procedures.

In 2018 the EGNOS coverage area was increased up to 72° northern latitude, enabling the addition of an LPV minima also for the aerodromes in on the northern tip of the Norwegian mainland. This inclusion has been completed and published in AIP Norway, however, due to performance values especially relating to continuity fall below ICAO requirements, not all LPV minima are operational.

Furthermore, the implementation of RNP-AR procedures is ongoing where this has a benefit on safety or the environment. Avinor aim to implement RNP-AR to all IRE where possible by the end of 2028 – provided a majority of the aircraft serving the airport commit to use the procedures (i.e. equip aircraft with INS, certify both aircraft and crew, and use the procedures operationally).

In a transition, after implementation, comes rationalization. The decommissioning will be based on ICAO guidelines, EU regulations and guidelines (EASA and Eurocontrol), and EU SJU implementation targets for Single European Skies.

Decommissioning will take place in two waves:

1) from 2020-2025: rationalization of duplicated procedures and equipment.

2) from 2026-2030: rationalization to exclusive use of PBN; with only designated airports and airspace providing navigation services based on conventional procedures and equipment

This implies that certain smaller airports, due to cost avoidance ("lifecycle management/end-of-life" considerations) and reduction of "sunk costs" will transition to "GNSS only"-service from 2025 onwards. Considering the strain in AIP services, including required re-design associated with the withdrawal of conventional procedures and airspace design alterations; all airports not designated as required in GNSS contingency situations will complete the transition by year-end 2030.

European Commission Implementing Regulation (EU) 2018/1048 – Article 4

The transition plan as presented in this document is the result of the cooperation been Saerco (ATS at ENAL and ENCN), Avinor ANS (ATS remaining AD's), and Avinor AS (AO, CNS-, PD- and DAT-provider).

All commercial- and State- operators (or organization representing them), including airspace users organized in NLF (Norwegian Aerial Sports organization), have been consulted in the period August – September 2022, and again in November. In March, the national healthcare provider responsible for air ambulance services was consulted, as one of the major stakeholders when procuring services from Operators. This has prompted a new revision of the PBN Transition Plan Norway.

Date	Type	Stakeholder	Outcome / comments
24.08.2022	Meeting 1:1	Norges LuftsportsForbund (Norwegian air-sports federation)	Information noted. No comments.
24.08.2022	Meeting 1:1	Norges flygerforbund (Association of Norwegian pilots)	Information noted. Significant part of the meeting used to discuss RFI issues in north-eastern Norway, and the corrective actions taken by ANSP. Ref. section 3.3 & 3.4.
24.08.2022	Meeting 1:1	Babcock Air Ambulance Norway (Since changed name to *Avincis Aviation Norway AS*)	No show. Communication on email focusing on avionics and equipment onboard. Would prefer RNP-AR to challenging airports especially in the west.
25.08.2022	Meeting 1:1	Widerøe Flyveselskap AS (plus, post-meeting emails up to and including April 2023)	Focus on robustness and as far as practicable coordinate the decommissioning with new avionics. It is noted that nav-aids will not be replaced when reaching end-of-life, but that individual considerations may be required for some especially complicated locations. Focus on robustness, and possibilities offered be RNP-AR.
26.08.2022	Meeting 1:1	Royal Norwegian Air Force	Focus on robustness in ANS provision. Further details of the meeting are kept confidential.
8.11.2022 9.11.2022	Meeting, all operators trafficking Norwegian airports invited. Minutes distributed to all regardless of attendance	Avinor Flytryggings-møte (Central Aerodrome Safety Committee – all Avinor airports and all operators using these invited)	Information noted. Significant part of the meeting used to discuss RFI issues in north-eastern Norway, and the corrective actions taken by ANSP. Ref. section 3.3 & 3.4. Some questions regarding the "definition" of <u>exclusive use</u> at larger aerodromes with ILS CAT-I facilities and use of facilities that will remail based on Art. 6 "contingency measures" reasons.

27.03.2023	Meeting 1:1	Helseforetaket Luftambulanse-tjenesten HF (Norwegian Helthcare Services, department for Air Ambulance Services)	Information noted. Significant part of the meeting used to discuss RFI issues in north-eastern Norway, and the corrective actions taken by ANSP. Ref. section 3.3 & 3.4.
May 2023	Written correspondence	EUROCONTROL (plural) CAA's of: Finland, Sweden.	*Reviewed by Eurocontrol, updated relevant sections/items*
June 2023	Written correspondence	Eurocontrol (Network Manager)	*From Eurocontrol:* *"The NM consultation on this version of the document is* ***complete****."*

The feedback is generally focusing on the missing consolidation between different international, regional and national legislation; and generally, that EU 2018/1048 is not explicit in the expectation towards airspace users and their obligations to conform to EU 2018/1048; and to a certain degree that the a.m. Implementing Rule does not apply to them. Secondly, it is pointed out that there is a "missing link" in the IR, in relation to the ICAO requirements (annex 10, attch. H), the efficiency required by EU SES II, and national strategies and regulations, when it comes to the ANSP/AO's rationale and justification for rationalization.

It is our understanding that, apart from the mentioned interpreted "lack of coherence" and explicit justification, no substantial negative inputs to the plan and subsequent decommissioning were raised, provided the normal procedure for decommissioning of conventional navigations aids is followed (ie. a formal hearing is carried out 2-6 months before the nav-aid is withdrawn from the AIP).

One might argue that it hence is unclear what the "legal status" of *PBN Transition Plan - Norway* is as operators still expect a "duplicated procedure" wrt. an official hearing, and possibly also follow up of potential comments to the hearing, for each nav-aid identified in the Plan.

It is also noted, and greatly welcomed having in mind the operators and airspace users' comments, that EASA in Q4 2022 released/publish an official document (Opinion or Decision) aimed at operators and airspace users, describing the expectations and obligation also for this section of the air transport community.

Communication with neighboring countries/airspace blocks has not been carried out at this revision, as there are no significant changes to this revision of the Plan that describes navigation aids having cross-border use.

The next revisions are planned for 2024, with focus on the requirements coming into force on 24.01.2024; and also special emphasis on decommissioning of navaids resulting in the first "GNSS only" airports (preparing the start of "wave 2").

Further revisions of this document should be expected in 2026, 2028 and 2030.

1.2 International legislation and obligations

1.2.1 ICAO A.37/11, ICAO GANP, EUR ICAO

ICAO Assembly resolution 37/11 requires States to develop a PBN implementation plan. The State is bound by the following high-level principles:

- endorses ICAO and is committed to following the Global Air Navigation Plan (GANP) – stipulate any non-compliance listed in the AIP.
- endorses the PBN Manual (ICAO Doc 9613).
- recognizes and is committed to complying with General Assembly Resolution 37/11 of 2010.
- ICAO Annex 10, Vol. I, Attachment H: *Strategy for Rationalization of conventional Radio Navigation Aids and Evolution toward supporting Performance-based Navigation.*

ICAO Resolution 37/11: Urges all States to implement RNAV and RNP air traffic services (ATS) routes and approach procedures in accordance with the ICAO PBN concept laid down in the Performance-based Navigation (PBN) Manual (Doc 9613). This resolution covers all phases of flight, and only specifies the kind of specification for the final approach phase. Thus, the wording is broad though the intention clear.

ICAO Doc 9750, the Global Air Navigation Plan (GANP) identifies PBN as the “highest priority” and outlines implementation issues involving PBN planning and implementation as part of the Aviation System Block Upgrades (ASBUs).

Also from ICAO Annex 10, Vol. I, Attachment H:

Attachment H *Annex 10 — Aeronautical Communications*

3.6.4 In a few limited cases, it may not be possible to provide the same level of benefits through the application of PBN as is possible when using conventional navigation capabilities, due to procedure design limitations or other aspects such as terrain-constrained environments. States are invited to bring these cases to the attention of ICAO.

4. STRATEGY

Based on the considerations above, the need to consult aircraft operators and international organizations, and to ensure safety, efficiency and cost-effectiveness of the proposed solutions, 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.

— END —

1.2.2 EU legislation: EASA Basic Regulation and Implementing Rules

The State recognizes the following European regulations, and compliance thereto:

a) SES regulations and target objectives
b) EU BR 216/2008
c) CP1 IR (EU) 2021/116
d) PBN IR (EU) 2018/1048
e) ATS (EU) 2017/373 [applicable for Air Navigation Service Suppliers]
f) ADR (EU) 2014/139 [applicable for Aerodrome Operators]
g) SERA (EU) 2016/1185 [generally applicable for Operators]

The PBN IR, EU Regulation 2018/1048; article 4 requires States to develop a PBN Transition Plan. Norway views the PBN Implementation Plan and PBN Transition Plan in a single initiative.

Timeline for implementation:

PBN IR Article 4 & 7 Applicability with AUR.2005		Applies 03/12/2020	Applies 25/01/2024	Applies 06/06/2030
Art 4	Transition Plan *(or significant updates)* approved *(living document)*[1]	X[1]	X[1]	X[1]
AUR.2005 1/2/3	RNP APCH at IREs without Precision Approach (PA)	X		
	RNP APCH at all IREs (with PA)		X	
AUR.2005 4/5	RNAV 1 or RNP 1 (+ RF if required) SID and STAR - one per IRE		X	
	RNAV 1 or RNP 1 (+RF if required) for all SID and STARs			X
AUR.2005 6	RNAV 5 ATS Routes (excl. SIDs/STARs) at and above FL150[2]	X		
	RNAV 5 ATS Routes (excl. SIDs/STARs) below FL150		X	
AUR.2005 7	Helicopter RNP 0.3 or RNAV 1 or RNP 1 (+RF if required) SID/STAR - one per IRE		X	
	Helicopter RNP 0.3 or RNAV 1 or RNP 1 (+RF if required) for all SID/STAR			X
	Helicopter RNP 0.3 or RNAV 1 or RNP 1 ATS Routes (excl. SIDs/STARs) below FL150		X	

Note 1 - The transition plan will have several iterations; Article 4 requires that the draft/significant updates to the plan must be approved by the competent authority ***early enough*** *to provide sufficient time for the ANSPs to meet the identified implementation date. (Sufficient time would include accounting for the AIRAC cycle dates, publication and regulatory approval and compliance with other national requirements - see the PBN Portal for an example of the implementation scheduling and time required: https://pbnportal.eu/epbn/main/PBN-Tools/Planning-Estimation.html). The planned implementation dates detailed in the transition plans should be commensurate with the target date obligations.*

Note 2 - CP 1 requires FRA to be implemented with two milestones: 2022 & 2025. FRA is associated with RNAV 5 through the ICAO EUR requirement for RNAV 5 published in ICAO Doc 7030. (CP 1's revised FRA requirements replace previous requirements in the PCP IR).

In Norway the PBN Implementation plan has existed for roughly a decade, and the current plan is in its 4th revision. Hence, as implementation in the pragmatic sense has already been completed, the PBN Transition plan focuses on the rationalization activities.

Implementation has always been dependent on an over-all positive business case for the aviation community, while also upholding or improving the safety standard and increasing capacity. The cost related to PBN implementation for ANSP, and Airport Operators, arise from implementing procedures for air navigation – both air operations (PANS OPS procedures), and service provision; ATM (PANS ATM). A considerable part also stems from ensuring the safety level is maintained in the transition as well as in operations (including training-, safety- and administrative activities).

For the aircraft operators, implementation cost is related to avionics; in addition to already mentioned changes for ANSP/AO. Benefits of PBN related to increased safety, more efficient routing, and capacity increase, are achieved in the implementation activities - and the positive factors of the equation are hence accumulating.

For the ANSP and AO, much of the savings from PBN implementation comes in the form of reduced costs of ground based conventional navigation aids. This in turn affecting the TNC and aerodrome charges (and as a secondary effect improves the operator's financial results). However, this depends on the rationalization capability.

As the investment-costs related to implementing PBN has already been absorbed, and this document aims at describing the activities related to rationalization/decommissioning required in order to achieve a reduction of operating costs.

The PBN IR is found to support the later, in article 5:

Article 5

Exclusive use of PBN

1. Providers of ATM/ANS shall not provide their services using conventional navigation procedures, or using performance-based navigation which is not in accordance with the requirements of point AUR.PBN.2005 of the Annex.

2. Paragraph 1 shall be without prejudice to Article 6 and to the possibility of providers of ATM/ANS to provide their services using landing systems enabling CAT II, CAT IIIA or CAT IIIB operations within the meaning of points 14, 15 and 16, respectively, of Annex I to Regulation (EU) No 965/2012.

Article 6

Contingency measures

Providers of ATM/ANS shall take the necessary measures to ensure that they remain capable of providing their services through other means where, for unexpected reasons beyond their control, GNSS or other methods used for performance-based navigation are no longer available, making it impossible for them to provide their services in accordance with Article 3. Those measures shall include, in particular, retaining a network of conventional navigation aids and related surveillance and communications infrastructure.

From Articles 5 & 6 the following is derived:

Except for operations depending on ILS CAT-II/III, as of 06.06.2030 conventional navigation aids will not have any purpose, except for the event of failure in PBN-components; either in the space segment, with signal propagation, or in the aircraft.

This implies unless a contingency situation is present, the use of conventional procedures is prohibited. In the case of a contingency situation, the aircraft is expected to:

1) if the destination is an airport with conventional nav-aids: continue to destination

2) if the airport is a "GNSS-only"-airport: divert to the designated alternate aerodrome (according to its flight plan) with conventional nav-aids

Considering the need to operate a safe, but cost-efficient network of airports and navigation services implies that rationalization of procedures and the equipment supporting these is required, and dictated by the regulations (EU SES, ICAO, etc).

As Norwegian airports along the shoreline are generally located in challenging terrain, Avinor as the airport operator, has opted to implement RNP-AR provided operators are or will be compliant, according to AUR.PBN.2005(2):

AUR.PBN.2005 Routes and procedures

(1) Providers of ATM/ANS shall implement, at all instrument runway ends, approach procedures in accordance with the requirements of the RNP approach (RNP APCH) specification, including LNAV, LNAV/VNAV and LPV minima and, where required due to traffic density or traffic complexity, radius to fix (RF) legs.

(2) By way of derogation from point (1), at instrument runway ends where, due to terrain, obstacles or air traffic separation conditions, the implementation of 3D approach procedures is excessively difficult, providers of ATM/ANS shall implement 2D approach procedures in accordance with the requirements of the RNP approach (RNP APCH) specification. In that case, they may also, in addition to the implementation of those 2D approach procedures, implement 3D approach procedures in accordance with the requirements of the RNP authorisation required (RNP AR APCH) specification.

1.3 Norwegian Legislation

1.3.1 BSL G 6-2 and the Norwegian Aeronautical Navigation Strategy

The Norwegian legislation in this field is based on EU IR 2018/1048 and implemented as BSL G 6-2. (FOR-2019-02-15-120)

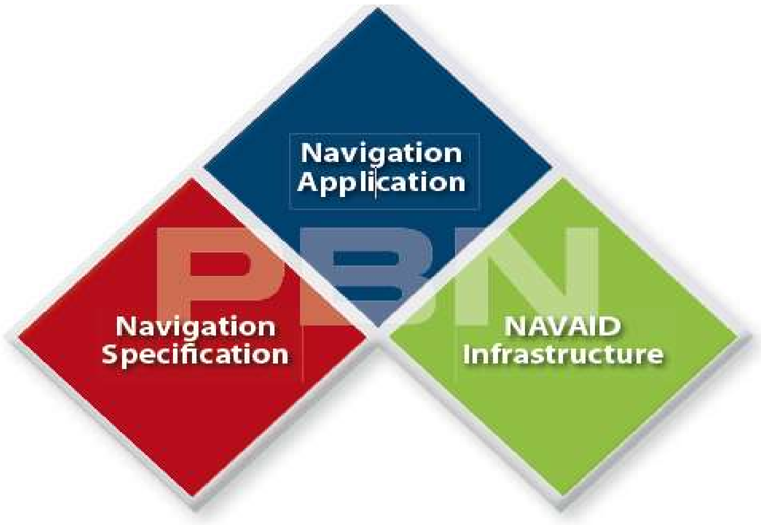
In addition, the Norwegian CAA has developed the document “Navigasjonsstrategi for luftfart i Norge”. This document serves as an overall strategy for the State needs wrt. air navigation.

The implementation of PBN was generally driven by a focus on increased safety through implementation of vertically guided instrument approach procedures. But one should also bear in mind the positive effects on the environment; both with regards to emissions as well as noise-reduction above populated areas. A reduction in environmental impact stems from the implementation of Free Routes Airspace which provides more efficient and direct routing for the airspace users; thereby reducing emissions. Improved flight efficiency is also achieved through the introduction of RF turns on SIDs, STARs, and IAP’s, which enables shorter routes to be developed – and noise sensitive areas to be avoided.

RNP operations require the use of GNSS, and Norway has authorized the use of GNSS in all flight phases within Norwegian airspace.

2 Currently available Navigation Services

Norwegian airspace is currently operating in a mixed-mode, serving both PBN-equipped aircraft and conventionally equipped aircraft alike. There is also a significant duplication of the conventional navigation service in addition to the service offered by PBN(GNSS).



2.1 Airspace Structure

Airspace structure and its description is available in AIP Norway.

The information is also available in the service offered by IPPC.no, derived from the AIP.

2.1.1 En-route

PBN implementation in en-route airspace is completed and based on GNSS, with a VOR/DME Minimum Operating Network available for GNSS outages/contingency situations.

Within Avinor ANS, the following have been implemented:

- Above FL 135 implemented Free Route Airspace in line with CP1 AF#3 as DCT
- In en-route airspace at and above FL135 introduced RNAV 5 ATS routes in accordance with the PBN IR.
- In en-route airspace below FL135, introduced RNAV 5 ATS routes in accordance with the PBN IR.

2.1.1.1 Continental (Norway FIR)

ATS-routes (en-route phase) are based on RNAV 5 with GNSS and VOR/DME as supporting infrastructure.

All Routes above FL 95 and Free Route Airspace above FL135 is based on GNSS supported RNAV 5 specification.

