

PBN NavSpecs and Route Spacing (Ref. PBN Manual Doc 9613 Volume II, Attachment B & PANS-OPS Doc 8168 Volume II, Part III, PANS-ATM Doc 4444, and Annex 15)

| Nav Specs           | Flight Phase    |                      |                 |          |              |       |                      |           | Supporting Nav. Infrastructure                                    | Route Spacing (NM)   | Additional Functionality<br>(Required or Optional) |     |                    |           |        | Operational Requirements   |   |   |  |  |
|---------------------|-----------------|----------------------|-----------------|----------|--------------|-------|----------------------|-----------|---|--|--|-----|--------------------|-----------|--------|--|---|---|--|--|
|                     | En-route Remote | En-route Continental | Arrival         | Approach |              |       |                      | Departure |   |  | RF   | FRT | TOAC <sup>2)</sup> | Baro VNAV | Nav DB | Communication  | Navigation  | Surveillance  | AIM  | Others   |
|                     |                 |                      |                 | Initial  | Intermediate | Final | Missed <sup>1)</sup> |           |   |  |  |     |                    |           |        |  |   |   |  |  |
| RNAV 10<br>(RNP 10) | 10              |                      |                 |          |              |       |                      |           | Not require ground based Naviad<br>Dual LRNS (INS, IRS FMS, GNSS) | Lateral<br>50 between RNAV10, RNP4, or RNP2<br><br>Longitudinal<br>50 with DCPC, procedureal position report<br>- Distance verification : at least every 24min<br>50 with reporting interval 27min<br>5min with reporing interval 14min                  |  |     | TBD <sup>2)</sup>  |           | O      | Voice com through 3rd party, DCPC in some areas.<br><br>Longitudinal<br>50 with RCP240 (ADS-C) | RNAV 10 (RNP 10)<br>Approval, lateral deviation less than 7NM (same direction)/6NM (opposite direction) | Longitudinal<br>Procedural pilot position report (max 24min)<br>50 with RSP 180 (CPDLC) | WGS-84; QMS for AIS; AIRAC<br>Compliance for publication (42 days, recommended 56 days ); ICARD for new waypoint names; Air Navigation Plan Amendment for Regional ATS Routes; Regional Supplementary Procedures (Doc 7030) for application in airspace over the high seas; PBCS | System safety and datalink performance (PBCS) must be monitored, TLS 5X10 <sup>-9</sup> accident per flight hour.<br><br>Max ADS-C periodic reporting interval - 27min for 50NM - 14min for 5min |
| RNAV 5              |                 | 5                    | 5 <sup>3)</sup> |          |              |       |                      |           | VOR/DME<br>DME/DME<br>INS or IRS<br>GNSS                          | Lateral<br>16.5 - straight unidirectional racks (same direction route-ECAC)<br>18 - straight bidirectional tracks (opposite direction route- ECAC)<br>10 - ATC intervention capability (ECAC)<br>30 - No ATS Surveillance in high traffic density (ECAC) |  |     | TBD                |           | O      | DCPC- VHF  | RNAV 5 OPS Approval (BRNAV)   | Procedural pilot position report<br>Surveillance (RNAV 5)                               | WGS-84; QMS for AIS; AIRAC<br>Compliance for publication (42 days, recommended 56 days; ICARD for new waypoint names; Air Navigation Plan Amendment for Regional ATS Routes  |  |
| RNAV 2              |                 | 2                    | 2               |          |              |       |                      | 2         | GNSS<br>DME/DME<br>DME/DME/IRU                                    | Lateral<br>8 to 9 - straight tracks in high traffic density (en-route) (FAA)   |  |     | TBD                |           | R      | DCPC- VHF  | RNAV 2 OPS Approval (PRNAV, US RNAV AC 90-100)  | surveillance  | Same as RNAV 5   |  |
| RNAV 1              |                 | 1                    | 1               | 1        | 1            |       | 1                    | 1         | GNSS<br>DME/DME<br>DME/DME/IRU                                    | Lateral<br>For SIDs/STARs (PANS-ATM)<br>7 between RNAV1 and RNAV1, RNP1. RNP APCH, or RNP AR APCH  |  |     | TBD                | O         | R      | DCPC- VHF  | RNAV 1 OPS Approval (PRNAV, US RNAV AC 90-100)  | surveillance  | WGS-84; QMS for AIS; AIRAC<br>Compliance for publication (42 days, recommended 56 days   |  |

