



# NAV03.1 — RNAV 1 in TMA Operations

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Performance-based navigation distinguishes between RNAV and RNP Specifications, both of which rely on area navigation techniques which allow aircraft to operate on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these. An RNAV 1 specification includes several requirements, one being a requirement for the lateral and longitudinal total system error (TSE) to be within +/- 1NM at least 95% of the flight time.

Individual States, ANSPs, and airports will evaluate the business need for SID routes or STAR routes. Where providers of ATM/ANS have established SID or STAR, they shall implement those routes in accordance with the requirements of RNAV 1 or RNP1 specification, as applicable.

PBN Regulation (EU) 2018/1048 of 18 July 2018, does not impose obligatory establishment of SID or STAR (business decision on having SID or STAR is up to an individual stakeholder). However, the regulation does prescribe obligatory set of specifications to be complied with, where a stakeholder had decided to establish SID or STAR.

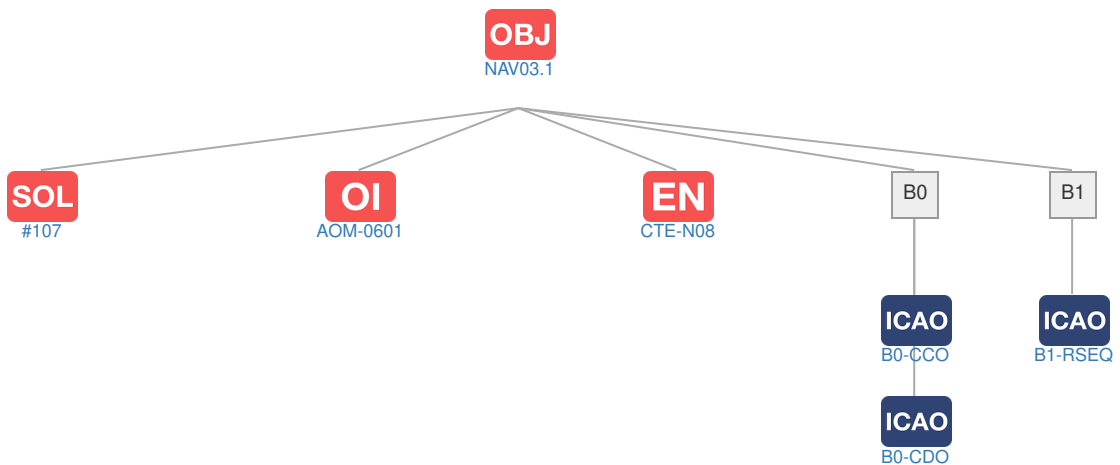
*NOTE: Where higher performance requirements than RNAV 1 are required in order to maintain air traffic capacity and safety in environments with high traffic density, traffic complexity or terrain features, SIDs or STARs shall be implemented in accordance with the requirements of the RNP 1 specification. See objective NAV 03.2 for details.*

*NOTE FOR MILITARY AUTHORITIES: It is the responsibility of each military authority to review this Objective IN ITS ENTIRETY and address each of the SLoAs that the military authority considers RELEVANT for itself. This has to be done on top and above of the review of "MIL" SLoAs which identify actions EXCLUSIVE to military authorities.*

<b>Edition</b>	2022
<b>Stakeholders</b>	Regulator / Air Navigation Service Provider / Airspace Users
<b>Type</b>	SES
<b>Scope</b>	ECAC+
<b>Status</b>	Active

## Context

### Related Elements



## Applicability Area(s) and Timescales

<b>Applicability Area 1:</b>	All EU SES States except: Maastricht UAC (EU SES states instrument RWY ends)
<b>Applicability Area 2:</b>	Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Israel, Moldova, Morocco, North Macedonia, Serbia, Türkiye, Ukraine, United Kingdom (Other ECAC+ states' instrument RWY ends, except those already listed in Applicability Area 1.)