2.1.1.2 Oceanic (Bodø OFIR)

Flights operating in Bodø OFIR have to be certified according to Minimum Navigation Performance System (MNPS) specifications. Procedures stated in ICAO Doc 7030/4 - North Atlantic (NAT) Regional Supplementary Procedures apply.

There are currently 3 ATS routes between mainland Norway and Svalbard. These are classified as RNP 10 in Bodø OFIR (NAT region).

2.1.2 TMA

2.1.2.1 Arrival and departure – ATC airports

Arrival and departure procedures are supported by RNAV SID and STAR based on GNSS, with DME/DME or VOR/DME as supporting infrastructure. Current status is reflected in Appendix III

2.1.2.2 Arrival and departure – AFIS airports

Most smaller AFIS aerodromes does not have a STAR in the traditional sense, instead they have Arrival procedures are mainly based upon appropriate certified aircraft using a published Terminal Arrival Altitude (TAA) concept that enable them to fly directly to a RNAV waypoint from where a RNAV(GNSS) (or SCAT-I) procedure can be executed. Alternatively, a DCT routing to a conventional navigation aid from where a conventional instrument approach may be executed.

Departure procedures are to a great extent based on Conventional Omni-SID; and supported by “company procedures” with some exceptions. Current status is reflected in Appendix III.

2.1.3 Aerodromes

The PBN Implementation project was completed in 2017 (initiated in 2013); with

- RNP APCH implemented at all eligible runway ends; as well as
- Conventional procedures replaced* with RNAV1 SIDs and STARs.

* Except ENAN. SID not available. STAR available only as conventional; RNAV 1 STAR in planning.

Note: local airports with limited traffic volume do not generally have SID and STAR. Departures are usually manually deconflicted via 5LNC RNAV points if required; and arrivals are cleared directly to IAP’s from en-route phase.

In 2018 the EGNOS coverage area was increased up to 72° northern latitude, enabling the addition of an LPV minima also for the aerodromes in on the northern tip of the Norwegian mainland. This inclusion is in progress, but there are some outstanding issues that need to be resolved prior to approval from the Norwegian regulator.

Furthermore, the implementation of RNP-AR procedures where this has a benefit on safety og the environment is ongoing. RNP-AR is already operational at ENGM, ENEV, ENHD, ENVA, and under implementation at ENBR, ENZV and ENSB. Amongst airports with an expressed need for RNP-AR procedures are ENTC, ENKR, ENAT, ENAL. A number of local airports would also benefit from RNP-AR procedures, but so far none of the operators on these airports are certified to fly them (and hence the cost/benefit analysis is negative).

New in this revision, is that Avinor will aim to provide RNP-AR procedures to all IRE's; in order to increase safety and availability of the airport through lower minima. Also, the RNP-AR aims to reduce the track miles flown in an approach; and hence reducing the fuel consumption – thereby greatly reducing the CO2 emissions, as well as fuel costs for the operators.

List over implemented PBN-procedures and status for specific TMA's and aerodromes is summed up in Annex I.

2.1.4 Currently available Approaches – ATC airports

All ATC airports have RNAV (GNSS) procedures implemented. Primary infrastructure is GNSS; supported by either VOR/DME or DME/DME as a secondary infrastructure. ILS is provided to at least one RWY if not both; and supplemented by non-precision procedures based on VOR/DME and/or NDB.

2.1.5 Currently available Approaches – AFIS airports

All AFIS airports have RNAV (GNSS) procedures implemented.

Most of the AFIS airports have a LOC/DME procedure to one RWY supplemented by non-precision procedures based on VOR/DME and/or NDB. Some AFIS airports have only non-precision procedures based on VOR/DME and/or NDB.

In addition, 17 AFIS airports have implemented SCAT-I procedures to one or both runways (geography permitting).

Coordinated with the implementation of SCAT-I procedures, RNAV (GNSS)-LNAV procedures are being implemented with GNSS or GNSS and DME/DME as supporting infrastructure (ref also PBN Implementation plan Norway)

2.2 Training: ATCO & ATSEP

Avinor AS and Avinor ANS developed a training program as part of implementing PBN Instrument Procedures throughout Norway. This program was implemented in the form of presentations and lectures on location, as well as various digital information packets and presentations.

2.3 Operator capabilities

The information contained in this section is derived from the Norwegian Aeronautical Navigation Strategy as prepared by the Norwegian Civil Aviation Authority.

2.3.1 Aircraft fleet equipage

It should be noted that the trend is a growing demand for SBAS-capable avionics, as the positive advantages of a geometric glidepath is recognized as it greatly reduces the risks of. a CFIT due to wrong input of QNH.

Operators urge the avionic community to come up with solutions enabling the use of geometric glidepath also for RNP-AR operations; in practice that RNP-AR can rely on GNSS+SBAS as altitude source for the (geometric) glidepath. The implementation of a geometric glidepath (based on GNSS+SBAS) for RNP-AR is considered to be some years in the future, as significant principal decisions both in IFPP and for avionics community wrt. functionality and design needs to conclude.

Generally, the airspace users may be divided in the following groups:

Airlines flying national and international routes:

- all major operators are PBN compliant to RNP 1 and RNP APCH (generally based on Baro-VNAV) to LNAV/VNAV minima. Some are also becoming operational to LPV minima (we have been informed that newer B737 aircraft operated by Norwegian are SBAS capable, and also SAS new Airbus-fleet are SBAS capable providing the product key for the avionics SW is purchased by the operator).
- medium size jet-fleet is generally capable of RNP-AR (RF-legs, RNP 0.1 to RNP 0.3 nm).

Airlines flying regional routes

- PBN compliant to RNP 1 and RNP APCH (based on LNAV/VNAV and LPV)

- a minority (air-ambulance operator, and small percentage of regional airliners) capable of RNP to SBAS to (LPV) minima; however, the percentage is growing

- majority not capable of RNP-AR – However there are plans also in the regional airliners segment to retrofit airframes to RNP-AR capable of RF-legs and accuracy down to RNP 0,1. The justification is Avinor's BIUF-projects, where RNP-AR is foreseen to significantly improve regularity and safety through 3D guidance down to much lover minima.

General aviation, commercial operators (business jets, air ambulance etc.)

- PBN compliant to RNP 1 and RNP APCH (based on LNAV/VNAV and LPV)

- best equipped are capable of RNP-AR (RF-legs, RNP 0.1). Majority are partly compliant in that equipment/avionics are available, but crew is not certified and/or company procedures are not available and/or approved by NCAA for RNP-AR operations.

General Aviation, recreational actors

- Minority are PBN compliant to RNP 1 and RNP APCH (based on LPV). Majority partly compliant in that equipment/avionics are available, but aircraft not crew is certified.

Helicopters

- Offshore helicopters are generally equipped for RNP APCH, based on LNAV/VNAV and/or LPV. Some also expected to obtain RNP-AR approvals. This is also valid for SAR helicopters (AW101) operated by RNoAF and CHC (SAR services on contract from Ministry of Justice).

- Smaller helicopters operating inland may be divided into two sub-categories:
    a) Air ambulance: operate on low-level RNP routes when not on VFR.
    b) Others: generally, operate low-level VFR only.

Military/State Aircraft

- RNoAF is partly PBN-capable (C130J, AW101, P-8, and F-35 assumed capable); older aircraft assumed not capable (such as the Bell 412SP). It should be noted that military applications of GPS (including the PPS) imply that the navigation capability is not inferior to the civil avionic systems; however not all State aircraft seek dual certification; and hence although in practice capable, they are remain not certified as such.
It is assumed that allied forces have the same status.

2.3.2 Current operational environment

The table below summarizes the airspace in relation to current navigation specification and corresponding CNS / navigation-aids supporting the nav-spec.:

Flight phase	NAV-application	NAV specification	NAV infrastructure (primary)	NAV infrastructure (contingency)	NAV application (contingency/ Fall-back procedures)
En-route	ATS-routes	RNAV 5 RNP 10***	GNSS	VOR/DME (required) Surveillance	Surveillance service (vectoring)
TMA / TIA	SID/STAR	RNAV 1	GNSS	VOR/DME or DME/DME (where available) NDB Surveillance	Conventional SID/STAR Surveillance service (vectoring)
CTR / TIZ	IAP	RNP APCH APV and RNP-AR	GNSS	Conventional (ILS, VOR/DME, NDB, SCAT-I)	Conventional IAP (type/number based on operational analysis)

2.4 PBN Implementation plans and future operational environment

2.4.1 Future operating environment

The major drawback with PBN is its dependance on GNSS, and its relatively weak satellite signals susceptible to disturbances from both natural and man-made sources.

It should be noted that in some scenarios, GNSS is “one component” even though the systems consist of several satellite systems (GPS, Galileo, Glonass, Beidou, etc.); and those again are built up with many individual satellites (each constellation typically have 20-30 satellites operational).

Also, service indicating values such as MTBO, is not defined as for conventional systems. The navigation service is described by statistical probability values related to availability, continuity, integrity and accuracy; where the “NavStar Global Positioning Service” (aka GPS) for instance by design only offers a position-solution within a certain accuracy 95% of the time. This is again transposed to Vertical and Horizontal alarm limits; to which ICAO has defined a required probability to stay within..

This has since been converted into Navigation Specifications referring to Required Navigation Performance (RNP) for certain airspace volumes and different operations within these.

With the implementation of EU 2018/1048, the infrastructure available will be:

Flight phase	NAV-application	NAV specification	NAV infrastructure (primary)	NAV infrastructure (contingency)	NAV application (contingency/ Fall-back procedures)
En-route	ATS-routes	RNAV 5 RNP 10***	GNSS	VOR/DME (required) Surveillance	
TMA / TIA	SID/STAR	RNAV 1	GNSS	VOR/DME or DME/DME (where available) Surveillance**	Conventional «company proc.» SID/STAR if possible Surveillance service (vectoring)
CTR / TIZ	IAP	RNP APCH: APV, and RNP-AR*	GNSS	Conventional* (ILS, VOR/DME)	Conventional IAP*

* where available

** implies that VHF communication infrastructure and surveillance coverage is available with sufficient coverage in all TMA's and TIA's.

*** In Bodø Oceanic Airspace

Surveillance: Generally, controlled airspace is covered by at least one non-dependant (i.e. MSSR's and/or WAM) surveillance sensors, and a planned dependent (i.e ground based ADS-B) surveillance coverage for the northern part of Norway (Namsos TIA and north) as of November 2022. ADS-B coverage for southern part of Norway is TBD. This will allow for vectoring in TMA's, TIA's and CTR's.

It is being investigated if surveillance also should be implemented at airports where ATS is provided as AFIS. For AFIS provision, surveillance is not required, but it may be argued that surveillance will provide a better service level. A g gradual transition to also establishing surveillance coverage in TIZ according to WAM/ADS-B coverage and availability of surveillance display system for AFISO should be expected. This will also imply that verification of correct approach path by radio finding will be obsolete. The VHF/UHF Direction Finders used in the AFIS service may hence be decommissioned when replaced by WAM and/or ADS-B based surveillance.

Communication: There is sufficient VHF/AM radio coverage in all TMA's, TIA's, CTR's, TIZ's and RMZ's at flight altitude.

2.4.2 TMA / TIA Future navigation concept

All navigation in TMA's and TIA's will be based on RNAV 1 (possible with RF) in line with previous requirement in the now repelled PCP IR AF#1 by January 2024; and is in fact to a large degree already implemented.

Most airports are equipped with RNAV 1 SID and STAR. Some smaller airports have "Omni-SID" instead of a normal SID, which implies that the aircraft navigates to a point to which it may directly set course to destination (or join an ATS route). The equivalent for arrival procedures is a Terminal Arrival Area (TAA), where the aircraft can navigate to any Initial Approach Fix (IAF) and from there execute RNP APCH.

Current navigation infrastructure in the TMA typically consists of GNSS, plus a variety of conventional navigation aids, such as NDB's, VOR's and DME's – as well as a combination of these to support different approaches, sometimes overlapping operational needs. There is hence a need to review the operational navigation requirements, and decide how these requirements are most effectively met, whilst for the sake of sustainable economic development, not over-delivering on available options. The transitional arrangements may be divided into two phases :

1) 2020-2025: reduction and rationalization of duplicated conventional services.

2) 2026-2030: conventional navigation aids will only remain as long as it supports conventional procedures to airports designated with a "GNSS contingency"-role in the airport network (i.e. provided the airport is within Airport Concept A-D). Navigation in TMA/TIA, or regions of TMA/TIAs, not supporting contingency procedures will be based on GNSS alone.

This is regarded as sufficient, also recognizing the requirements of SERA, which requires the operators to plan the flights with sufficient fuel to reach an alternate airport with conventional IAP (Instrument Approach Procedures). This implies that in the event of a GNSS outage, the flights will under all circumstances navigate towards a TMA and airport where DVOR/DME or DME/DME serving the TMA, and an ILS serving the IAP to at least 1 Instrument Runway End (IRE).

We hence expect the CNS-evolution at TMAs to follow two distinct paths; one for the TMAs serving airports with conventional nav-aids; and another for TMAs serving "GNSS-only"-airports.

2.4.2.1 Contingency Nav-aids evolution in TMA's 2020 - 2030;

As seen from the tables prior, today's infrastructure to support operations if GNSS becomes unavailable is the VOR MON. It is expected that the CNS equipment to support the contingency situation if GNSS becomes unavailable in the future, will evolve into a DME/DME infrastructure to support RNP1 in high- to medium traffic density airspaces; or where other factors makes this the most suitable infrastructure.

NOTE: the evolution of equipment described below describes nav-support and procedures in addition to RNP(GNSS)-based SIDs and STARsused under normal operations:

2.4.2.1.1 Sola TMA

GNSS Contingency operations: Due traffic volume, it is expected that TMA covering ENZV (and ENHD) will be equipped for RNP-navigation based on multiple DMEs (DME/DME/DME). Infrastructure located in the northern part of Sola TMA is expected to be used by both TMA's. As Sola VOR ("ZOL") is new; and also supports approach procedures; the VOR/DME will be decommissioned late in the period.

2.4.2.1.2 Flesland TMA

GNSS Contingency operations: Due rnp volume, it is expected that TMA covering ENBR will be equipped for RNP-navigation based on multiple DMEs (DME/DME/DME). Infrastructure located in the southern part of Flesland TMA is expected to be used by both TMA's. As Flesland VOR ("FLS") reaches its "end-of-life"-date in 2026; and both runways are supported by ILS procedures; the VOR/DME will be decommissioned around 2025.

2.4.2.1.3 Værnes TMA

As current TMA operations are based on GNSS supported by one NDB (in addition to radar vectoring service), a DME/DME network to support RNP operations will be added before 2030.

2.4.2.1.4 Bodø TMA

GNSS Contingency operations : As the project "new airport, new town" is expected to be implemented in the later part of 2020's an evolution towards DME/DME for both TMA and en-route may be expected around 2030. The reason is that Bodø DVOR which is currently supporting conventional navigation in the airspace will be situated in an increasingly less suitable location, and effectively will be "absorbed" by city development (buildings, roads and other infrastructure). As the DVOR has a sensitive area with a 600m radius, a relocation or replacement have proven impossible. Alternative locations have been explored, but found "not suitable" due to either mountainous terrain or effects from being located too close to the sea (reflections and varying influences of the sea due to the big difference in tidal conditions will negatively affect the stability of the navigation signals)

Hence, a solution where multiple DMEs replace the VOR/DME's role for both TMA and en-route applications is being explored.

The time for decommissioning of VOR/DME (BDO) will depend on the rate of city developments; but is currently expected to take place around 2030.

2.4.2.1.5 Kirkenes TMA (incl. Vadsø)

GNSS Contingency operations: Kirkenes TMA has historically been subject to considerable GNSS outages and is as such more than others required retain conventional nav-aids to support RNAV 1 SID and STAR operations. Both VOR at Kirkenes and Vardø reaches its "end-of-life" in 2029. This implies that they must either be replaced by new VORs or replaced by DME/DME network. As the preferred technological solution as described by ICAO and Eurocontrol is an evolution towards DME/DME, an evolution towards this should be expected.

2.4.2.1.6 Sogn TIA

GNSS Contingency operations currently supported by Vollo, Florø and Sogndal VOR/DME. The TIA supports airports in "airport concept E", except for Florø. This implies that in a GNSS outage situation, only Florø will be available for an instrument approach, as the other airports will not be provided with conventional approaches after 2030 (i.e. operations completely dependent on GNSS).

As the VOR/DME at Sogndal already has passed its theoretical End-of-Life date but will remain operational "on condition" until 2025; unless it has a catastrophic malfunction. When this VOR/DME is withdrawn and decommissioned, GNSS contingency operations in Sogn TIA will rely on conventional navigation support from Florø and Vollo VOR/DME. As these are located by the coast, and relatively distant from ENSG, it may result in poor low-level coverage in the eastern part of the TMA due to mountainous terrain in the region.

Florø VOR/DME will after 2030 be the only conventional nav-aid for Florø Airport. Vollo VOR/DME as this is part of the VOR MON in place for en-route purposes. Both will remain for the foreseeable future according to EU 2018/1048 §6.

2.4.2.2 Contingency Nav-aids evolution in TMA's 2025 – 2035 or later

In the below TMAs the timeframe and/or technical solution is not yet finalized. In some TMAs the evolution requires further investigation, and/or the exact date for the change is not critical. However, the following evolution should be expected in the timeframe 2025-2035:

2.4.2.2.1 Kjevik TMA

GNSS Contingency operations currently supported by Svensheia VOR/DME. Transition to DME/DME will be evaluated when the nav-aid reaches EoL. A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.2 Møre TMA

GNSS Contingency operations currently supported by Vigra and Kvernberget VOR/DME, and to some degree also NDB (Tautra). Transition to DME/DME will be evaluated when mentioned nav-aids reaches EoL. A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.3 Helgeland TMA

GNSS Contingency operations currently supported by Rørvik, Brønnøy, Sandnessjøen, Vardefjell (Mosjøen), and Bodø VOR/DME, and to some degree also NDB (Strømmen).