|                     |   |        |         |         |         |     |         |         |                                      |  |   |   |     |   |   |  |  |   |   |   |
|---------------------|---|--------|---------|---------|---------|-----|---------|---------|--------------------------------------|--|---|---|-----|---|---|--|--|---|---|---|
| RNP 4               | 4 |        |         |         |         |     |         |         | Not require ground-based Naviad GNSS | Lateral<br>50 between RNAV10, RNP4 or RNP2<br>23 between RNP4 or RNP2 (SLOP up to 2NM)<br>- 12 for climbs/descends through aircraft in level<br>20 between RNP4 or RNP2 (No SLOP or SLOP up to 0.5NM)<br>- 9 for climbs/descends through aircraft in level<br><br>Longitudinal<br>50 with reporting interval 32min<br>30 with reportin interval 12min<br>5 min with reporting intercal 14min   |   | O | TBD |   | R | DCPC or CPDLC.<br>Requires PBCS (RCP240)   | RNP 4 OPS Approval   | ADS with a lateral deviation contract having 5NM.<br>Requires PBCS (RSP180) | WGS-84; QMS for AIS; AIRAC Compliance for publication (42 days, recommended 56 days; ICARD for new waypoint names; Air Navigation Plan Amendment for Regional ATS Routes; Regional Supplementary Procedures (Doc 7030) for application in airspace over the high seas; PBCS | Conformance monitoring shall be ensured by establishing an ADS-C event contract specifying a lateral deviation change event with a maximum of 5 NM threshold and a waypoint change event<br><br>Max ADS-C periodic reporting interval<br>- 32min for 50NM<br>- 12min for 30NM<br>- 14min for 5min |
| RNP 2               | 2 | 2      |         |         |         |     |         |         | GNSS                                 | Lateral<br>Apply minima in RNP4 if RNP2 is related Between RNP2 or GNSS equipage<br>- 23 for SLOP up to 2NM, climbs/descends through aircraft in level<br>- 20 for No SLOP or SLOP up to 0.5NM, climbs/descends through aircraft in level<br>- 18 for SLOP up to 2 NM with VHF DCPC<br>- 15 for No SLOP or SLOP up to 0.5NM with VHF DCPC<br>- 10 for SLOP up to 2 NM with VHF DCPC, climbs/descends through aircraft in level<br>- 7 for No SLOP or SLOP up to 0.5NM with VHF DCPC, climbs/descends through aircraft in level<br>Longitudinal<br>30 with reportin interval 12min<br>5 min with reporting intercal 14min |   | O | TBD |   | R | Requires PBCS (RCP240) for Oceanic/Remote; For other areas, depends on operational considerations (route spacing, traffic density, complexity, contingency procedures) | RNP 2 OPS Approval (Oceanic/Remote/continental)                                | Requires PBCS (RSP180) for Oceanic/Remote                                   | Same as RNP 4   | Conformance monitoring shall be ensured by establishing an ADS-C event contract specifying a lateral deviation change event with a maximum of 5 NM threshold and a waypoint change event<br><br>Max ADS-C periodic reporting interval<br>- 12min for 30NM<br>- 14min for 5min                     |
| RNP 1               |   |        | 1       | 1       | 1       |     | 1       | 1       | GNSS                                 | Lateral<br>For SIDs/STARs (PANS-ATM)<br>5 between RNP1 and RNP1, RNP APCH, or RNP AR APCH  | O |   | TBD | O | R | DCPC (RNP 1 SIDs/STARs)  | RNP 1 OPS Approval   | Not required except reduced route spacing                                   | WGS-84; QMS for AIS; AIRAC Compliance for publication (42 days, recommended 56 days)  |   |
| A RNP <sup>4)</sup> | 2 | 2 or 1 | 1 - 0.3 | 1 - 0.3 | 1 - 0.3 | 0.3 | 1 - 0.3 | 1 - 0.3 | GNSS<br>Multi-DME may be provided    | Lateral<br>7 - straight and turning tracks (<90°) in high traffic density (en-route, Terminal, Eurocontrol)<br>6 to 7 NM with an RNP 0.5 (terminal, Eurocontrol)   | R | O | TBD | O | R | DCPC- VHF  | A-RNP OPS Approval (Navigation accuracy at least ±1NM, 95% of the flight time) | surveillance (may not be required to certain navigation application)        | WGS-84; QMS for AIS; AIRAC Compliance for publication (42 days, recommended 56 days)  |   |