Timescales	From	By	Applicable to
Initial operational capability	01-01-2001	-	Applicability Area 1 + Applicability Area 2
One SID and STAR per instrument RWY, where established	-	25-01-2024	Applicability Area 1
Locally determined number of RNAV1 SID/STAR, where established	-	06-06-2030	Applicability Area 2
All SIDs and STARs per instrument RWY, where established	-	06-06-2030	Applicability Area 1

## Links to ATM Master Plan Level 2

### OI Operational Improvement Steps

Code	Title	IOC	FOC	Related Elements
AOM-0601	Terminal Airspace Organisation Adapted through Use of - Best Practice		-	SOL OI EN OBJ DS

### EN Enablers

Code	Title	IOC	Related Elements
CTE-N08	DME Ground Infrastructure optimisation	31-12-2019	STK OI OBJ DS PCP

### SOL Links to SESAR Solutions

Code	Title	Program	Related Elements
#107	Point Merge in complex TMA	SESAR1	OI OBJ DS EOC

### PCP Links to PCP ATM Sub-Functionalities

Code	Title	Related Elements
No record found		

**ICAO** ICAO Block Modules

Designator	Title	Related Elements
B0		
B0-CCO	Improved Flexibility and Efficiency in Departure Profiles	OI OBJ
B0-CDO	Improved Flexibility and Efficiency in Descent Profiles (CDOs)	OI OBJ
B1		
B1-RSEQ	Improved Airport operations through Departure, Surface and Arrival Management	SOL OI OBJ PCP

## References

**Applicable legislation**

Commission Implementing Regulation (EU) 2018/1048 of 18 July 2018 laying down airspace usage requirements and operating procedures concerning performance-based navigation

**Applicable ICAO Annexes and other references**

None

**Deployment Programme 2022**

-

**Operating Environments**

Terminal Airspace

## Expected Performance Benefits

<b>Safety</b>	Increased situational awareness and indirect benefit to both ATC and pilot through reduction of workload during RNAV operations.
<b>Capacity</b>	-
<b>Operational efficiency</b>	Reduction in fuel burn through optimised routes and TMA procedures.
<b>Cost efficiency</b>	-
<b>Environment</b>	Emissions and noise nuisance reduced by use of optimal flight procedures and routings.
<b>Security</b>	-

## Stakeholder Lines of Action

Code	Title	From	By	Related Enablers
REG01	Verify the transition plan for PBN in ANS provision	03-12-2020	06-06-2030	
ASP01	Develop an airspace concept based on RNAV 1 arrival and departure procedures	01-01-2001	06-06-2030	EN
ASP02	Provide appropriate terrestrial navigation infrastructure to support RNAV 1 operations	01-01-2001	06-06-2030	EN
ASP03	Train air traffic controllers in RNAV 1 procedures	01-01-2003	06-06-2030	
ASP04	Train procedure designers in RNAV 1 capabilities	FINALISED		
ASP05	Develop and implement at least one RNAV 1 SID and RNAV 1 STAR per instrument RWY	01-01-2001	25-01-2024 06-06-2030	EN
ASP06	Publish in AIPs all co-ordinate data in WGS-84 meeting the quality requirements set out in ICAO Annex 15	FINALISED		
ASP07	Define all RNAV procedures to be for RNAV 1 approved aircraft and designed in accordance with the EUROCONTROL guidelines and ICAO PANS OPS	DELETED		EN
ASP08	Adapt ATS automated systems to ensure the availability of information regarding aircraft RNAV equipage for systematic display to relevant control positions	FINALISED		
ASP09	Implement adaptations to ATS systems to permit the display on flight strips (and extended track labels) radar labels and/or radar position symbols, of aircraft RNAV equipage	DELETED		
ASP10	Recommend to adapt ATS radar display systems to permit the display, on radar labels and/or radar position symbols, of aircraft RNAV equipage. Such display should be automatic. Manual updates should be possible	DELETED		
ASP11	Develop a local RNAV 1 safety assessment	01-01-2001	06-06-2030	
ASP12	Establish the transition plan for PBN in ANS provision	03-12-2020	06-06-2030	
ASP13	Develop and implement all RNAV 1 SID and RNAV 1 STAR per instrument RWY	01-01-2001	06-06-2030	EN
USE01	Install appropriate RNAV 1 equipment	01-01-2001	31-12-2023	EN
USE02	Train flight crews in RNAV 1 TMA procedures	01-01-2001	31-12-2023	