It will be evaluated prior to next revision of this document (expected 2024) how to deal with GNSS reversionary modes in the TMA, if the TMA only supports approaches to "concept E"– airports. Keeping in mind that Concept E-airports will not be provided with conventional approaches nor conventional nav-aids after 2030 (i.e., operations completely dependent on GNSS). The evaluation will determine whether to expect a transition to a "limited navigation support" environment, with "scattered" coverage from the existing VOR MON (provided for en-route applications, implying little coverage to lower altitudes of the TMA); or a transition to DME/DME/DME navigation; for possible GNSS contingency situations.

→ Conventional nav-aids supporting operations in the TMA will be evaluated in 2024, before a decision on decommissioning or replaced may be expected.

2.4.2.2.4 Lofoten TMA

GNSS Contingency operations currently supported by Evenes, Stokmarknes and Bodø VOR/DME.

It will be evaluated prior to next revision of this document (expected 2024) how to deal with GNSS reversionary modes in the TMA, if the TMA only supports approaches to "concept E"– airports. Keeping in mind that Concept E-airports will not be provided with conventional approaches nor conventional nav-aids after 2030 (i.e., operations completely dependent on GNSS). The evaluation will determine whether to expect a transition to a "limited navigation support" environment, with "scattered" coverage from the existing VOR MON (provided for en-route applications, implying little coverage to lower altitudes of the TMA); or a transition to DME/DME/DME navigation; for possible GNSS contingency situations.

→ Conventional nav-aids supporting operations in the TMA will be evaluated in 2024, before a decision on decommissioning or replaced may be expected.

2.4.2.2.5 Evenes TMA

GNSS Contingency operations currently supported by Evenes VOR/DME. Transition to DME/DME will be evaluated when mentioned nav-aids reaches EoL. A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.6 Bardufoss TMA

GNSS Contingency operations currently supported by Bardufoss VOR/DME. Transition to DME/DME will be evaluated when mentioned nav-aids reaches EoL. A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.7 Andøya TMA

GNSS Contingency operations currently supported by Andøya CVOR/DME. Transition to DME/DME will be evaluated when mentioned nav-aids reaches EoL. A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.8 Tromsø TMA

GNSS Contingency operations currently supported by Tromsø VOR/DME. Transition to DME/DME will be evaluated when mentioned nav-aids reaches EoL. A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.9 Hammerfest TMA

GNSS Contingency operations currently supported by Hammerfest VOR/DME. Transition to RNP 1 provided through a DME/DME will be available from Q3 2023. Discontinuation of current VOR/DME will be evaluated when mentioned nav-aids reach EoL.

A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.10 Alta TMA

GNSS Contingency operations currently supported by Alta VOR/DME. Transition to

RNP 1 provided through a DME/DME will be available from Q3 2023. Discontinuation of current VOR/DME will be evaluated when mentioned nav-aids reach EoL.

A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.11 Banak TMA

GNSS Contingency operations are currently supported by Banak VOR/DME. Transition to

RNP 1 provided through a DME/DME will be available from Q3 2023. Discontinuation of current VOR/DME will be evaluated when mentioned nav-aids reach EoL.

A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.12 Finnmark TIA

GNSS Contingency operations currently supported by Vardø and Seida VOR/DME, and to a limited degree by Kirkenes, Banak and Hammerfest VOR/DME. Same concerns as for Kirkenes TMA applies, and a transition to

RNP 1 provided through a DME/DME will be available from 2024. Discontinuation of current VOR/DME will be evaluated when mentioned nav-aids reach EoL.

A conventional nav-aid supporting TMA operations will remain available in the foreseeable future.

2.4.2.2.13 Sørkjosen TIA

GNSS Contingency operations currently supported by Tromsø and Alta VOR/DME.

It will be evaluated prior to next revision of this document (expected 2024) how to deal with GNSS reversionary modes in the TIA, if the TIA only supports approaches to "concept E"– airports. Keeping in mind that Concept E-airports will not be provided with conventional approaches nor conventional nav-aids after 2030 (i.e., operations completely dependent on GNSS). The evaluation will determine whether to expect a transition to a "limited navigation support" environment, with "scattered" coverage from the existing VOR MON (provided for en-route applications, implying little coverage to lower altitudes of the TMA); or a transition to DME/DME/DME navigation; for possible GNSS contingency situations.

2.4.2.2.14 Namsos TIA

GNSS Contingency operations currently supported by Rørvik VOR/DME.

However, the TIA and Rørvik and Namsos airports are in airport-concept E; where traffic volumes are low, and a likely conclusion is that a conventional reversionary mode is considered unnecessary; as the TIA only supports approached to "concept E"– airports; which will not be provided with conventional approaches after 2030 (i.e., operations completely dependent on GNSS).

Namsos TIA will be supported by Rørvik VOR/DME as part of the VOR MON in place for en-route purposes, and hence will remain available for navigation in the TIA for the foreseeable future.

2.4.2.2.15 Svalbard TIA

GNSS Contingency operations currently supported by NDB's and DME/DME/DME navigation.

NDB Isfjord was decommissioned in 2022. Remaining NDB's ("ADV" and "LON") will remain in operation until 2030 supporting operators not equipped for RNAV1 operations.

2.4.3 Aerodrome CTR / TIZ

Lists of currently available navigation aids are available in AIP Norway.

Generally, airports in Avinor Airport Concept A, B, C and D will operate with PBN APCH as the "default" expected approach offered by ATS. At Oslo, Bergen, and Stavanger airports ILS CAT-II/III approaches will also remain available. For remaining airports within these airport concepts, ILS CAT-I (or "LOC-only" at ENHF, ENBN, ENFL and ENML) approaches will remain, but approached only being available in GNSS contingency situations.

Avinor Airports within Airport Concept E will generally operate with PBN APCH as <u>the only available approach</u> (no conventional contingency). For the exact extent and time for discontinuation of conventional procedures at each airport (and decommissioning of the supporting navigation aids), please refer to Annex II "decommissioning plan".

<u>Note:</u> SCAT-I, as for GBAS, is not included as a relevant sensor in the PBN environment, and as such not covered in this plan (as it is neither a conventional nav-aid, nor has it a place in PBN). The operator using this system will be consulted wrt. details on the discontinuation of the SCAT-I service, but generally, operations will generally not be continued beyond 2025.

2.5 STATUS PBN Procedures

PBN is implemented in en-route and TMA/TIA airspace, as described under "current situation".

For aerodromes, PBN APCH has been implemented to the extent possible. See annex I for type of minima available at each instrument runway end (IRE).

AUR.PBN.2005 (2) and (3) is especially valid for Norwegian airports. We have:

AUR.PBN.2005 Routes and procedures

(1) Providers of ATM/ANS shall implement, at all instrument runway ends, approach procedures in accordance with the requirements of the RNP approach (RNP APCH) specification, including LNAV, LNAV/VNAV and LPV minima and, where required due to traffic density or traffic complexity, radius to fix (RF) legs.

(2) By way of derogation from point (1), at instrument runway ends where, due to terrain, obstacles or air traffic separation conditions, the implementation of 3D approach procedures is excessively difficult, providers of ATM/ANS shall implement 2D approach procedures in accordance with the requirements of the RNP approach (RNP APCH) specification. In that case, they may also, in addition to the implementation of those 2D approach procedures, implement 3D approach procedures in accordance with the requirements of the RNP authorisation required (RNP AR APCH) specification.

(3) By way of derogation from point (1) at instrument runway ends without an appropriate SBAS coverage, providers of ATM/ANS shall implement RNP APCH procedures, including LNAV and LNAV/VNAV minima. Providers of ATM/ANS shall also implement LPV minima at those instrument runway ends, no later than 18 months from the date at which such appropriate SBAS coverage is available.

Note, however, as Norway has its fair share of complex terrain in close proximity of the airports, not all 3 minima are available at all airports. This is caused by terrain that either requires a VPA (vertical profile angle) and/or an offset angle in the horizontal plane beyond what the design criteria of ICAO DOC 8168 "PANS OPS" allow. The list in Annex II should hence be regarded as an exemption list, describing the argumentation with regards to AUR.PBN. (2) or (3).

- For (2): In the column for LNAV, LNAV/VNAV and LPV is markes "---" if the minima is not available for the applicable runway. If an RNP procedure is available, but only as an "LNAV to circling" minima, than the column will read "---" and the existence of a RNP is indicated in the notes (right column). The following text is found in the table of annex I:

> "LNAV/VNAV and/or LPV (*as applicable for the airport in question*) not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of Baro-VNAV in PANS OPS allow for, or an off-set of the procedure outside LPV or Baro-VNAV criteria in PANS OPS. Ref PBN.AUR.2005 (2); RNP-AR planned."

- For (3): LPV-minima has been produced for all IRE's where possible; however, also in this case there are some shortages, as LPV to Point-in-Space is not used for fixed wing. Also, 9 of our airports are located so far north that the SBAS continuity is outside ICAO requirements for SBAS. This implies special considerations; and at the moment LPV-minima for these airports are suspended by NOTAM. These airports will have the following text in the table of annex I:

> "Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3."

All available minima-lines, or the lack thereof, is listed in annex I. This also contains a description of why it could not be implemented, and when/if RNP-AR implementation is being considered at the IRE (pending operators becoming equipped and certified).

RNP APCH to the Aerodromes

The main purpose of the PBN-Project (executed from 2013-2017) was to replace conventional Non-Precision Approaches with the introduction of GNSS-based Approach with Vertical guidance (APV). Secondary task to provide APVs at all IFR runway ends, as a back-up to existing precision approach facilities (back-up to ILS CAT-I and SCAT-I). During implementation, all three minima-lines were established as far as possible.

RNP APCH is now considered the primary approach concept, with ILS and SCAT-I used only in cases where these procedures have better minima compared to the APV minima.

All RNAV(GNSS) approach procedures are since 2021 re-named to RNP(GNSS); according to ICAO requirements.

Furthermore RNP-AR are available at ENGM, ENEV, ENHD, ENVA, ENBR, ENZV and ENSB.

In the period from 2023-2025 RNP-AR will be implemented at all Avinor airports with LDA>1199m.

In the period from 2025-2028, provided operators become compliant, RNP-AR procedures will be provided for remaining IREs at Avinor-operated airports.

2.5.1 Planned implementations and operations concepts

2.5.1.1 **En-route operations**

RNAV5 ATS routes or dedicated FRA Arrival/Departure Connecting routes/points will connect the en-route operations with TMAs.

To connect these RNAV 5 ATS routes or dedicated FRA Arrival/Departure Connecting routes/points with the runway, RNAV1 SIDs and STARs could be developed with the RNAV1 STARs connecting to the runway via RNP APCH.

The process for transition from RNAV 5 to RNAV 1 for helicopter routes with reference to AUR.PBN.2005 (7) is ongoing, and there is currently a consultation ongoing in this regard. The process will be completed by January 2024.

2.5.1.2 TMA/TIA: SID's and STAR's

Implement RNAV 1 with RF, by January 2024.

2.5.1.3 Airport: Instrument Approach Procedures

When the PBN-project completed in early 2017, the EGNOS coverage was limited to 70°N; which in February 2018 was extended to 72°N. This implied that 9 aerodromes previously outside the coverage area now became eligible for an LPV minima in the RNAV (RNP) approach plate. The inclusion of the LPV minima has been added at suitable AIRAC cycles and has been completed. However, most procedures have since been set inoperative by NOTAM, as the continuity provided by EGNOS (as operated by ESSP and used based on EWA with Avinor ANS) is below standard. ANSP, AO, and Operators/airspace users have not yet been able to agree on suitable arrangements for mitigating actions. Investigations into the nature of the outages, their foreseeability, distribution and duration is still ongoing, to determine if operations can be carried out safely, or if the minima-line has to be permanently removed.

The PBN-concept also opens for specially tailored procedures for challenging terrain and/or avoidance of environmentally sensible areas. These procedures typically include curved segments (referred to as "RF-legs") or increased accuracy/narrow track during the approach. The procedures require pre-approval from authorities; hence RNP-AR ("authorization required").

Many of the local aerodromes are located in challenging terrain, often resulting in high minima from where visibility to the threshold is required. This affects the availability of the airport; and cancellations may be regarded too frequent. By implementing RNP-AR procedures, the minima could be reduced, and the availability increased. However, the introduction of RNP-AR procedures will not give any benefits to the aerodrome or passengers if the operator's avionics is non-compliant to the specification. Currently RNP-AR procedures have only been introduced at regional- and national airports served by aircraft with RNP-AR capability.

Discussions with operators is ongoing, as there is a strategic initiative in Avinor, based on sustainability of aviation - both regarding the environmental impacts, as well as economic consequences. The Avinor-group senior management decided on the 21st October 2022 to implement RNP-AR procedures to all Avinor IRE where possible, provided the Operators have, or are willing to enter into an agreement to gain, RNP-AR certification and fly the procedures.

Further implementation of RNP-AR should hence be expected, and will be implemented to all Avinor airports in the following order:

- Phase I: all runways suitable for jet aircraft (LDA > 1199m) from 2022-2025 (decided)

- Phase II: all remaining runways (where possible) from 2025-2028 (conditional on user equipage).

3 Decommissioning

3.1 Background and strategy

The PBN-transition in Norway is in line with ICAO and EU requirements and strategies, referring to:

- European Commission Implementing Regulation (**EU 2018/1048**) (including the national legislative act bringing the EU requirement in to binding Norwegian legal text “forskrift”), and

- **Eurocontrol guidelines** (PBN handbook no. 6 “European GNSS Contingency/Reversion Handbook for PBN Operations”), and

- **ICAO Annex 10 Vol.1 attachment H:** “Nav-aid Infrastructure Optimization Handbook for PBN Implementation”).

- **National strategies**: The Norwegian government by the Ministry of Trade and Fisheries have also developed a “PNT strategy” giving a holistic view of the use of GNSS from a cross-sector viewpoint. This way developed in 2018-2019 and published 2020. The content hence predates (EU) 2018/1048.

The Norwegian government by the Ministry of Transportation have also developed a “airspace strategy” giving and holistic view of the use of airspace, and what services are available in those airspace volumes. Use of GNSS and implementation of the PBN environment (EU) 2018/1048) is included in this document. It also describes rationalization, from the view of State aircraft and the special interests and considerations from this airspace user, as well as the general civil use. The general interpretation is that the principle of PBN IR Article 5 is respected; and if certain airspace users should have additional needs beyond this, then that user should expect to carry the cost incurred for the additional service.

The overall strategy being, based on above as follows:

- Rationalize NDB, VOR, and associated procedures <u>aligned with equipment life cycle</u> and PBN implementation planning
    - Current plan is based on end-of-life dates for the components.
    - Rationalization sequence: from south to north.

- Replace approaches without vertical guidance with vertically guided procedures
    - RNP APCH is implemented with all 3 minima, where possible.
    - RNP-AR will be considered implemented where useful.

- Where a terrestrial navigation reversion capability is required, evolve the existing DME infrastructure towards providing a PBN infrastructure complementary to GNSS
    - existing DME’s will remain if required to achieve DME/DME coverage in an airspace volume
    - VOR MON sites are all co-located with DME (DVOR/DME)
    - The evolution indicates that where it is possible from a radio-technical point of view (i.e., practical number of components may provide a suitable coverage), the VOR MON will in time be replaced by DME/DME in high density traffic airspaces. Aircraft operating without capability to fly RNP based on DME/DME must rely on vectoring service.

- Provide a residual capability based on VOR/DME to cater to airspace users not equipped with suitable DME/DME avionics, where required.

- The evolution indicates that where it is possible from a radio-technical point of view (i.e. practical number of components may provide a suitable coverage), the VOR MON will in time be replaced by DME/DME in high traffic density airspaces. Aircraft operating without capability to fly RNP based on DME/DME must rely on vectoring service.

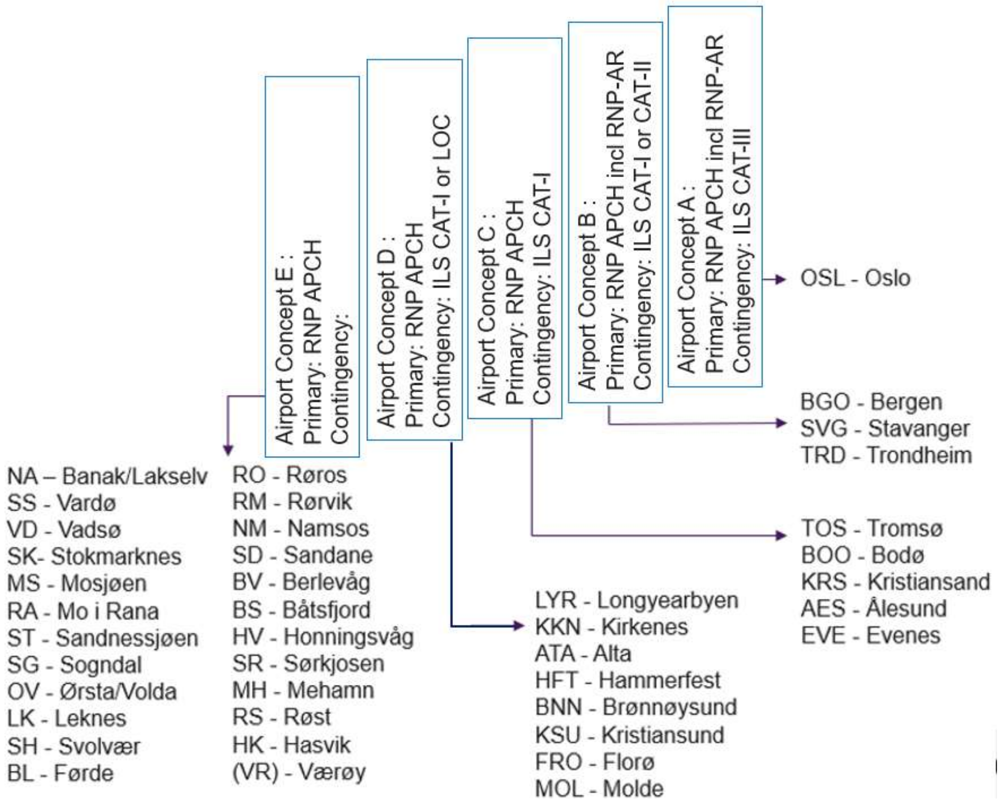
For the operators, this implies that RNP 1 capability based on DME/DME should be implemented. Also, it implies that not equipping for RNP1 based on DME/DME, may lead to reduced access to, and less efficient routing in, certain airspaces, in the event of a GNSS outage.

