

Supporting
European
Aviation



RNAV 5 routes - positions sensors versus data provision

General overview, ICAO requirements

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PBN En-route Operations in Europe Provisions

- **Doc 7030 - EUR Regional Supplementary Procedures**

Chapter 4. NAVIGATION

4.1 PERFORMANCE-BASED NAVIGATION (PBN)

4.1.1 Area navigation (RNAV) specifications

4.1.1.2 **RNAV 5**

Area of applicability

4.1.1.2.3 The requirements included in the RNAV 5 (B-RNAV) specification for en-route operations shall apply to all such operations conducted under IFR ...

- **COMMISSION IMPLEMENTING REGULATION (EU) 2018/1048** of 18 July 2018 laying down airspace usage requirements and operating procedures concerning performance-based navigation:

ANNEX SUBPART PBN - Performance-based navigation

AUR.PBN.2005 Routes and procedures

(6) Where providers of ATM/ANS have established ATS routes for en route operations, they shall implement those routes in accordance with the requirements of the **RNAV 5** specification.

RNAV 5 Implementation Considerations

NAVAID infrastructure

Doc 9613 - PBN Manual, Chapter 2

- States may prescribe the carriage of **RNAV 5** on specific routes or for specific areas/flight levels of their airspace.
- **RNAV 5** operations are based on the use of RNAV equipment which automatically determines the aircraft position in the horizontal plane using input from one or a combination of the following types of position sensors, together with the means to establish and follow a desired path:
 - a) **VOR/DME**;
 - b) DME/DME;
 - c) INS or IRS; and
 - d) GNSS.

Area Navigation Routes Data Provision

Doc 10066 PANS-AIM, Appendix 1 - AIP Data Set

Table A1-3 - ATS Routes, Route Segment, PBN requirements, Sensor requirements:

- Indication on the sensor requirements including any navigation specification limitations.

Table A1-3 - Waypoint, Formation:

- Navaid (text) - The station identification of the reference VOR/DME.
- Bearing (bearing) - The bearing from the reference VOR/DME, if the waypoint is not collocated with it.
- Distance (distance) - The distance from the reference VOR/DME, if the waypoint is not collocated with it.