## Supporting Material

Title	Related SLoAs
EASA - EASA Decision 2018/013/R - AMC & GM to Regulation (EU) 2018/1048 (PBN IR) – Annex II to EASA Decision 2018/013/R 11/2018 <a href="https://www.easa.europa.eu/sites/default/files/dfu/Annexes%20to%20EDD%202018-013-R.pdf">https://www.easa.europa.eu/sites/default/files/dfu/Annexes%20to%20EDD%202018-013-R.pdf</a>	ASP01, ASP05, ASP12, ASP13
EC - COMMISSION IMPLEMENTING REGULATION (EU) 2017/373 - (OJ L 62, 8.03.2017, p. 1) - COMMISSION IMPLEMENTING REGULATION (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 03/2017 <a href="https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0373&amp;from=EN">https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32017R0373&amp;from=EN</a>	ASP11
EUROCONTROL - Air Navigation Systems Safety Assessment Methodology (SAM) - Version 2.1 / 11/2006 <a href="https://www.eurocontrol.int/tool/safety-assessment-methodology">https://www.eurocontrol.int/tool/safety-assessment-methodology</a>	ASP11
EUROCONTROL - Airspace Concept Handbook for the Implementation of Performance Based Navigation (PBN) - Edition 4.0 / 04/2021 <a href="https://www.eurocontrol.int/publication/airspace-concept-handbook-implementation-performance-based-navigation-pbn">https://www.eurocontrol.int/publication/airspace-concept-handbook-implementation-performance-based-navigation-pbn</a>	ASP01, ASP05, ASP12, ASP13
EUROCONTROL - Distance Measuring Equipment Tracer (DEMETER) Tool - Version 1.0.4 / 01/2012 <a href="https://www.eurocontrol.int/online-tool/distance-measuring-equipment-tracer">https://www.eurocontrol.int/online-tool/distance-measuring-equipment-tracer</a>	ASP02
EUROCONTROL - European Route Network Improvement Plan (ERNIP) Part 1 - European Airspace Design Methodology - Guidelines - 2.0 / 12/2018 <a href="https://www.eurocontrol.int/publication/european-route-network-improvement-plan-ernip-part-1">https://www.eurocontrol.int/publication/european-route-network-improvement-plan-ernip-part-1</a>	ASP01, ASP12
EUROCONTROL - GUID-114 - Guidelines for RNAV 1 Infrastructure Assessment - Edition 2.0 / 07/2021 <a href="https://www.eurocontrol.int/publication/eurocontrol-guidelines-rnav-1-infrastructure-assessment">https://www.eurocontrol.int/publication/eurocontrol-guidelines-rnav-1-infrastructure-assessment</a>	ASP02
ICAO - Doc 4444 - Air Traffic Management - Edition 16 / 11/2016 <a href="https://store.icao.int/">https://store.icao.int/</a>	ASP03
ICAO - Doc 7030 - Regional supplementary Procedures - Edition 5 / 07/2011 <a href="https://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx">https://www.icao.int/EURNAT/Pages/EUR-and-NAT-Document.aspx</a>	ASP01, ASP03, ASP12
ICAO - Doc 8168-Volume I - Aircraft Operations - Volume I - Flight Procedures - Edition 5 / 11/2010 <a href="https://store.icao.int/">https://store.icao.int/</a>	ASP03
ICAO - Doc 8168-Volume II - Aircraft Operations - Volume II - Construction of Visual and Instrument Flight Procedures - Edition 5 / 11/2011 <a href="https://store.icao.int/">https://store.icao.int/</a>	ASP01, ASP03, ASP05, ASP12, ASP13
ICAO - Doc 9613 - Performance-based Navigation (PBN) Manual - Edition 4 / 03/2013 <a href="https://store.icao.int/en/performance-based-navigation-pbn-manual-doc-9613">https://store.icao.int/en/performance-based-navigation-pbn-manual-doc-9613</a>	ASP01, ASP02, ASP05, ASP12, ASP13, USE01, USE02
ICAO - Doc 9992 - Manual on the Use of Performance-based Navigation (PBN) in Airspace Design - First Edition / 01/2013 <a href="http://store1.icao.int/">http://store1.icao.int/</a>	ASP01
JAA - TGL 10 Revision 1 - Airworthiness and Operational Approval for Precision RNAV Operations in Designated European Airspace 02/2005 <a href="http://www.eurocontrol.int/articles/navigation-library">http://www.eurocontrol.int/articles/navigation-library</a>	USE01

## Consultation & Approval

<b>Working Arrangement in charge</b>	NSG - Navigation Steering Group
<b>Outline description approved in</b>	-
<b>Latest objective review at expert level</b>	12/2018
<b>Commitment Decision Body</b>	Provisional Council (PC)
<b>Objective approved/endorsed in</b>	07/2001
<b>Latest change to objective approved/endorsed in</b>	05/2019