The purpose of both VOR MON, and future DME/DME networks independently of GNSS being to guide the aircraft from one airport to another: and when at the arrival airport - onto a conventional approach such as ILS CAT-I/II/III.

It should also be noted that airports of national and regional importance, will remain with conventional navigation aids; generally, ILS CAT-I. These airports are found in the Avinor Airport Concepts A-D; and will remain operational and with close to normal capacity both in TMA/TIA and CTR/TIZ also during GNSS outage. These are airports that will serve as "alternate with conventional nav-aids" (or safe havens) when referring to operator requirements, as found in SERA.

Airports in Avinor Airport Concepts E, as well as TMA/TIAs only serving such airports, will become "GNSS only"-airports. This implies that operations based on IFR may cease in the event of a GNSS outage; however, the degree of limitations may vary depending on the cause, actual GNSS/signal degradation, and other operator specific conditions (such as availability of augmentation from other systems, such as Inertial Reference Systems (IRU-equipment), possibility of visual operations, etc).

The Avinor Airport Concepts are as follows – A trough E from right to left column:



The geographical distance, and implicitly flight duration (with regard to fuel consumption), between airports offering conventional procedures for contingency situations have been assessed and found acceptable. It is recognized that this in some cases will imply a need for carrying more fuel, with the operational consequences that may have. Significant negative consequences at the operator side should results in comments or inputs to the consultation process as carried out prior to this transition plan. In such event this issue will be examined and reassessed if necessary.

For airports not providing ILS CAT-II/III service; it is understood that conventional navigation aids will no longer have any purpose, except in the event of a failure in PBN-components; either in the space segment, in signal propagation, or in the aircraft.

Any such failure implies a contingency situation; in which case the aircraft is expected to:

1) if the destination is an airport with conventional nav-aids: continue to destination

2) if the airport is a “GNSS-only”-airport: divert to the designated alternate aerodrome (according to its flight plan) with conventional nav-aids

This implies that rationalization of procedures and the equipment supporting these is possible from the time PBN APCH is implemented, and operators are equipped to use them.

According to PBN IR this shall happen on the 06.06.2030 at the latest. This does not imply that rationalization cannot commence before this date. From the economical side; considering the cost related to re-investments in equipment reaching its “end-of-life”-date in the timeframe 2025-2030 (according to ICAO strategy); rationalization is feasible from 01.12.2020, considering the two phases as described in 1.1.

When no longer in use, rationalization is seen as the logical conclusion of EU 2018/1048 article 5 and 6 respectively:

26.7.2018 EN Official Journal of the European Union L 189/7

Article 5

Exclusive use of PBN

1. Providers of ATM/ANS shall not provide their services using conventional navigation procedures, or using performance-based navigation which is not in accordance with the requirements of point AUR.PBN.2005 of the Annex.

2. Paragraph 1 shall be without prejudice to Article 6 and to the possibility of providers of ATM/ANS to provide their services using landing systems enabling CAT II, CAT IIIA or CAT IIIB operations within the meaning of points 14, 15 and 16, respectively, of Annex I to Regulation (EU) No 965/2012.

Article 6

Contingency measures

Providers of ATM/ANS shall take the necessary measures to ensure that they remain capable of providing their services through other means where, for unexpected reasons beyond their control, GNSS or other methods used for performance-based navigation are no longer available, making it impossible for them to provide their services in accordance with Article 3. Those measures shall include, in particular, retaining a network of conventional navigation aids and related surveillance and communications infrastructure.

Hence, the transition to “PBN only” is planned to take place from 2025 to 2030.

The exact decommissioning-plan for each aerodrome (CTR/TIZ), TMA/TIA and en-route segment can be found in Annex II.

Avinor do not operate with a “Targeted Infrastructure Reduction” number as there are operational specific causes for every installation.

It should however be noted that Norway will also be included in the overall EU-target for decommissioning. The high-level aim for the European Commission when calculating ANS charges, is a withdrawal from service of conventional systems (NDB, VOR, LOC/ILS) of approximately:

a. 30% by 2020

b. 60% by 2025

c) 80% by 2030

Norway will continue all DVOR/DMEs still having a purpose - according to PBN IR article 6 - in the foreseeable future. NDBs will generally be decommissioned, and ILS (or LOC) will remain at regional hubs. This has to do with the special operating conditions in Norway, the importance of air travel in the regions, and the historical incidents relating to GNSS outages.

Avinor has identified **108** navigation aids that is planned discontinued when reaching their respective End-of-Life date. The nav-aids in question are of the following equipment categories:

- **Non-Directional Beacons: 55** installations to be decommissioned
- **VHF Omnidirectional Ranging: 2** installations to be decommissioned (note: associated DME may remain if required to achieve DME/DME coverage in the region)
- **Localizer: 22** installations to be decommissioned
- **Instrument Landing System (*LOC, GP, DME*): 4** installations to be decommissioned
- **Distance Measuring Equipment: 25** installations to be decommissioned (mainly those associated with ILS or LOC, and that do not serve a purpose in providing DME/DME coverage).

3.2 Consequences to ATS and CNS

The discontinuation of conventional procedures implies the end of “mixed mode”-operations; and as such contributes to an easier operational environment for ATS.

A reduction in CNS equipment locally, will imply that CNS/ATSEP personnel will be centralized to the regional or local hubs where the physical equipment will remain. In the transition period, servicing of CNS will be provided remotely, or through travel when necessary. This implies that time from malfunction to corrective action may increase; but that since PBN procedures have already been provided, they will be the only option if conventional navigations aids malfunction.

3.3 Contingency scenarios Airport and TMA/TIA

The major drawback with GNSS is related to relatively weak satellite signals susceptible to disturbances from both natural and man-made sources.

GNSS contingency situations occur when the GNSS Signal-in-Space is not received by the aircraft; and the consequence to aviation depends on the extent of the outage:

3.3.1 Local Scenario

This scenario is typically induced by local man-made disturbances, either unintentional or intentional. The situation is likely to be resolved by various policing actions and will generally have little impact on air traffic in the network as a whole – although it may halt operations at one airport in a shorter timeframe.

Contingency solutions: the aircraft will divert to alternate airport not experiencing GNSS outage/disruption. No network effects.

3.3.2 Regional Scenario

This scenario is typically induced by local man-made disturbances either unintentional or intentional; or natural phenomenon relating to atmospheric conditions etc.. Depending on the source, the situation may be resolved by various policing actions, or it will remain until the situation resolves in other manners. It may have some impact on air traffic in the network as a whole – and may halt operations in the regions affected – especially locations not included by the contingency solutions.

Contingency solutions: the aircraft will divert to an alternate airport with conventional procedures and navigation aids. Network effects will include (limited) increase of traffic to reginal hubs (including their airspace).

3.3.3 National and International Scenario

This scenario is typically induced by man-made military disturbances either unintentional or intentional; discharging Electo-Magnetic pulses of catastrophic proportions; or natural phenomenon relating to atmospheric conditions; or very strong solar storms with flares being slung directly towards earth, affecting the not only the space segment, but also power- and communication grids. The issue would be that the radio-energy will be so strong, that electronic circuits are permanently destroyed.

Such events are likely to stop all air traffic in the network as a whole – and disrupts operations in the regions affected. Depending on intensity, solar flares of catastrophic dimensions may disrupt significant portions of society; also knocking out power generation and distribution, telecommunication systems, and basically rendering all items containing a micro-chip useless. In this scenario, there is no contingency solution; as most of the CNS functions, including ground-based communications- navigation- and surveillance-systems likely are malfunctioning.

In this scenario, a considerable number of satellites are permanently out of service; and before repositioning the surviving satellites (if control systems are operational?), the systems will be out of use for extensive periods. However, this scenario will not only affect the air transportation sector, but all telecommunication systems, power generation, etc. concerning all aspects of the general society.

For either reason; natural og war-like sabotage; There is no contingency solution covering this.

3.3.4 Regions of special concern

Certain areas and airspace volumes in Norway will not be subject to decommissioning of conventional navigation aids, as the impact a stop in civilian air-transport services will severely impact local societies. If based solely on GNSS, an outage will have detrimental effect on the services to the general public that are considered unacceptable. Certain airspaces are “safety critical” in the respect that medical evacuation and access to emergency healthcare services rely on effective air-transportation services.

These areas are typically the northern and eastern parts of Finnmark county, where access to healthcare services rely on medical evacuation by air ambulance services. Many of the local airports would be planned as “GNSS only”-airports; but due to above-described criticality for the local community, conventional nav-aids will remain in the foreseeable future, and until more robust GNSS navigation solutions are implemented (such as multi-constellation, multi frequency (MCMF) and/or authentication services). The exact extent is available in Annex 2.

3.4 Contingency scenarios

3.4.1 En-route

A Minimum Operating Network of VOR/DME installations assures RNAV 5 capability in the event of GNSS outage.

A VOR MON of 15 stations are included in this network, which covers all of mainland Norway above FL95, with the exception of a small area in central Norway where radar is designated as a contingency solution.

It is expected that the CNS equipment to support the contingency situation if GNSS becomes unavailable in the future, will evolve into a DME/DME infrastructure to support RNAV 5 in designated airspaces; or where other factors makes this the most suitable infrastructure.

3.4.2 TMA / TIA

3.4.2.1 Normal Operations

Required navigational performance for operations within the TMAs will generally be RNAV 1.

Identify whether consistent, highly repeatable turn performance is required for avoiding noise sensitive areas or reducing track length. In this case develop RNP1 operations and identify RF functionality as a requirement.

Enable CCOs/CDOs by segregating inbound and outbound flows laterally wherever possible:

a. Assess climb and descent performance of aircraft fleets operating within the State. Develop a climb and descent profile chart.

b. Crossing points to be near departure end of runway or at distance from aerodrome. Close crossing points allow all departures to have uninterrupted climb passing under arrival flow. Distant crossing points allow arriving aircraft an uninterrupted descent whilst departing traffic crosses above the arrival flow.

3.4.2.2 GNSS Contingency operations

As described in 3.3.; the effects and operational limitations depend on the geographical extend of the GNSS outage.

For local outages, the effect is mainly at one airport. The extent of signal disruption is not likely to extend significantly into TMA/TIA airspace. However, higher workload on the air traffic controllers in the approach is a likely consequence, due to one or more flights diverting to their alternate destination and/or regional hubs.

Regional outages will likely extend significantly into TMA/TIA airspace. Higher workload on the air traffic controllers in the approach is a likely a consequence, due to several flights diverting to their alternate aerodrome and/or regional hubs not affected by the GNSS outage or offering conventional procedures. In addition, navigation in the TMA/TIA and CTR/TIZ will need to rely on contingency procedures based on conventional nav-aids and/or an increased number of flights relying on vectoring service. First phase will be to get all flights down to a conventionally equipped runway; and second phase will be handling daily operations in a “non-GNSS” environment. This may imply limitations on capacity.

National bigger outages will likely extend significantly into several TMA/TIA airspace and en-route airspace. Higher workload on the air traffic controllers in all ATS services is a likely a consequence, due to several flights diverting to their alternate aerodrome with conventional procedures. In addition, navigation en-route, in the TMA/TIA and CTR/TIZ will need to rely on contingency procedures based on conventional nav-aids and/or an increased number of flights relying on vectoring service. First task will be to get all flights down to a conventionally equipped runway; secondly handling daily operations in a “non-GNSS” environment. This may imply limitations on capacity.

3.4.2.3 Hazard Identification and analysis

Reference is made to the Safety Analysis carried out for PBN implementation. Further, a local analysis (including a public hearing) will be performed as part of the decommissioning process, and usually 3 – 6 months prior to procedures and/or nav-aids being withdrawn.

3.4.3 Aerodromes: CTR / TIZ

3.4.3.1 Normal Operations

Normal operations imply ATS giving approach clearance to the RNP-approach; or to a conventional approach if weather is below the RNP minima and a lower minima is available using conventional procedures and equipment.

From 06.06.2030; alternative procedures will only be available in GNSS contingency situations unless the runway offers ILS CAT-II / III services (ENGM, ENZV, ENBR, ENTO, ENRY).

Generally, LPV and LNAV/VNAV will provide similar minima as current conventional procedures, but as the ICAO PANS OPS requirements are not identical differences might occur.

3.4.3.2 Contingency

As in 3.4.2.; the extent of the outage is manageable, but consequences in efficiency may occur.

GNSS outage at a local aerodrome without conventional procedures or equipment will effectively stop all normal IFR operations. Flights will need to divert to the designated alternate airport.

Aerodromes with a role as regional hub will likely experience an increase in traffic volume, as flight will need to divert to these aerodromes in a GNSS contingency situation.

3.4.3.3 Hazard Identification and analysis

Reference is made to the Safety Analysis carried out for PBN implementation (ref. 360 folder: 12-61)

For the rationalization phase, there will be carried out a dedicated “initial safety verification” prior to withdrawal of conventional procedures and consequent decommissioning of equipment. This will follow the MS/SMS of the ATS provider.

It has under the consultation process (2023) been pointed out that at some airports, the requirement of EASA Air OPS CAT.OP.MPA.126 may become difficult to comply with for operators with aircraft not equipped with INS (Intertial Navigation System) / IRS (Inertial Reference System). It is noted that INS/IRS is not explicitly mandatory in Norwegian airspace; however, ICAO Annex 10 Vol.I 7th ed.

Attachment H 3.4.1 (d) specified that *"States may consider requiring INS equipage from airspace users to bridge the gaps in coverage".*

A generic safety assessment was carried out during the PBN Implementation Project (national process) in 2013-2016. This SSA came to the below conclusion when referring to the requirement of safe extraction from the instrument approach procedure: *Safe extraction shall be possible through; either;*

i) being able to extract the aircraft using raw data/dead reckoning; or
ii) the ANSP would retain essential nav-aids allowing for a safe extraction using conventional navigation systems and procedures.

With this PBN Transition Plan, the ANSP and Airport operator(s) announce that the second option (e.g., item *ii* above) to this safe extraction requirement will be withdrawn in the coming decade. Referring to the ICAO Annex 10 Vol.I 7th ed. Attachment H 3.4.1 (d) recommendation, the Operators should use the coming years to equip their fleet with INS capability, as some of the airports (airports in Avinor Airport concept E), will decommission many of the nav-aids although considered required by operators. This applies especially to NDBs which (according to in ICAO Annex 10 Vol.I 7th ed. Attachment H 3.2.1 (a)) "*serves no role in PBN operations*"; in addition to conventional landing systems (ILS and LOC) at less network-critical aerodromes.

PBN IR Article 3 demands ANSPs to implement the PBN concept, and article 5 Exclusive Use of PBN requires decommissioning of conventional navigation - unless the nav-aid is required for contingency operations. Hence, also nav-aids that operators view as critical for their safe extraction, shall be subject to decommissioning. This implies, when recognizing the challenging terrain in the vicinity of many Norwegian airports, an indirect requirement and mandatory equipage of INS for some operations; as a safe extraction using dead reckoning will not be possible without. The Norwegian Ministry of Transportation (MoT) has been made aware of this indirect requirement of the PBN Transition Plan and confirms that an indirect INS requirement for certain airports or operations in fact is the intended and correct interpretation of the PBN IR and its equivalent in Norwegian Law (Forskrift: BSL G 6-2. (FOR-2019-02-15-120))

Consequently, the following consensus has been reached:

- As some operators are not yet equipped with INS, the ANSP, Airport-, and Aircraft Operator will re-examine instrument procedures at airports where safe extraction using dead reckoning is not possible, and <u>to the extent practical</u>, adjust the decommissioning schedule to align with the operators plans for either INS implementation and/or fleet renewal.

- Airports where GNSS outages are regularly experienced will be re-evaluated one years prior to planned decommissioning of its conventional nav-aids. The evaluation shall focus on whether there is a need for reinvestments rather than decommissioning (ref. Article 6) and section 3.3 and 3.4 of this document.

The decommissioning plans as presented in the Annex' will remain, but adjustments due to above re-evaluations may prompt revisions being issued - keeping the document up to date with evolving operator capabilities and RFI environment.

The SSA referred to in the first sentence of this section, will be updated according to the above conclusions. For the rationalization phase, there will be carried out a dedicated "initial safety verification" prior to withdrawal of conventional procedures and consequent decommissioning of equipment. The procedure and associated nav-aid will be evaluated individually when assigned an AIRAC date; approximately one year prior to the transition/decommissioning date. The change will follow the MS/SMS of the ATS provider responsible for the procedure in question.

Annex I: PBN Implementation status and plans

The below tables summarize the implementation status, and future plans for PBN approaches.

Please observe:

when "---" is annotated, this means that a procedure has not, and cannot, be implemented. The reason behind this lack of procedure or lack of minima-line is described in the "comments"-column.