Area Navigation Routes Data Provision

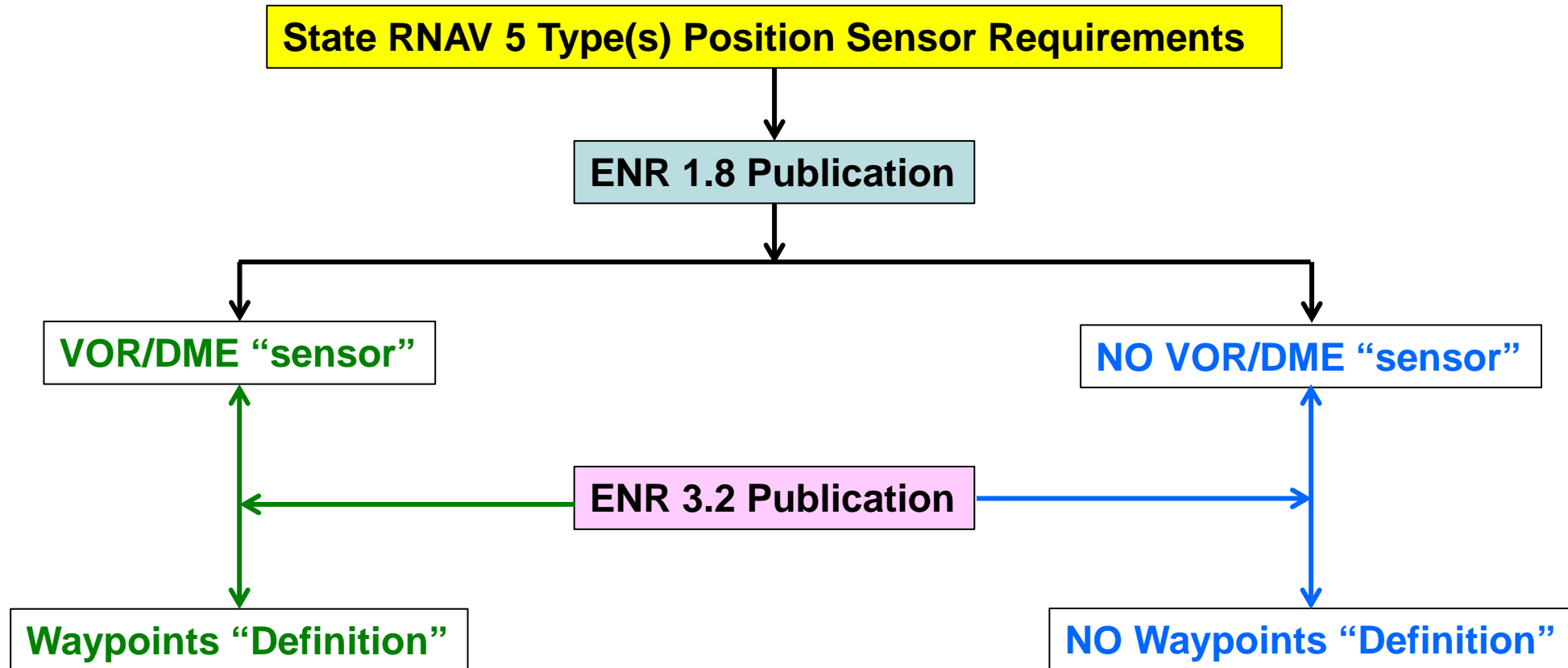
Doc 10066 PANS-AIM, Appendix 2 - AIP

ENR 3.2 Area navigation routes

- *#AIP-DS#* Detailed description of PBN (RNAV and RNP) routes, including:
 - 2) in respect of waypoints defining an area navigation route, additionally as applicable:
 - a) station identification of the reference VOR/DME;
 - b) bearing to the nearest degree and the distance to the nearest tenth of a kilometre or tenth of a nautical mile from the reference VOR/DME, if the waypoint is not collocated with it; and
 - c) elevation of the transmitting antenna of DME to the nearest 30 m (100 ft);
- No requirement for sensors by ICAO but for ICAO EUR Region - ECAC Area requirement is incorporated in the European Route Network Improvement Plan (ERNIP) Part 1, Chapter 9. The required placeholder is AIP, ENR 1.8.

Area Navigation Routes Data Provision

Doc 10066 PANS-AIM, Appendix 2 - AIP



Area Navigation Routes Data Provision

Doc 10066 PANS-AIM, Appendix 2 - AIP Fictitious Example

(RNAV 5 based on position sensors including VOR/DME)

Route designator (RNP/RNAV ¹) (RCP/RSP ³) Name of significant points Coordinates	Way-point IDENT of VOR/DME BRG & DIST ELEV DME Antenna	MAG REF BRG Geodesic DIST	Upper Limits Lower Limits Airspace classification	Direction of cruising levels		Required Navigation Accuracy	Remarks Controlling unit channel Logon address
				Odd	Even		
1	2	3	4	5		6	7
L123 (RNAV 5) ² (RCP 180/RSP 240)							For continuation, see AIP (specify).
▲ TEMPO (FIR BDRY) 565024N 0295136W	WOB 040° 136.3 NM 150 M		995.7NM				Amsel ACC channel: 120.300
▲ ULENI 442348N 0332942W	WOB 050° 286.3 NM 150 M	050° 230°	434.3NM		↓	+/- 5 NM	
△ ABOLA 454236N 0351012W	WOB 015° 336.7 NM 150 M	073° 253°	195.6NM	FL660 FL095 Class C		+/- 5 NM	
▲ ILURU (FIR BDRY) 500112N 0413648W	WOB 015° 286.3 NM 150 M	077° 257°	365.8NM		↑	+/- 5 NM	
							For continuation, see AIP (specify).

1. RNP = required navigation performance; RNAV = area navigation specification.
2. RNAV 5 = An RNAV specification having a lateral navigation accuracy of 5 nautical miles. RNAV 5 is also referred to as B-RNAV in the EUR.
3. RCP = required communication performance; RSP = required surveillance performance.

Area Navigation Routes Data Provision

Doc 10066 PANS-AIM, Appendix 2 - AIP Publication

ENR 3.2 Area navigation routes

- *Bulgaria*
- *Lithuania*
- *Norway*
- *Poland*
- *Romania*
- ...

Трасета за зонална навигация (RNAV) Area Navigation (RNAV) Routes						
Route designator (RNP/RNAV) Name of significant points Coordinates	Waypoint IDENT of VOR/DME BRG & DIST km (NM) ELEV DME Antenna m (ft)	MAG BRG Geodesic DIST km (NM)	Upper Limits Lower Limits Airspace classification	Direction of cruising levels Odd Even	Navigation accuracy requirement	Remarks Controlling unit Frequency
1	2	3	4	5	6	7
L605 (RNAV 5)	Total DIST km (NM) 303.8 (164.0)					<i>For continuation see AIP Romania</i>
▲ BULEN (FIR BDRY) 434500N 0254900E	GRN 002° 66.8 (36.1) 90 (300)	120° 122.2 (66.0)	FL660 FL245 Class C	↓	5NM	All ATS route segments (laterally and vertically) are PERM except: GONGO - VABUR FL175 - FL245 CDR 1 H24 ALTN route: by ATC clearance
▲ GONGO 430553N 0270157E	WRN 251° 65.5 (35.4) 60 (200)	122°	FL660 FL175		5NM	

QUESTIONS

Interface Summary