|                                    |  |     |     |         |         |           |                                      |     |                                      |   |                 |  |     |                 |   |              |                          |              |  |  |
|------------------------------------|--|-----|-----|---------|---------|-----------|--------------------------------------|-----|--------------------------------------|---|-----------------|--|-----|-----------------|---|--------------|--------------------------|--------------|--|--|
| RNP APCH<br>(Part A) <sup>5)</sup> |  |     |     | 1       | 1       | 0.3       | 1                                    |     | GNSS<br>(Missed App - RNAV or Conv.) | Lateral<br>For SIDs/STARs (PANS-ATM)<br>7 between RNAV1 and RNP APCH<br>5 between RNP1 and RNP APCH                                 | O               |  | TBD | O               | R | Not required | RNP APCH OPS Approval    | Not required | WGS-84, QMS for AIS, AIRAC, Compliance for publication (42 days, recommended 56 days ) |  |
| RNP APCH<br>(Part B) <sup>5)</sup> |  |     |     | 1       | 1       | Angular   | 1 or 0.3<br>(Initial Straight MISAP) |     | GNSS                                 | Lateral<br>For SIDs/STARs (PANS-ATM)<br>7 between RNAV1 and RNP APCH<br>5 between RNP1 and RNP APCH                                 | O               |  | TBD |                 | R | Not required | RNP APCH OPS Approval    | Not required | WGS-84, QMS for AIS, AIRAC, Compliance as above.                                       |  |
| RNP AR APCH                        |  |     |     | 1 - 0.1 | 1 - 0.1 | 0.3 - 0.1 | 1 - 0.1                              |     | GNSS<br>(DME/DME may be authorized)  | Lateral<br>For SIDs/STARs (PANS-ATM)<br>7 between RNAV1 and RNP AR APCH<br>5 between RNP1 and RNP AR APCH                           | R <sup>6)</sup> |  | TBD | R <sup>6)</sup> | R | Not required | RNP AR APCH OPS Approval | Not required | WGS-84; QMS for AIS; AIRAC Compliance for publication (42 days, recommended 56 days    |  |
| RNP 0.3                            |  | 0.3 | 0.3 | 0.3     | 0.3     |           | 0.3                                  | 0.3 | GNSS                                 | Lateral (no clear reference)<br>For SIDs/STARs (PANS-ATM)<br>7 between RNAV1 and RNP0.3<br>5 between RNP1, RNP APCH and RNP AR APCH | O               |  | TBD | O               | R | Not required | RNP 0.3 OPS Approval     | Not required | WGS-84; QMS for AIS; AIRAC Compliance for publication (42 days, recommended 56 days    |  |

1) RNP requirements do not apply to initial and intermediate missed approach segments.

2) TOAC (Time of Arrival Control), TBD (To Be Determined)

3) RNAV 5 may be used for initial parts of STARs outside 30 NM from the ARP.

4) Advanced RNP core requirements are limited to RNP 1 in all flight phases except final approach (RNP 0.3) and RNP 2 in oceanic/remote and en-route continental. A scaleability option will allow accuracy values between 0.3 and 1.0, in 0.1 NM increments, in all flight phases except oceanic/remote/en-route continental (RNP 1 and RNP 2) and final approach (RNP 0.3).

5) Part A and B refer to the Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, Part C, Chapter 5, Part A — RNP APCH operations down to LNAV and LNAV/VNAV minima and Part B — RNP APCH operations down to LP and LPV minima, respectively.

6) Specific requirement for RF and VNAV