Implementation status at airports with ATC:

ICAO Code	Airport name	IFR RWY	LNAV	LNAV/VNAV	LPV	RNP AR	Notes:
ENAL	Ålesund, Vigra	06	Impl.	---	Impl.	Planned 2024	LNAV/VNAV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for. Ref PBN.AUR.2005 (2); RNP-AR planned
		24	Impl.	Impl.	Impl.	Planned 2024	
		Contingency: VOR RWY 06 and ILS RWY 24 (CAT-I) Nav-aids available: GNSS and VOR/DME					
ENAN	Andøya, Andenes	03	---	---	---	---	RWY closed
		21	---	---	---	---	RWY closed
		14	Impl.	Impl.	Impl.	Planned 2025	
		32	Impl.	Impl.	Impl.	Planned 2025	
		Contingency: LOC or VOR RWY 14, and VOR RWY 32 Nav-aids available: GNSS and VOR/DME					
ENAT	Alta	11	Impl.	Impl.	Impl.	Planned 2024	
		29	---	---	---	Planned 2024	Currently only served by circling procedures LNAV/VNAV and LPV are not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of Baro-VNAV in PANS OPS allow for. For LPV, the vertical profile for a straight in-procedure is (by operators to the aerodrome) considered too steep to be comfortable for passenger flights (statement from operators: “VPA that exceed 3,9 degrees will not be used”). Ref PBN.AUR.2005 (2); Possibility for RNP-AR will be investigated.
		Contingency: ILS RWY 11 (CAT-I), alternatively with circling to RWY 29 if wind dictates. Nav-aids available: GNSS, VOR/DME and from 2024 DME/DME/DME					
ENBO	Bodø	07	Impl.	Impl.	Impl.	Planned 2024	
		25	Impl.	Impl.	---	Planned 2024	Terrain avoidance for a straight-in procedure would result in a VPA higher than the design criteria of Baro-VNAV in PANS OPS allow for; hence an offset procedure is provided. For LPV, the vertical profile for a straight in-procedure is (by operators to the aerodrome) considered too steep to be comfortable for passenger flights (statement from operators: “VPA that exceed 3,9 degrees will not be used”). Ref. PBN.AUR.2005 (2); RNP-AR will be provided.
		Contingency: ILS RWY 07 and ILS RWY 25 (both CAT-I) Nav-aids available: GNSS and VOR/DME. From 2028/2029 also DME/DME/DME					

ICAO Code	Airport name	IFR RWY	LNAV	LNAV/VNAV	LPV	RNP AR	Notes:
ENBR	Bergen, Flesland	17	Impl.	Impl.	Impl.	Impl.	
		35	Impl.	Impl.	Impl.	Impl.	
		Contingency: ILS RWY 17 (CAT-II) and ILS RWY 35 (CAT-I) Nav-aids available: GNSS and VOR/DME. From 2025 also DME/DME/DME					
ENCN	Kristiansand, Kjevik	03	Impl.	Impl.	Impl.	Planned 2024	
		21	Impl.	Impl.	Impl.	Planned 2024	
		Contingency: ILS RWY 03 and ILS RWY 21 (both CAT-I) Nav-aids available: GNSS and VOR/DME					
ENDU	Bardufoss	10	Impl.	Impl.	Impl.	No plan	
		28	Impl.	---	Impl.	No plan	LNAV/VNAV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for. Ref PBN.AUR.2005 (2); Possibility for RNP-AR will be investigated but an implementation decision has not been taken.
		Contingency: LOC RWY 10 and ILS RWY 28 (CAT-I) Nav-aids available: GNSS and VOR/DME					
ENEV	Harstad/Narvik Evenes	17	Impl.	---	Impl.	Planned Q3 2023	LNAV/VNAV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for. Ref PBN.AUR.2005 (2); RNP-AR planned.
		35	Impl.	---	---	Impl.	LNAV/VNAV and LPV not possible due terrain. Terrain avoidance for a straight-in procedure would result in a VPA higher than the design criteria of Baro-VNAV in PANS OPS allow for. For LPV, the vertical profile for a straight in-procedure is (by operators to the aerodrome) considered too steep to be comfortable for passenger flights (statement from operators: “VPA that exceed 3,9 degrees will not be used”). An off-set procedure would be outside of the tolerances of the design criteria for both Baro-VNAV and LPV of PANS OPS. RNP-AR (LNAV/VNAV) available as procedure with RF turn.
		Contingency: ILS RWY 17 (CAT-I) and VOR RWY 35 Nav-aids available: GNSS and VOR/DME					

ICAO Code	Airport name	IFR RWY	LNAV	LNAV/VNAV	LPV	RNP AR	Notes:
ENGM	Oslo	NOTE: ENGM is the only Norwegian airport for which the PCP IR is applicable.					
		01R	Impl.	Impl.	Impl.	Impl.	
		01L	Impl.	Impl.	Impl.	Impl.	
		19R	Impl.	Impl.	Impl.	Impl.	
		19L	Impl.	Impl.	Impl.	Impl.	
		Contingency: ILS CAT-III available to all IRE's Nav-aids available: GNSS and DME/DME/DME NOTE: current DVOR/DME will be discontinued in Q1 2024.					
ENHD	Haugesund, Karmøy	13	Impl.	Impl.	Impl.	Impl.	
		31	Impl.	Impl.	Impl.	No plan	
		Contingency: ILS RWY 13 (CAT-I) and VOR RWY 31 Nav-aids available: GNSS and VOR/DME, and from 2025 also DME/DME/DME					
ENKB	Kristiansund, Kvernberget	07	Impl.	Impl.	Impl.	Planned 2024	Ref PBN.AUR.2005 (2); RNP-AR planned.
		25	Impl.	---	Impl.	Planned 2024	LNAV/VNAV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for; or as is this case an off-set procedure outside of the tolerances of the design criteria for Baro-VNAV of PANS OPS. Ref PBN.AUR.2005 (2); RNP-AR planned.
		Contingency: ILS RWY 07 (CAT-I) and VOR RWY 25 Nav-aids available: GNSS and VOR/DME					
ENKR	Kirkenes, Høybuktmoen	05	Impl.	---	Impl.	Planned Q4 2023	LNAV/VNAV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for outside of the tolerances of the design criteria for Baro-VNAV of PANS OPS. Ref PBN.AUR.2005 (2); RNP-AR planned.
		23	Impl.	Impl.	Impl.	Planned Q4 2023	Ref PBN.AUR.2005 (2); RNP-AR planned.
		Contingency: VOR RWY 05 and ILS RWY 23 (CAT-I) Nav-aids available: GNSS and VOR/DME, and from 2024 DME/DME/DME					
ENNA	Lakselv, Banak	16	Impl.	Impl.	Impl	Planned Q3 2023	
		34	Impl.	Impl.	Impl	Planned Q3 2023	
		Contingency: LOC RWY 16 and ILS RWY 34 (CAT-I) Nav-aids available: GNSS and VOR/DME, and from 2024 DME/DME/DME					
ENOL	Ørlandet	15	Impl.	Impl.	Impl.	No plan	
		33	Impl.	Impl.	Impl.	No plan	
		Contingency: ILS RWY 15 and ILS RWY 33 (both CAT-I) Nav-aids available: GNSS and VOR/DME, and from 2026 DME/DME/DME (plus TACAN for MIL users)					

<table>
<tr><th>ICAO Code</th><th>Airport name</th><th>IFR RWY</th><th>LNAV</th><th>LNAV/VNAV</th><th>LPV</th><th>RNP AR</th><th>Notes:</th></tr>
<tr><td rowspan="3">ENRY</td><td rowspan="3">Moss, Rygge</td><td>12</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No plan</td><td>Special regulations apply for use of the aerodrome. PPR required.</td></tr>
<tr><td>30</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No plan</td><td>Special regulations apply for use of the aerodrome. PPR required.</td></tr>
<tr><td colspan="6">Contingency: ILS RWY 30 (CAT-I) and NDB RWY 12
Nav-aids available: GNSS and DME/DME/DME (plus TACAN for MIL users)</td></tr>
<tr><td rowspan="3">ENTC</td><td rowspan="3">Tromsø, Langnes</td><td>18</td><td>Impl.</td><td>---</td><td>Planned 2024</td><td>Planned 2024</td><td>LNAV/VNAV and LPV not possible due terrain. Terrain avoidance for a straight-in procedure would result in a VPA higher than the design criteria of Baro-VNAV in PANS OPS allow for (Currently, the GP of the ILS is 4,0 degrees / 7%).

Ref PBN.AUR.2005 (2); RNP-AR planned.</td></tr>
<tr><td>36</td><td>Impl.</td><td>---</td><td>Planned 2024</td><td>Planned 2024</td><td>LNAV/VNAV and LPV are not possible due to terrain. Terrain avoidance for a straight-in procedure would result in a VPA higher than the design criteria of Baro-VNAV in PANS OPS allow for (Currently, the GP of the ILS is 4,0 degrees / 7%).

Ref PBN.AUR.2005 (2); RNP-AR planned.</td></tr>
<tr><td colspan="6">Contingency: ILS RWY 18 and ILS RWY 36 (both CAT-I)
Nav-aids available: GNSS and VOR/DME</td></tr>
<tr><td rowspan="3">ENTO</td><td rowspan="3">Sandefjord, Torp</td><td>18</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No Plan</td><td></td></tr>
<tr><td>36</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No Plan</td><td></td></tr>
<tr><td colspan="6">Contingency: ILS RWY 18 (CAT-II) and ILS RWY 36 (CAT-I)
Nav-aids available: GNSS, VOR/DME and DME/DME/DME</td></tr>
<tr><td rowspan="3">ENVA</td><td rowspan="3">Trondheim, Værnes</td><td>09</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td></td></tr>
<tr><td>27</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td></td></tr>
<tr><td colspan="6">Contingency: ILS RWY 09 and ILS RWY 27 (both CAT-I)
Nav-aids available: GNSS and NDB, and from 2026 DME/DME/DME</td></tr>
<tr><td rowspan="5">ENZV</td><td rowspan="5">Stavanger, Sola</td><td>18</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>RNP-AR under testing and available on AIP SUP. Expected to become fully operational by Q4 2023</td></tr>
<tr><td>36</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>RNP-AR under testing and available on AIP SUP. Expected to become fully operational by Q4 2023</td></tr>
<tr><td>10</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No Plan</td><td></td></tr>
<tr><td>28</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No Plan</td><td></td></tr>
<tr><td colspan="6">Contingency: ILS RWY 18 (CAT-II) and ILS RWY 36 (CAT-I)
Nav-aids available: GNSS and VOR/DME, and from 2025 DME/DME/DME</td></tr>
</table>

Implementation status at airports with AFIS:

<table>
<tr><th>ICAO Code</th><th>Airport name</th><th>IFR RWY</th><th>LNAV</th><th>LNAV/VNAV</th><th>LPV</th><th>RNP AR</th><th>Notes:</th></tr>
<tr><td rowspan="3">ENBL</td><td rowspan="3">Førde, Bringeland</td><td>07</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Planned 2026</td><td></td></tr>
<tr><td>25</td><td>Impl.</td><td>---</td><td>Impl.</td><td>Planned 2026</td><td>LNAV/VNAV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for; outside of the tolerances of the design criteria for Baro-VNAV of PANS OPS.
Ref AUR.PBN.2005(2); RNP-AR planned.</td></tr>
<tr><td colspan="6">Contingency: NIL (see Annex II Decom plan)
Nav-aids available: GNSS</td></tr>
<tr><td rowspan="3">ENBN</td><td rowspan="3">Brønnøysund</td><td>03</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Planned 2028</td><td></td></tr>
<tr><td>21</td><td>---</td><td>---</td><td>---</td><td>Planned 2028</td><td>No published procedures to RWY 21 due high terrain north and north-east of the aerodrome (on extended centerline, and also too close for any conventional or RNP APCH procedures).</td></tr>
<tr><td colspan="6">Contingency: VOR will remain (due Art. 6 of the PBN IR)
Nav-aids available: GNSS and VOR/DME</td></tr>
<tr><td rowspan="3">ENBS</td><td rowspan="3">Båtsfjord</td><td>03</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Planned 2028</td><td>Ref AUR.PBN.2005(3);
Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3.</td></tr>
<tr><td>21</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Planned 2028</td><td>Ref AUR.PBN.2005(3);
Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3.</td></tr>
<tr><td colspan="6">Contingency: LOC/DME will remain (due Art. 6 of the PBN IR); pls. ref. section 3.3.4.
Nav-aids available: GNSS and from 2024 DME/DME/DME</td></tr>
<tr><td rowspan="3">ENBV</td><td rowspan="3">Berlevåg</td><td>06</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Planned 2028</td><td>Ref AUR.PBN.2005(3);
Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3.</td></tr>
<tr><td>24</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>Planned 2028</td><td>Ref AUR.PBN.2005(3);
Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3.</td></tr>
<tr><td colspan="6">Contingency: NIL (see Annex II Decom plan)
Nav-aids available: GNSS and from 2024 DME/DME/DME</td></tr>
</table>

ENFL	Florø	07	Impl.	Impl.	Impl.	Planned 2027	
		25	Impl.	---	---	Planned 2027	LNAV/VNAV and LPV not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for; outside of the tolerances of the design criteria for Baro-VNAV and LPV of PANS OPS. Ref AUR.PBN.2005(2); RNP-AR planned.
		Contingency: VOR/DME will remain (due Art. 6 of the PBN IR) Nav-aids available: GNSS and VOR/DME					
ENHF	Hammerfest	04	Impl.	Impl.	Planned 2024	Planned 2027	Ref AUR.PBN.2005(3); LPV planned published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements should be expected! Ref. also section 2.5.1.3.
		22	Impl.	Impl.	Planned 2024	Planned 2027	Ref AUR.PBN.2005(3); LPV planned published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements should be expected! Ref. also section 2.5.1.3.
		Contingency: LOC RWY 04 and LOC RWY 22 Nav-aids: GNSS and VOR/DME					
ENHK	Hasvik	11	Impl.	Impl.	Impl.	Planned 2027	Ref AUR.PBN.2005(3); Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3.
		29	Impl.	Impl.	Impl.	Planned 2027	Ref AUR.PBN.2005(3); Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3.
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS					
ENHV	Honningsvåg, Valan	08	offset issue	offset issue	offset issue	Planned 2027	RNP APCH to RWY 08 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for and outside of the tolerances of the design criteria for Baro-VNAV and LPV of PANS OPS. Ref AUR.PBN.2005(2); RNP-AR planned. RNP APCH to circling (LNAV): Approach from north (RNP A) or west (RNP D) available. Neither approach is per definition in the runway direction. Note also: SBAS service is not likely to comply with ICAO annex 10 SBAS-service continuity requirements. Ref. also section 2.5.1.3.
		26	---	---	---	Planned 2027	RNP APCH to RWY 26 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for and outside of the tolerances of the design criteria for Baro-VNAV and LPV of PANS OPS. Ref AUR.PBN.2005(2); RNP-AR planned. RNP APCH to circling (LNAV):

							Approach from north (RNP A) or west (RNP D) available. Neither approach is per definition in the runway direction. Note also: SBAS service is not likely to comply with ICAO annex 10 SBAS-service continuity requirements. Ref. also section 2.5.1.3.
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS					
ENLK	Leknes	02	Impl.	Impl.	---	Planned 2027	LPV not possible due to terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for; or as is this case at Leknes; an off-set procedure outside of the tolerances of the design criteria for LPV of PANS OPS (doc 8168).
		20	Impl.	Impl.	Impl.	Planned 2027	
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS					
ENMH	Mehamn	17	Impl.	Impl.	Impl.	Planned 2028	Ref AUR.PBN.2005(3); Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3
		35	Impl.	Impl.	Impl.	Planned 2028	Ref AUR.PBN.2005(3); Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS.					
ENML	Molde, Årø	07	Impl.	Impl.	Impl.	Planned 2024	
		25	Impl.	Impl.	Impl.	Planned 2024	
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS					
ENMS	Mosjøen, Kjerstad	16	---	---	---	Planned 2026	No published procedures to RWY 16: RNP APCH to RWY 16 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for and outside of the tolerances of the design criteria for all RNP APCH minima of PANS OPS. Ref AUR.PBN.2005(2); RNP-AR planned. RWY 16 is accessible by executing an RNP APCH to RWY 33, followed by visual circling (guiding lights for the visual approach track available for night-time operations)
		34	Impl.	Offset issue	Impl.	Planned 2026	
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS and VOR/DME (Vardefjell)					
ENRO	Røros	03	---	---	---	Planned	No published procedures to RWY 13 due terrain.

							Ref PBN.AUR.2005 (2); RNP-AR planned.
		31	Impl.	---	---	Planned	LNAV/VNAV and LPV not possible due to terrain. Terrain avoidance for a straight-in procedure would result in a VPA higher than the design criteria for Baro-VNAV of PANS OPS allow for. The case at Røros; an off-set procedure will be outside of the tolerances of the PANS OPS design criteria for both Baro-VNAV and LPV, hence only LNAV is provided. Ref PBN.AUR.2005 (2); RNP-AR planned.
		Contingency: Until 2026: ILS RWY (CAT-I) → After 2026: NIL. Nav-aids: GNSS and VOR/DME (Tolga)					
ENNM	Namsos	07	Impl.	Impl.	Impl.	Planned 2027	
		25	Impl.	Impl.	Impl.	Planned 2027	
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS					
ENNO	Notodden, Tjuven	12	Impl.	---	---	No plan	LNAV/VNAV and LPV to RWY 12 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). "LNAV only" available; due to need of «Step down fix»
		30	Impl.	---	---	No plan	LNAV/VNAV and LPV to RWY 30 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). "LNAV only" available; due to need of «Step down fix»
		Contingency: NIL (see Annex II Decom plan) Nav-aids: GNSS					

ENOV	Ørsta-Volda, Hovden	06	Planned 2025	---	---	Planned 2025	LNAV/VNAV and LPV to RWY 06 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned. RNP APCH to circling (LNAV): overlay to current LOC procedure in planning.
		24	Apch. to circling provided	---	---	Planned 2025	LNAV/VNAV and LPV to RWY 24 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned. RNP APCH to circling (LNAV): "RNAV A"
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENRA	Mo i Rana, Røssvoll **GENERAL NOTE:** Airport will be permanently closed in 2027. A new airport (ENMR) will be opened in 2027. The new airport will be fully compliant with PBN IR. The new aerodrome will not be provided with ground based nav-aids.	13	Impl.	---	---	---	LNAV/VNAV and LPV to RWY 13 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR is not planned, as the airport will be permanently closed, giving way for a new airport located a few kilometers to the south of current airport. RNP APCH to circling minima (LNAV); approach from west implemented.
		31	Impl.	---	---	---	LNAV/VNAV and LPV to RWY 31 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR is not planned, as the airport will be permanently closed, giving way for a new airport located few kilometers to the south of current airport. RNP APCH to circling minima (LNAV); approach from west implemented.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS and VOR/DME (Vardefjell)					
ENRM	Rørvik, Ryum	04	Impl.	Impl.	Impl.	Planned 2027	
		22	Impl.	---	Impl.	Planned 2027	LNAV/VNAV to RWY 22 is not possible due to an obstacle (telecom tower) in the

							approach-path; incompatible with (outside of the tolerances of) the design criteria for Baro-VNAV minima of PANS OPS. Ref AUR.PBN.2005(2); RNP-AR planned.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS and VOR/DME					
ENRS	Røst	02	Impl.	Impl.	Impl.	Planned 2028	
		20	Impl.	Impl.	Impl.	Planned 2028	
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENSB	Svalbard, Longyear-byen	10	Impl.	Impl.	---	Planned Q3 2023	LPV not possible: airport at 78° N
		28	Impl.	---	---	Impl.	LPV not possible: airport at 78° N. LNAV/VNAV RWY 28 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR available.
		Contingency: ILS RWY 10 (CAT-I) and LOC RWY 28. Nav-aids available: GNSS and DME/DME/DME. (Existing NDB's will be decommissioned in 2030 (see Annex II Decom plan for details)). Airfield is located at Svalbard.					
ENAS	Ny-Ålesund, Hamnerabben	12	Impl.	---	---	No plan	LPV not possible, airport at 79° N. LNAV/VNAV to RWY 12 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV of PANS OPS (doc 8168).
		30	Impl.	---	---	No plan	LPV not possible, airport at 79° N. LNAV/VNAV to RWY 30 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV of PANS OPS (doc 8168).
		NOTES: Airfield is located at Svalbard. Airfield is not open for public use. Traffic is limited to charter flights operated by the mining company that owns the airfield only. Procedures available are aligned with the capabilities of the only aircraft operating to/from the airfield.					

		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS and DME/DME/DME					
ENSD	Sandane	08	Impl.	---	---	Planned 2026	LNAV/VNAV and LPV to RWY 08 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned.
		26	Impl.	---	---	Planned 2026	LNAV/VNAV and LPV to RWY 26 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENSG	Sogndal, Haukåsen	06	Impl.	---	---	Planned 2026	LNAV/VNAV and LPV to RWY 06 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV minima of PANS OPS (doc 8168). RNP APCH implemented as “RNP A”; a LNAV Apch to circling: approach parallel to RWY. Ref AUR.PBN.2005(2); RNP-AR planned.
		24	Impl.	---	Impl.	Planned 2026	LNAV/VNAV RWY 24 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					

ENSH	Svolvær, Helle	01	Impl.	Impl.	Impl.	Planned 2026	
		19	---	---	---	Planned 2026	No published procedures to RWY 19 due high terrain north of the aerodrome (on extended centerline, and also too close for any conventional or RNP APCH procedures; including LNAV only). It will be investigated if RNP-AR could be accomplished.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENSK	Skagen, Stokmarknes	08	Impl.	Impl.	Impl.	Planned 2026	
		26	Impl.	---	---	Planned 2026	LNAV/VNAV and LPV to RWY 26 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV/VNAV and LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENSO	Stord, Sørstokken	14	Impl.	Impl.	Impl.	No plan	
		32	Impl.	Impl.	Impl.	No plan	
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS and VOR/DME, and from 2025: DME/DME/DME					
ENSR	Sørkjosen	14	---	---	---	Planned 2027	RNP APCH to RWY 14 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV, LNAV/VNAV nor LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned. RNP APCH to circling (LNAV) available.
		32	---	---	---	Planned 2027	RNP APCH to RWY 32 not possible due terrain. Terrain avoidance would result in a VPA higher than the design criteria of PANS OPS allow for, or an offset angle outside of the tolerances of the design criteria for LNAV, LNAV/VNAV nor LPV minima of PANS OPS (doc 8168). Ref AUR.PBN.2005(2); RNP-AR planned. RNP APCH to circling (LNAV) available.
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENSS	Vardø, Svartnes	15	Impl.	Impl.	Impl.	Planned 2028	Ref AUR.PBN.2005(3); Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3

		33	Impl.	Impl.	Impl.	Planned 2028	Ref AUR.PBN.2005(3); Published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements! Ref. also section 2.5.1.3
		Contingency: VOR/DME will remain (due Art. 6 of the PBN IR); pls. ref. section 3.3.4. Nav-aids available: GNSS and VOR/DME, and from 2024: DME/DME/DME					
ENST	Sandnessjøen, Stokka	02	Impl.	Impl.	Impl.	Planned 2028	
		20	Impl.	Impl.	Impl.	Planned 2028	
		Contingency: NIL (see Annex II Decom plan) Nav-aids available: GNSS					
ENVD	Vadsø	07	Impl.	Impl.	Planned 2024	Planned 2028	Ref AUR.PBN.2005(3); LPV planned published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements should be expected! Ref. also section 2.5.1.3
		25	Impl.	Impl.	Planned 2024	Planned 2028	Ref AUR.PBN.2005(3); LPV planned published in AIP-AD, however, continuity values below ICAO Annex 10 SBAS requirements should be expected! Ref. also section 2.5.1.3
		Contingency: LOC/DME will remain (due Art. 6 of the PBN IR); pls. ref. section 3.3.4. Nav-aids available: GNSS and VOR/DME (Seida), and from 2024: DME/DME/DME					
ENVR	Værøy (heliport)	N/A	Impl.	---	Planned 2024	No plan	No runway, helipad only. Contingency: none available. Approach designed as PinS.

Implementation status at airports without ATS:

<table>
<tr><th>ICAO Code</th><th>Airport name</th><th>IFR RWY</th><th>LNAV</th><th>LNAV/VNAV</th><th>LPV</th><th>RNP AR</th><th>Notes:</th></tr>
<tr><td rowspan="3">ENEG</td><td rowspan="3">Hønefoss, Eggemoen</td><td>04</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No plan</td><td>ATS currently not available</td></tr>
<tr><td>22</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No plan</td><td>ATS currently not available</td></tr>
<tr><td colspan="6">Contingency: NIL
Nav-aids available: GNSS and DME/DME/DME</td></tr>
<tr><td rowspan="3">ENGK</td><td rowspan="3">Arendal, Gullknapp</td><td>05</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No plan</td><td>ATS currently not available</td></tr>
<tr><td>23</td><td>Impl.</td><td>Impl.</td><td>Impl.</td><td>No plan</td><td>ATS currently not available</td></tr>
<tr><td colspan="6">Contingency: NIL
Nav-aids available: GNSS and VOR/DME (SVA “Svensheia”, not suitable for supporting Instr.Apch.Proc.)</td></tr>
</table>

Planned implementation (airport in planning):

<table>
<tr><th>ICAO Code</th><th>Airport name</th><th>IFR RWY</th><th>LNAV</th><th>LNAV/VNAV</th><th>LPV</th><th>RNP AR</th><th>Notes:</th></tr>
<tr><td rowspan="4">ENMR</td><td rowspan="4">Mo i Rana, Fagerlia</td><td>08</td><td>Planned</td><td>Planned</td><td>Planned</td><td>Planned</td><td>AFIS will be available</td></tr>
<tr><td>26</td><td>Planned</td><td>Planned</td><td>Planned</td><td>Planned</td><td>AFIS will be available</td></tr>
<tr><td colspan="6">Contingency: NIL
Nav-Aids: GNSS and VOR/DME (“Vardefjell”, not suitable for supporting Instr.Apch.Proc.)</td></tr>
<tr><td colspan="6">SID and STAR to both IRE’s will be provided and based on RNAV 1 (GNSS)</td></tr>
</table>

Airports /Heliports with "Cat H" PBN instrument approach procedures

NOTE: For airports listed here, the significant volume of helicopter operations consists of heavy helicopters (S-92) trafficking offshore installations in the North Sea. The traffic hence comes from the west, and it is very noisy. Procedures from east (inland) is not required, as almost all traffic comes from the west, and the helicopters hover/Heli-taxi to the LATO and land with the nose to the wind regardless.

ICAO Code	Airport name	IFR RWY	LNAV	LNAV/VNAV	LPV	Comments
ENKB	Kristiansund, Kvernberget	07	Impl.	---	---	LPV mimima not possible for "RNP Y (helicopter) RWY 07 due terrain west of the track (and consequent step-down fix)" LPV minima for fixed wing, ie."RNP Y RWY 07", may be used instead.
		25	Impl.	---	---	LPV minima for fixed wing, ie."RNP RWY 25", may be used instead.
ENFL	Florø	07	Impl.	---	Planned 2024	LPV minima for fixed wing, ie."RNP Y RWY 07", may be used. RNP Y is used for both fixed wing and helicopter. RNP X (Helicopter) will be updated with LPV-minima in 2024
		25	---	---	---	No straight in procedures for RWY 25, hence no vertical guidance available. Helicopters may use RNP RWY 25
ENBR	Bergen, Flesland	17	Impl.	---	Planned 2024*	ATC policy & noise abatement: Approaching helicopters shall normally use "RNP 139" or "RNP 043". * "RNP 139 / RNP 043" will be updated with LPV-minima in 2024. LPV minima for fixed wing, ie."RNP Z RWY 17", may be used.
		35	Impl.	---	Planned 2024	As above. LPV minima for fixed wing, ie."RNP Z RWY 35", may be used.

ENZV	Stavanger, Sola	10	Impl.	---	Planned 2024	
		28	---	---	---	ATC / AO policy: Due noise abatement, this RWY is generally not used other than in extraordinary windy conditions.
		18	---	---	---	ATC policy: Approaching helicopters shall use "RNP 044" or "RNP 081" Alternatively, RNP RWY 36.
		36	Impl.	---	Impl.	ATC policy: Approaching helicopters shall use "RNP 044" or "RNP 081" Alternatively, RNP RWY 36.
ENHF	Hammerfest	04	Planned 2024	Planned 2024	Planned 2024	Procedures with all 3 minima-lines will be developed for fixed wing and helicopters.
		22	Planned 2024	Planned 2024	Planned 2024*	ATC policy: Helicopters approaching from the north shall use "RNP 133". "RNP 133" will be updated with LPV-minima in 2024. Procedures with all 3 minima-lines will be developed for fixed wing and helicopters.
ENBO	Bodø	07	Impl.	---	---	Approaching helicopters from ENVR shall use "RNP 117" or alternatively RNP RWY 07 / 25
		25	---	---	Planned 2024*	Approaching helicopters from ENVR shall use "RNP 117" or alternatively RNP RWY 07 / 25 * RNP 117" will be updated with LPV-minima in 2024.
ENBN	Brønnøysund, Brønnøy	03	Impl.	---	Planned 2024*	ATC policy & noise abatement: Approaching helicopters shall normally use "RNP 085". "RNP 085" will be updated with LPV-minima in 2024 LPV minima for fixed wing, i.e..“RNP X RWY 03”, may be used.
		21	---	---	---	No published procedures to RWY 21 due high terrain north and north-east of the aerodrome (on extended centerline, and also too close for any conventional or RNP APCH procedures).
ENVR	Værøy (FATO)	03	Impl.	---	Planned 2024	
		21	Impl.	---	Planned 2024	

Annex II: NAV AID Evolution Plan (decommissioning plan)

List of conventional nav-aids used for approach and landing; Aerodrome or TMA/TIA.

Planned decommissioning based on “end-of-life”; and considering EU 2018/1048 art.6 concerning the need for conventional systems in the event of GNSS contingency:

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
LOC	ENAL	C	Ålesund/Vigra	RWY 24		Remains, ref. EU 2018/1048, Art. 6	
GP	ENAL	C	Ålesund/Vigra	RWY 24		Remains, ref. EU 2018/1048, Art. 6	
DME	ENAL	C	Ålesund/Vigra	RWY 24		Remains, ref. EU 2018/1048, Art. 6	
DME	ENAN	M	Andøya/Andenes	Ident: «AND»		Remains, ref. EU 2018/1048: Art. 6	
VOR	ENAN	M	Andøya /Andenes	Ident: «AND»		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENAN	M	Andøya /Andenes	RWY 14	Under consideration: awaiting MIL feedback	Remains, ref. EU 2018/1048: Art. 6	
LOC	ENAT	D	Alta	RWY 11		Remains, ref. EU 2018/1048, Art. 6	
GP	ENAT	D	Alta	RWY 11		Remains, ref. EU 2018/1048, Art. 6	
DME	ENAT	D	Alta	RWY 11		Remains, ref. EU 2018/1048, Art. 6	
DVOR	ENAT	D	Alta	Ident: «ATA»		Remains, ref. EU 2018/1048, Art. 6	
DME	ENAT	D	Alta	Ident: «ATA»	Co-located DVOR	Remains, ref. EU 2018/1048, Art. 6	
NDB	ENAT	D	Alta	Amtmannsnes (ident: «ALA»)	Decommissioned	Decom AIRAC 11.08.2022	2022
L	ENAT	D	Alta	Talvik (Ident: «TV»)	Decommissioned	Decom AIRAC 11.08.2022	2022
DME	ENBL	E	Førde/Bringeland	RWY 07	Decom	Decom	2025
LOC	ENBL	E	Førde/Bringeland	RWY 07	Decom	Decom	2025
LOC	ENBL	E	Førde/Bringeland	RWY 25	Decom	Decom	2028
DME	ENBL	E	Førde/Bringeland	RWY 25	Decom	Decom	2028
L	ENBL	E	Førde/Bringeland	Bringeland	Decom	Decom	2028
DVOR	ENBN	D	Brønnøysund/Brønnøy	Ident: «BNN»		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENBN	D	Brønnøysund/Brønnøy	Ulvingen	Decommissioned	Decom AIRAC 28.01.2021	2021
DME	ENBN	D	Brønnøysund/Brønnøy		Co-located DVOR: «BNN»	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENBO	C	Bodø	RWY 07		Remains, ref. EU 2018/1048, Art. 6	
GP	ENBO	C	Bodø	RWY 07		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENBO	C	Bodø	RWY 25		Remains, ref. EU 2018/1048, Art. 6	
GP	ENBO	C	Bodø	RWY 25		Remains, ref. EU 2018/1048, Art. 6	

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
DME	ENBO	C	Bodø	RWY 07		Remains, ref. EU 2018/1048, Art. 6	
DME	ENBO	C	Bodø	RWY 25		Remains, ref. EU 2018/1048, Art. 6	
GP	ENBR	B	Bergen/Flesland	RWY 17	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENBR	B	Bergen/Flesland	RWY 17	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENBR	B	Bergen/Flesland	RWY 17	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 5.2	
DVOR	ENBR	B	Bergen/Flesland	Ident: «FLS»	Remains until replaced by DME/DME network	Remains, ref. EU 2018/1048, Art. 6	2026
DME	ENBR	B	Bergen/Flesland		Co-located DME	Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENBR	B	Bergen/Flesland	RWY 35		Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENBR	B	Bergen/Flesland	RWY 35		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENBR	B	Bergen/Flesland	RWY 35		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENBS	E	Båtsfjord	RWY 21	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENBS	E	Båtsfjord	RWY 21	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 5.2	
L	ENBS	E	Båtsfjord	Båtsfjord	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENBV	E	Berlevåg	RWY 24	Decom	Decom	2028
DME	ENBV	E	Berlevåg	RWY 24	Decom	Decom	2028
L	ENBV	E	Berlevåg	Berlevåg	Decom	Decom	2028
LOC	ENCN	C	Kristiansand/Kjevik	RWY 03		Remains, ref. EU 2018/1048, Art. 6	
GP	ENCN	C	Kristiansand/Kjevik	RWY 03		Remains, ref. EU 2018/1048, Art. 6	
DME	ENCN	C	Kristiansand/Kjevik	RWY 03		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENCN	C	Kristiansand/Kjevik	RWY 21		Remains, ref. EU 2018/1048, Art. 6	
GP	ENCN	C	Kristiansand/Kjevik	RWY 21		Remains, ref. EU 2018/1048, Art. 6	
DME	ENCN	C	Kristiansand/Kjevik	RWY 21		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENCN	C	Kristiansand/Kjevik	Odderøya	Decommissioned	Decom AIRAC 02.DEC. 2021	2021
L	ENCN	C	Kristiansand/Kjevik	Birkeland	Decommissioned	Decom AIRAC 02.DEC. 2021	2021
DME	ENDU	M	Bardufoss	RWY 10		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENDU	M	Bardufoss	RWY 10		Remains, ref. EU 2018/1048: Art. 6	
GP	ENDU	M	Bardufoss	RWY 28		Remains, ref. EU 2018/1048: Art. 6	
DME	ENDU	M	Bardufoss	RWY 28		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENDU	M	Bardufoss	RWY 28		Remains, ref. EU 2018/1048: Art. 6	

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
DME	ENDU	M	Bardufoss	BDF	Co-located VOR “BDF”	Remains, ref. EU 2018/1048: Art. 6	
VOR	ENDU	M	Bardufoss	Ident: «BDF»		Remains, ref. EU 2018/1048: Art. 6	
NDB	ENDU	M	Bardufoss	TIL		Remains, ref. EU 2018/1048: Art. 6	
NDB	ENDU	M	Bardufoss	SJA		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENEV	C	Harstad/Narvik/ Evenes	RWY 17		Remains, ref. EU 2018/1048, Art. 6	
GP	ENEV	C	Harstad/Narvik/ Evenes	RWY 17		Remains, ref. EU 2018/1048, Art. 6	
DME	ENEV	C	Harstad/Narvik/ Evenes	RWY 17		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENEV	C	Harstad/Narvik/ Evenes	Odden	Nav-support for Missed Apch to be moved from NDB to VOR/DME, provided VOR-coverage is sufficient.	Decom	2024
L	ENEV	C	Harstad/Narvik/ Evenes	Fjellstad		Decom	2024
DVOR	ENFL	D	Florø	Ident: «FLO»		Remains, ref. EU 2018/1048, Art. 6	
DME	ENFL	D	Florø	Ident: «FLO»	Co-located VOR “FLO”	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENFL	D	Florø	RWY 07	Decom. LOC-proc to be replaced by VOR/DME procedures.	Decom AIRAC: JUN 2023	2023
DVOR	ENGM	A	Oslo/Gardermoen	Ident: «GRM»	DME/DME available if GNSS outage.	Decom AIRAC: JAN 2024	2024
DME	ENGM	A	Oslo/Gardermoen	Co-located DVOR «GRM»	DME will remain to support DME/DME/DME as source for RNP 1 in CTR+TMA	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENGM	A	Oslo/Gardermoen	RWY 01 L		Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENGM	A	Oslo/Gardermoen	RWY 01 R		Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENGM	A	Oslo/Gardermoen	RWY 19 L		Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENGM	A	Oslo/Gardermoen	RWY 19 R		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENGM	A	Oslo/Gardermoen	RWY 01 L		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENGM	A	Oslo/Gardermoen	RWY 01 R		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENGM	A	Oslo/Gardermoen	RWY 19 L		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENGM	A	Oslo/Gardermoen	RWY 19 R		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENGM	A	Oslo/Gardermoen	RWY 01 L		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENGM	A	Oslo/Gardermoen	RWY 01 R		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENGM	A	Oslo/Gardermoen	RWY 19 L		Remains, ref. EU 2018/1048, Art. 5.2	

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
DME	ENGM	A	Oslo/Gardermoen	RWY 19 R		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENHD	P	Haugesund/Karmøy	RWY 13	No plan available from AO		
DME	ENHD	P	Haugesund /Karmøy	RWY 13	No plan available from AO		
LOC	ENHD	P	Haugesund /Karmøy	RWY 13	No plan available from AO		
DME	ENHF	D	Hammerfest	RWY 04		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENHF	D	Hammerfest	RWY 04		Remains, ref. EU 2018/1048, Art. 6	
DME	ENHF	D	Hammerfest	RWY 22		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENHF	D	Hammerfest	RWY 22		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENHF	D	Hammerfest	Forsøl	Decom. Function replaced by VOR/DME fix.	Decom	2024
LOC	ENHK	E	Hasvik	RWY 29	Decom	Decom	2026
DME	ENHK	E	Hasvik	RWY 29	Decom	Decom 2026, unless required for DME/DME NETW.	2026
L	ENHK	E	Hasvik	Hasvik	Decom	Decom	2026
LOC	ENHV	E	Honningsvåg	RWY 26	Decom	Decom	2027
DME	ENHV	E	Honningsvåg	RWY 26	Decom	Decom 2027, unless required for DME/DME NETW.	2027
NDB	ENHV	E	Honningsvåg	Helnes	Decom	Decom	2027
LOC	ENKB	D	Kristiansund/Kvernberget	RWY 07		Remains, ref. EU 2018/1048, Art. 6	
DME	ENKB	D	Kristiansund/Kvernberget	RWY 07		Remains, ref. EU 2018/1048, Art. 6	
GP	ENKB	D	Kristiansund/Kvernberget	RWY 07		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENKB	D	Kristiansund/Kvernberget	Bremsnes	Decom	Decommissioned 3.11.2022	2023
LOC	ENKR	D	Kirkenes/Høybuktmoen	RWY 23		Remains, ref. EU 2018/1048, Art. 6	
GP	ENKR	D	Kirkenes/Høybuktmoen	RWY 23		Remains, ref. EU 2018/1048, Art. 6	
DME	ENKR	D	Kirkenes/Høybuktmoen	RWY 23		Remains, ref. EU 2018/1048, Art. 6	
CVOR	ENKR	D	Kirkenes/Høybuktmoen	Ident: «KIK»	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 6	
DME	ENKR	D	Kirkenes/Høybuktmoen	Ident: «KIK»	Co-located CVOR	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENLK	E	Leknes	RWY 02	Decom	Decom	2030
DME	ENLK	E	Leknes	RWY 02	Decom	Decom 2030, unless require for DME/DME NETW.	2030
NDB	ENLK	E	Leknes	Sandsund	Decom	Decom	2030

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
LOC	ENMH	E	Mehamn	RWY 17	Decom	Decom	2030
DME	ENMH	E	Mehamn	RWY 17	Decom	Decom 2030, unless required for DME/DME NETW.	2030
L	ENMH	E	Mehamn	Mehamn	Decom	Decom	2030
LOC	ENML	D	Molde/Årø	RWY 07	Decom	Decom	2028
GP	ENML	D	Molde/Årø	RWY 07	Decom	Decom	2028
DME	ENML	D	Molde/Årø	RWY 07	Decom	Decom 2028, unless required for DME/DME NETW.	2028
LOC	ENML	D	Molde/Årø	RWY 25	Decom	Decom	2025
DME	ENML	D	Molde/Årø	RWY 25	Decom	Decom 2025, unless required for DME/DME NETW.	2025
NDB	ENML	D	Molde/Årø	Tautra	Decom	Decom	2028
LOC	ENMS	E	Mosjøen	RWY 34	Decom	Decom	2026
DME	ENMS	E	Mosjøen	RWY 34	Decom	Decom	2026
L	ENMS	E	Mosjøen	Laksfors	Decom	Decom	2026
L	ENMS	E	Mosjøen	Mosjøen	Decom	Decom	2026
LOC	ENNA	D	Banak/Lakselv	RWY 16		Remains, ref. EU 2018/1048, Art. 6	
DME	ENNA	D	Banak/Lakselv	RWY 16	Ident: «BK»	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENNA	D	Banak/Lakselv	RWY 34		Remains, ref. EU 2018/1048, Art. 6	
GP	ENNA	D	Banak/Lakselv	RWY 34		Remains, ref. EU 2018/1048, Art. 6	
DME	ENNA	D	Banak/Lakselv	RWY 34	Ident: «BA»	Remains, ref. EU 2018/1048, Art. 6	
CVOR	ENNA	D	Banak/Lakselv	Ident: «BNA»		Remains, ref. EU 2018/1048, Art. 6	
DME	ENNA	D	Banak/Lakselv	Ident: «BNA»	Co-located VOR	Remains, ref. EU 2018/1048, Art. 6	
NDB	ENNA	D	Banak/Lakselv	Banak	Decommissioned	Decom AIRAC 24.03.2022	2022
L	ENNA	D	Banak/Lakselv	Porsang	Decommissioned	Decom AIRAC 24.03.2022	2022
NDB	ENNM	E	Namsos	Leirvika	Decom	Decom	2027
NDB	ENNM	E	Namsos	Namsos	Decom	Decom	2027
DME	ENNM	E	Namsos	NA	Decom	Decom 2026, unless required for DME/DME NETW.	2027
NDB	ENNO	P	Notodden/Tuven	HE	Airport Operator is considering earlier decommissioning date. Conclusion TBA next rev.	Decom	2030
DME	ENNO	P	Notodden/Tuven	RWY 12		Decom	2030
LOC	ENNO	P	Notodden/Tuven	RWY 12		Decom	2030

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
DME	ENOL	M	Ørland	RWY 33		Remains, ref. EU 2018/1048: Art. 6	
GP	ENOL	M	Ørland	RWY 33		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENOL	M	Ørland	RWY 33		Remains, ref. EU 2018/1048: Art. 6	
DME	ENOL	M	Ørland	RWY 15		Remains, ref. EU 2018/1048: Art. 6	
GP	ENOL	M	Ørland	RWY 15		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENOL	M	Ørland	RWY 15		Remains, ref. EU 2018/1048: Art. 6	
NDB	ENOL	M	Ørland	UTH			2023
NDB	ENOL	M	Ørland	TAR			2023
LOC	ENOV	E	Ørsta-Volda/ Hovden	RWY 06	Optimization of RNP procedures ongoing. Will possibly requiring RNP-AR	Decom	2025
DME	ENOV	E	Ørsta-Volda/ Hovden	RWY 06	as above	Decom., unless require for DME/DME NETW.	2025
NDB	ENOV	E	Ørsta-Volda/ Hovden	Baatvik	as above	Decom	2025
L	ENOV	E	Ørsta-Volda/ Hovden	Hovden	as above	Decom	2025
LOC	ENRA	E	Mo I Rana/ Røssvoll	RWY 31	Existing airport will discontinue operations and new airport will open in 2026/2027. Nav-aids are located in the touch-down zone of the new runway, and existing nav-aids needs to be decommissioned due developments/ landscaping of new runway. NOTE: New airport is planned without conventional nav-aids. Decom time will be coordinated with development plans of the new airport.		2023
DME	ENRA	E	Mo I Rana/ Røssvoll	RWY 31			2023
NDB	ENRA	E	Mo I Rana/ Røssvoll	Strømmen			2023
L	ENRA	E	Mo I Rana/ Røssvoll	OM / Alterneset	Decom	Decom	2023
L	ENRA	E	Mo I Rana/ Røssvoll	«MM»	Decom	Decom	2023
L	ENRA	E	Mo I Rana/ Røssvoll	Gruben	Decom	Decom	2023
LOC	ENRO	E	Røros	RWY 31	Decom	Decom	2026
GP	ENRO	E	Røros	RWY 31	Decom	Decom	2026
DME	ENRO	E	Røros	RWY 31	Decom	Decom 2026, unless required for DME/DME NETW.	2026
NDB	ENRO	E	Røros	Rambu Ident: «RBU»	Decom	Decom	2026
L	ENRO	E	Røros	Røros Ident; «RS»	Decom	Decom	2026
NDB	ENRS	E	Røst	Røst	Decom	Decom	2030
DME	ENRS	E	Røst	Røst	Decom	Required to support RNP 1 (DME/DME) in Bodø TMA	
NDB	ENRY	M	Moss/ Rygge	Ident: «RG»		Remains, ref. EU 2018/1048: Art. 6	

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
NDB	ENRY	M	Moss/ Rygge	Ident: «YG»		Remains, ref. EU 2018/1048: Art. 6	
LOC	ENRY	M	Moss/ Rygge	RWY 30	Supports ILS CAT-II	Remains, ref. EU 2018/1048: Art. 6	
GP	ENRY	M	Moss/ Rygge	RWY 30	Supports ILS CAT-II	Remains, ref. EU 2018/1048: Art. 6	
DME	ENRY	M	Moss/ Rygge	RWY 30	Supports ILS CAT-II	Remains, ref. EU 2018/1048: Art. 6	
LOC	ENSB	D	Svalbard/Longyear	RWY 10		Remains, ref. EU 2018/1048, Art. 6	
GP	ENSB	D	Svalbard/Longyear	RWY 10		Remains, ref. EU 2018/1048, Art. 6	
DME	ENSB	D	Svalbard/Longyear	RWY 10		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENSB	D	Svalbard/Longyear	RWY 28		Remains, ref. EU 2018/1048, Art. 6	
DME	ENSB	D	Svalbard/Longyear	RWY 28		Remains, ref. EU 2018/1048, Art. 6	
DME	ENSB	D	Svalbard	Skolten		Remains, ref. EU 2018/1048, Art. 6	
DME	ENSB	D	Svalbard	Torfjell		Remains, ref. EU 2018/1048, Art. 6	
DME	ENSB	D	Svalbard	Gunnarberget		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENSB	D	Svalbard/Longyear	Advent	Decom	Decom	2030
NDB	ENSB	D	Svalbard/Longyear	Longyear (at airport)	Decom	Decom	2030
NDB	ENSB	D	Svalbard/Longyear	Isfjord	Decommissioned	Decom AIRAC	2022
LOC	ENSD	E	Sandane/Anda	RWY 26	Decom	Decom	2030
DME	ENSD	E	Sandane/Anda	RWY 26	Decom	Decom 2026, unless required for DME/DME NETW.	2026
NDB	ENSD	E	Sandane/Anda	Stegen	Decom	Decom	2026
L	ENSD	E	Sandane/Anda	Anda	Decom	Decom	2026
DVOR	ENSG	E	Sogndal/Haukåsen	Ident: «SOG»	GNSS contingency operations in TIA will be dependent on DVOR/DME “Vollo” and “Florø”.	Decom	2026
DME	ENSG	E	Sogndal/Haukåsen		Co-located VOR	Decom	2026
DME	ENSG	E	Sogndal/Haukåsen	RWY 06	Decom	Decom	2026
LOC	ENSG	E	Sogndal/Haukåsen	RWY 06	Decom	Decom	2026
DME	ENSG	E	Sogndal/Haukåsen	RWY 24	Decom	Decom	2026
LOC	ENSG	E	Sogndal/Haukåsen	RWY 24	Decom	Decom	2026
GP	ENSG	E	Sogndal/Haukåsen	RWY 24	Decom	Decom	2026
NDB	ENSG	E	Sogndal/Haukåsen	Kaupanger	Decom	Decom	2026
NDB	ENSG	E	Sogndal/Haukåsen	Vangsnes	Decom	Decom	2026
LOC	ENSH	E	Svolvær/Helle	RWY 01	Decom	Decom	2030
DME	ENSH	E	Svolvær/Helle	RWY 01	Decom	Decom 2030, unless required for DME/DME NETW.	2030
L	ENSH	E	Svolvær/Helle	Helle	Required for missed apch	Decom	2030

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
L	ENSH	E	Svolvær/Helle	Skrova	Decommissioned	Decom AIRAC 06.10.2022	2022
LOC	ENSK	E	Stokmarknes/ Skagen	RWY 08	Decommissioned	Decom AIRAC 06.10.2022	2022
DME	ENSK	E	Stokmarknes/ Skagen	RWY 08	Decommissioned	Decom AIRAC 06.10.2022	2022
LOC	ENSK	E	Stokmarknes/ Skagen	RWY 26	Decommissioned	Decom AIRAC 06.10.2022	2022
DME	ENSK	E	Stokmarknes/ Skagen	RWY 26	Decommissioned	Decom AIRAC 06.10.2022	2022
CVOR	ENSK	E	Stokmarknes/ Skagen	Ident: «SKG»	Supporting conventional approach to both IRE's as well as supporting navigation in TMA	Decom	2030
DME	ENSK	E	Stokmarknes/ Skagen	DVOR	DME co-located with CVOR remains until 2030	Decom	2030
L	ENSK	E	Stokmarknes/ Skagen	Kjerringnes	Decom. Missed apch based on DVOR/DME fix	Decom	2030
DME	ENSO	P	Stord/Sørstokken	RWY 14	No plan available from AO		
LOC	ENSO	P	Stord/Sørstokken	RWY 14	No plan available from AO		
VOR	ENSO	P	Stord/Sørstokken	Ident: «STD»	No plan available from AO		
DME	ENSO	P	Stord/Sørstokken		No plan available from AO		
LOC	ENSR	E	Sørkjosen		Offset apch. to circling	Decom	2027
DME	ENSR	E	Sørkjosen		Offset apch. to circling	Decom 2027, unless required for DME/DME NETW.	2027
NDB	ENSR	E	Sørkjosen	Hestvik	Decom	Decom	2027
CVOR	ENSS	E	Vardø/Svartnes		Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 6	
DME	ENSS	E	Vardø/Svartnes		Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENST	E	Sandnessjøen/Stokka	RWY 20	Decom	Decom	2027
DME	ENST	E	Sandnessjøen/Stokka	RWY 20	Decom	Decom	2027
MM	ENST	E	Sandnessjøen/Stokka	RWY 20	Decommissioned	Decom AIRAC 28.01.2021	2021
L	ENST	E	Sandnessjøen/Stokka	Hestad	Decommissioned	Decom AIRAC 28.01.2021	2021
LOC	ENTO	P	Sandefjord/Torp	RWY 36		Remains, ref. EU 2018/1048, Art. 6	
DME	ENTO	P	Sandefjord/Torp	RWY 36		Remains, ref. EU 2018/1048, Art. 6	
GP	ENTO	P	Sandefjord/Torp	RWY 36		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENTO	P	Sandefjord/Torp	RWY 18	Supports ILS CAT-II	Remains, ref. EU 2018/1048: Art. 5.2	
GP	ENTO	P	Sandefjord/Torp	RWY 18	Supports ILS CAT-II	Remains, ref. EU 2018/1048: Art. 5.2	
DME	ENTO	P	Sandefjord/Torp	RWY 18	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENTC	C	Tromsø	RWY 36		Remains, ref. EU 2018/1048, Art. 6	
GP	ENTC	C	Tromsø	RWY 36		Remains, ref. EU 2018/1048, Art. 6	

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
DME	ENTC	C	Tromsø	RWY 36		Remains, ref. EU 2018/1048, Art. 6	
LOC	ENTC	C	Tromsø	RWY 18		Remains, ref. EU 2018/1048, Art. 6	
GP	ENTC	C	Tromsø	RWY 18		Remains, ref. EU 2018/1048, Art. 6	
DME	ENTC	C	Tromsø	RWY 18		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENTC	C	Tromsø	Kobbe	Decom. Will be replaced with DVOR/DME fix	Decom	2024
L	ENTC	C	Tromsø	Kvalsund	Decom. Will be replaced with DVOR/DME fix	Decom	2024
LOC	ENVA	B	Trondheim/Værnes	RWY 09		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENVA	B	Trondheim/Værnes	RWY 09		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENVA	B	Trondheim/Værnes	RWY 09		Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENVA	B	Trondheim/Værnes	RWY 27		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENVA	B	Trondheim/Værnes	RWY 27		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENVA	B	Trondheim/Værnes	RWY 27	Ident: «TD»	Remains, ref. EU 2018/1048, Art. 5.2	
NDB	ENVA	B	Trondheim/Værnes	Ident:«VNS»	Replaces NDBs «GKN» and «FLR”	Remains, ref. EU 2018/1048, Art. 6	
NDB	ENVA	B	Trondheim/Værnes	Flornes	Decommissioned	Decom AIRAC 05.nov.2020	2020
NDB	ENVA	B	Trondheim/Værnes	Gråkallen	Decommissioned	Decom AIRAC 05.nov.2020	2020
LOC	ENVD	E	Vadsø	RWY 07	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 6	
DME	ENVD	E	Vadsø	RWY 07	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 6	
L	ENVD	E	Vadsø	Vadsø	Remains for GNSS robustness / RFI resilience	Remains, ref. EU 2018/1048, Art. 6	
LOC	ENZV	B	Stavanger/Sola	RWY 18	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENZV	B	Stavanger/Sola	RWY 18	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENZV	B	Stavanger/Sola	RWY 18 Ident: «ZV»	Supports ILS CAT-II	Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENZV	B	Stavanger/Sola	RWY 36		Remains, ref. EU 2018/1048, Art. 5.2	
GP	ENZV	B	Stavanger/Sola	RWY 36		Remains, ref. EU 2018/1048, Art. 5.2	
DME	ENZV	B	Stavanger/Sola	RWY 36 Ident: «SL»		Remains, ref. EU 2018/1048, Art. 5.2	
LOC	ENZV	B	Stavanger/Sola	RWY 10	Decommissioned	Decom AIRAC 14.07.2022	2022
GP	ENZV	B	Stavanger/Sola	RWY 10	Decommissioned	Decom AIRAC 14.07.2022	2022
DME	ENZV	B	Stavanger/Sola	RWY 10 Ident: «ZL»	Decommissioned	Decom AIRAC 14.07.2022	2022

System	ICAO ID	LH	Airport Name	Location	Comment	Contingency use?	DECOM DATE
NDB	ENZV	B	Stavanger/Sola	Rennesøy	Decommissioned	Decom AIRAC 07.10.2021	2021
NDB	ENZV	B	Stavanger/Sola	Varhaug	Decommissioned	Decom AIRAC 07.10.2021	2021
DVOR	ENZV	B	Stavanger/Sola	Ident: «ZOL»	Remains until replaced by DME/DME network	Remains, ref. EU 2018/1048, Art. 6	
DME	ENZV	B	Stavanger/Sola	«ZOL»	Co-located DVOR: «ZOL»	Remains, ref. EU 2018/1048, Art. 6	

NOTE: Decommissioning year is indicative for the timeframe 2026-2030.

NOTE 2: Svalbard is not necessarily under the scope of EU IR 1048/2018, and compliance is based on Norwegian law / Norwegian national jurisdiction.

LH = Airport concept:

A: Main international aerodrome of Norway

B: International aerodrome

C: National aerodrome

D: Regional aerodrome

E: Local aerodrome

P: Private operated aerodrome

M: Military operated aerodrome (civil movements allowed, but may be subject to PPR)

List of conventional Nav-Aids for En-route purposes:

(note: the list relates to “main user”/purpose (and consequently ownership). The nav-aid may also be used for TMA/TIA and/or approach functions at the airport where located!)

System	ICAO ID		Location	IDENT	Comment	Contingency use?	DECOM DATE
DME	ENBO	ENR	BODØ	BDO	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR	ENBO	ENR	BODØ	BDO	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME	ENEV	ENR	Lunnan	EVD	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR	ENEV	ENR	Lunnan	EVD	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Storfjell	HMF	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Storfjell	HMF	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME	ENHD	ENR	HAUGESUND / Karmøy	KRM	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR	ENHD	ENR	HAUGESUND / Karmøy	KRM	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME	ENKB	ENR	KRISTIANSUND / Kvernberget	KVB	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR	ENKB	ENR	KRISTIANSUND / Kvernberget	KVB	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Mesnali	MES	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Mesnali	MES	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME	ENRM	ENR	RØRVIK / Ryum	RVK	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR	ENRM	ENR	RØRVIK / Ryum	RVK	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Seida	SDA	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Seida	SDA	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Sigdal	SIG	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Sigdal	SIG	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Svensheia	SVA	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Svensheia	SVA	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Tolga	TGA	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Tolga	TGA	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Varden	TRO	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Varden	TRO	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Vardefjell2	VFL2	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Vardefjell2	VFL2	VOR MON	Remains, ref. EU 2018/1048, Art. 6	

System	ICAO ID		Location	IDENT	Comment	Contingency use?	DECOM DATE
DME	ENAL	ENR	Synnesfjell	VIG	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR	ENAL	ENR	Synnesfjell	VIG	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
DME		ENR	Vollo	VOO	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
VOR		ENR	Vollo	VOO	VOR MON	Remains, ref. EU 2018/1048, Art. 6	
NDB	ENFB	ENR	Statfjord B	STB		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENSL	ENR	Sleipner	SPA		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENOA	ENR	Oseberg A	OBA		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENSE	ENR	Snorre A	SNR		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENHE	ENR	Heidrun	HEI		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENGC	ENR	Gullfaks C	GFC		Remains, ref. EU 2018/1048, Art. 6	
DME	ENQA	ENR	Troll A	TRL		Remains, ref. EU 2018/1048, Art. 6	
DME	ENGC	ENR	Gullfaks C	GFC		Remains, ref. EU 2018/1048, Art. 6	
DME	ENHE	ENR	Heidrun	HEI		Remains, ref. EU 2018/1048, Art. 6	
DME	ENSL	ENR	Sleipner	SPA		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENBJ	ENR	Bjørnøya	BJO		Remains, ref. EU 2018/1048, Art. 6	
DME	ENLA	ENR	Ula	UL		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENLA	ENR	Ula	ULA		Remains, ref. EU 2018/1048, Art. 6	
NDB	ENEK	ENR	Ekofisk	EKO		Remains, ref. EU 2018/1048, Art. 6	
DME	ENEK	ENR	Ekofisk	EKO		Remains, ref. EU 2018/1048, Art. 6	
DME	BLA	TMA	Blåenga	BLA		Remains, ref. EU 2018/1048, Art. 6	
DME	ENOS	TMA	NORWAY ACC Oslo	NLK		Remains, ref. EU 2018/1048, Art. 6	
DME	ERB	TMA	Ertsrudberget	ERB		Remains, ref. EU 2018/1048, Art. 6	
DVOR	ENST	TMA	Sandnessjøen	STO		Decom	2030
DME	ENST	TMA	Sandnessjøen	STO	Co-located DVOR: STO	Decom 2030, unless require for DME/DME NETW	2030
VOR	ENTO	TMA	Sandefjord/Torp	TOR		Decom	2030
DME	ENTO	TMA	Sandefjord/Torp	TOR	Required for DME/DME coverage in Oslo TMA and Farris TMA	Remains, ref. EU 2018/1048, Art. 6	

Annex III: List of TMA and TIA with underlying airports

TMA or TIA	Underlying Airports	SID	STAR	Primary Infrastructure	Contingency Infrastructure
Oslo TMA	ENGM Gardermoen ENKJ Kjeller ENEG Eggemoen	RNAV 1 Omni-SID	RNAV 1	GNSS	DME/DME Surveillance (vectoring)
Salen TMA	ESKS Salen	RNAV 1	RNAV 1	GNSS	Surveillance (vectoring)
Farris TMA	ENRY Rygge ENTO Torp	RNAV 1 Omni-SID	RNAV 1	GNSS	DME/DME Surveillance (vectoring)
Kjevik TMA	ENCN Kjevik ENGK Gullknapp	RNAV 1 Omni-SID	RNAV 1	GNSS	For ENCN: VOR / DME available. For ENGK: Approach has no purpose as aerodrome is based on “GNSS only”-operations (all IAP’s require GNSS). Surveillance (vectoring)
Sola TMA	ENZV Sola ENHD Haugesund	RNAV 1 Omni-SID RNAV 1 CAT H	RNAV 1	GNSS	VOR/DME until replaced by DME/DME Surveillance (vectoring)
Flesland TMA	ENBR Flesland ENSO Stord	RNAV 1 Omni-SID RNAV 1 CAT H	RNAV 1	GNSS	VOR/DME until replaced by DME/DME Surveillance (vectoring)
Møre TMA	ENAL Ålesund ENOV Ørsta/Volda ENML Molde ENKB Kvernberget	RNAV 1 Omni-SID RNAV 1 CAT H	RNAV 1	GNSS	For ENAL & ENKB: VOR / DME available. For ENML & ENOV: Approach has no purpose as aerodrome is based on “GNSS only”-operations (all IAP’s require GNSS). Surveillance (vectoring)
Værnes TMA	ENVA Værnes	RNAV 1 Omni-SID	RNAV 1	GNSS	NDB “VNS” until DME/DME is available (by 2030). Surveillance (vectoring)
Ørland TMA	ENOL Ørland	RNAV 1 Omni-SID	RNAV 1	GNSS	Surveillance (vectoring) NDB TACAN (for MIL ops.)
Helgeland TMA	ENBN Brønnøysund ENMS Mosjøen ENST Stokka ENRA Mo i Rana	RNAV 1	RNAV 1	GNSS	For ENBN: VOR / DME available. For ENMS, ENST and ENRA: Approach has no purpose as aerodrome is based on “GNSS only”-operations (all IAP’s require GNSS). Surveillance (vectoring)
Bodø TMA	ENBO Bodø	RNAV 1 Omni-SID RNAV 1 CAT H	RNAV 1	GNSS	VOR/DME until replaced by DME/DME (by 2030) Surveillance (vectoring) TACAN (for MIL Ops.)
Lofoten TMA	ENRS Røst ENVR Værøy (Heli) ENLK Leknes ENSH Svolvær ENSK Stokmarknes	RNAV 1	RNAV 1	GNSS	Surveillance (vectoring) Approach has no purpose as aerodromes are based on “GNSS only”-operations (all IAP’s require GNSS).
Evenes TMA	ENEV Evenes	RNAV 1	RNAV 1	GNSS	VOR/DME Surveillance (vectoring)
Bardufoss TMA	ENDU Bardufoss	RNAV 1 Omni-SID	RNAV 1	GNSS	VOR/DME Surveillance (vectoring) TACAN (for MIL Ops.)

Andøya TMA	ENAN Andøya	None	Conventional*	GNSS	VOR / DME available Surveillance (vectoring) NOTE! RNAV 1 SID and STAR in planning. Target date for publishing/AIRAC: 2024
Tromsø TMA	ENTC Tromsø	RNAV 1 Omni-SID	RNAV 1	GNSS	VOR / DME available Surveillance (vectoring)
Alta TMA	ENAT Alta	RNAV 1	RNAV 1	GNSS	VOR / DME available Surveillance (vectoring)
Banak TMA	ENAN Banak	RNAV 1 Omni-SID	RNAV 1	GNSS	VOR / DME available Surveillance (vectoring)
Hammerfest TMA	ENHF Hammerfest ENHK Hasvik	RNAV 1 Omni-SID RNAV 1 CAT H	RNAV 1	GNSS	For ENHF: VOR/DME available For ENHK: Approach has no purpose as aerodrome is based on "GNSS only"-operations (all IAP's require GNSS). Surveillance (vectoring)
Kirkenes TMA	ENKR Kirkenes ENVD Vadsø	RNAV 1	RNAV 1	GNSS	VOR / DME until DME/DME network becomes operational (Q3 2024).
Finnmark TIA	ENHV Honningsvåg ENMH Mehamn ENBV Berlevåg ENBS Båtsfjord ENSS Vardø	None	None	GNSS	- NIL –
Sørkjosen TIA	ENSR Sørkjosen	None	None	GNSS	- NIL -
Namsos TIA	ENNM Namsos	RNAV 1	RNAV 1	GNSS	- NIL -
	ENRM Rørvik	RNAV 1	RNAV 1	GNSS	- NIL -
Røros TIA	ENRO Røros	RNAV 1 Omni-SID	RNAV 1	GNSS	VOR / DME available
Sogn TIA	ENSG Sogndal ENFL Florø ENBL Bringeland ENSD Sandane	RNAV 1 RNAV 1 CAT H	RNAV 1	GNSS	VOR/DME
Svalbard TIA*	ENSB Longyearbyen ENAS Hamnerabben**	RNAV 1 Omni-SID	RNAV 1	GNSS	DME/DME * Svalbard is not necessarily under the scope of EU IR 1048/2018, and compliance is based on Norwegian law / Norwegian national jurisdiction. **AD not open for public use

Annex IV: List of SID/STAR for all Runway Ends

ICAO Code	Airport Name	IFR RWY	SID	STAR	Primary Infrastructure	Contingency procedure
ENAL	Ålesund, Vigra	06	RNAV 1	RNAV 1	GNSS	Surveillance
		24	RNAV 1	RNAV 1		
ENAN	Andøya	14	None *	None *	VOR / DME	NDB, TACAN
		32	None *	None *		
ENAT	Alta	11	RNAV 1	RNAV 1	GNSS	VOR / DME, Surveillance
		29	RNAV 1 (none standard)	No instrument approach procedures nor STAR available for RWY 29 due terrain! If an RNP-AR proc. is achieved, a STAR will be provided. Pls. also ref. to Annex 1 (p. 33).		
ENBO	Bodø	07	RNAV 1 RNAV 1 CAT H	RNAV 1	GNSS	Surveillance
		25	RNAV 1 RNAV 1 CAT H	RNAV 1		
ENBR	Bergen, Flesland	17	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H	GNSS	Surveillance
		35	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H		
ENCN	Kristiansand, Kjevik	03	RNAV 1	RNAV 1	GNSS	Surveillance
		21	RNAV 1	RNAV 1		
ENDU	Bardufoss	10	RNAV 1	RNAV 1	GNSS	VOR / DME, Surveillance, TACAN
		28	RNAV 1	RNAV 1		
ENEV	Harstad/Narvik Evenes	17	RNAV 1	RNAV 1	GNSS	Surveillance
		35	RNAV 1	RNAV 1		

ENGM	Oslo	01R	RNAV 1	RNAV 1	GNSS	DME / DME Surveillance
		01L	RNAV 1	RNAV 1		
		19R	RNAV 1	RNAV 1		
		19L	RNAV 1	RNAV 1		
ENKB	Kristiansund, Kvernberget	07	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H	GNSS	Surveillance
		25	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H		
ENHD	Haugesund, Karmøy	13	RNAV 1	RNAV 1	GNSS	VOR/DME
		31	RNAV 1	RNAV 1		
ENKR	Kirkenes, Høybuktmoen	05	RNAV 1	RNAV 1	GNSS	None
		23	RNAV 1	RNAV 1		
ENNA	Lakselv, Banak	16	RNAV 1	RNAV 1	GNSS	VOR / DME, Surveillance
		34	RNAV 1	RNAV 1		
ENOL	Ørland	15	RNAV 1	RNAV 1	GNSS	Surveillance, NDB, TACAN
		33	RNAV 1	RNAV 1		
ENRY	Moss, Rygge	12	RNAV 1	RNAV 1	GNSS	Surveillance
		30	RNAV 1	RNAV 1		
ENTC	Tromsø, Langnes	18	RNAV 1	RNAV 1	GNSS	VOR / DME, Surveillance
		36	RNAV 1	RNAV 1		
ENTO	Sandefjord, Torp	18	RNAV 1	RNAV 1	GNSS	Surveillance
		36	RNAV 1	RNAV 1		
ENVA	Trondheim, Værnes	09	RNAV 1	RNAV 1	GNSS	Surveillance
		27	RNAV 1	RNAV 1		
ENZV	Stavanger, Sola	18	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H	GNSS	Surveillance
		36	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H		
		10	RNAV 1	RNAV 1		

			RNAV 1 CAT H	RNAV 1 CAT H		
		28	RNAV 1	RNAV 1		
ENBL	Førde, Bringeland	07	NONE	RNAV 1	GNSS	
		25	RNAV 1	RNAV 1		
ENBN	Brønnøysund	03	RNAV 1	NONE	GNSS	
		21	RNAV 1	NONE		
ENBS	Båtsfjord	03	NONE	NONE	N/A	
		21	NONE	NONE		
ENBV	Berlevåg	06	NONE	NONE	N/A	
		24	NONE	NONE		
ENFL	Florø	07	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H	GNSS	VOR / DME
		25	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H		
ENGK	Arendal, Gullknapp	05	RNAV 1	RNAV 1	GNSS	Surveillance
		23	RNAV 1	RNAV 1		
ENHF	Hammerfest	04	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H	GNSS	Surveillance
		22	RNAV 1 RNAV 1 CAT H	RNAV 1 RNAV 1 CAT H		
ENHK	Hasvik	11	NONE	NONE	N/A	
		29	NONE	NONE		
ENHV	Honningsvåg, Valan	08	NONE	NONE	N/A	
		26	NONE	NONE		
ENLK	Leknes	02	RNAV 1	RNAV 1	GNSS	Surveillance
		20	RNAV 1	RNAV 1		
ENMH	Mehamn	17	NONE	NONE	N/A	
		35	NONE	NONE		

ENML	Molde, Årø	07	RNAV 1	RNAV 1	GNSS	Surveillance
		25	RNAV 1	RNAV 1		
ENMS	Mosjøen, Kjerstad	16	NONE	NONE	N/A	
		34	NONE	NONE		
ENNM	Namsos	07	NONE	NONE	N/A	
		25	NONE	NONE		
ENNO	Notodden, Tjuven	12	RNAV 1	NONE	N/A	
		30	RNAV 1	NONE		
ENOV	Ørsta-Volda, Hovden	06	RNAV 1	RNAV 1	GNSS	Surveillance
		24	RNAV 1	RNAV 1		
ENRA	Mo i Rana, Røssvoll	13	NONE	NONE	N/A	
		31	NONE	NONE		
ENRM	Rørvik, Ryum	04	NONE	NONE	N/A	
		22	NONE	NONE		
ENRO	Røros	13	RNAV 1	NONE	GNSS	Surveillance
		31	RNAV 1	RNAV 1		
ENRS	Røst		NONE	NONE	N/A	
			NONE	NONE		
ENSB**	Svalbard, Longyear-byen	10	RNAV 1	NONE	GNSS	
		28	RNAV 1	NONE		
ENSD	Sandane	08	RNAV 1	NONE	GNSS	Surveillance
		26	RNAV 1	RNAV 1		
ENSG	Sogndal, Haukåsen	06	RNAV 1	RNAV 1	GNSS	
		24	RNAV 1	RNAV 1		
ENSH	Svolvær, Helle	01	RNAV 1	NONE	GNSS	Surveillance
		19	RNAV 1	NONE		
ENSK	Skagen, Stokmarknes	098	RNAV 1	RNAV 1	GNSS	Surveillance
		26	RNAV 1	NONE		
ENSO		14	RNAV 1	RNAV 1	GNSS	Surveillance

	Stord, Sørstokken	32	RNAV 1	RNAV 1		
ENSR	Sørkjosen	14	NONE	NONE	N/A	
		32	NONE	NONE		
ENSS	Vardø, Svartnes	15	NONE	NONE	N/A	
		33	NONE	NONE		
ENST	Sandnessjøen, Stokka	02	RNAV 1	NONE	GNSS	Surveillance
		20	RNAV 1	NONE		
ENVD	Vadsø	07	NONE	NONE	N/A	
		25	NONE	NONE		
ENVR	Værøy(heliport)	N/A	NONE	NONE		

*** ENAN**: SID not available. STAR is available, but only as a conventional procedure: Conventional DME-Arc is based on MIL-requirements. RNAV 1 SID (omni-SID) and RNAV 1 STAR will be implemented by Q3 2024.

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