

Notice of Requirement

NTC 91.263

RNP 2 Navigation Specification

Revision 1

Preliminary

The Director of Civil Aviation issues the following requirements (“the requirements”), conditions and restrictions relating to the use of the RNP 2 Navigation Specification under section 28(5) of the Civil Aviation Act 1990 and civil aviation rule 91.263(1).

Purpose

The purpose of this notice is to specify the requirements for RNP 2 operations, determined by the Director under rule 91.263, regarding:

- i. the application of the RNP 2 operations;
- ii. the navigation functionalities the aircraft systems must have;
- iii. requirements for system redundancy, including requirements for conventional navigation equipment
- iv. continuing airworthiness requirements;
- v. operator procedures;
- vi. the operational and training requirements placed on flight crew members; and
- vii. approval by the Director for RNP 2 operations.

Rule 91.263(b) requires compliance with the requirements in this Notice to ensure the safe operation of aircraft using RNP 2 procedures.

General

Civil Aviation Authority (CAA) notices contain approvals and requirements including the detail about the approvals, standards, conditions, procedures and technical specifications that have been approved or determined by the Director under the Civil Aviation Rules. These details must be complied with by parties to whom it applies. They apply in particular circumstances to particular aviation document holders as specified in the notice.

CAA notices are issued under Civil Aviation Rules in accordance with section 28(5) of the Civil Aviation Act. This section permits the Minister of Transport to make ordinary rules, and to specify any terms and conditions within the rules:

- to require a matter to be determined, or undertaken or approved by the Authority, the Director or another person; or
- to empower the Authority, Director, or another person to impose requirements or conditions as to the performance of any activity, including (but not limited to) any procedures to be followed.

Notices support a performance-based approach to regulation, and improve the flexibility and responsiveness of the Civil Aviation Rules. They may be used where performance-based regulation is the appropriate way to achieve the desired regulatory outcome, for example, in circumstances where new technological changes or challenges require more flexibility than prescribing requirements in the rules (and rulemaking may get quickly out-dated), or where there is a need to respond to safety issues which the rules do not adequately deal with.

The requirements stated in this notice are mandatory and must be complied with.

Related Rules

Civil Aviation Rules 91.261, 91.263, 91.263B and 91.263C

Effective Date

This notice comes into effect on 21 December 2022.

Issue of CAA Notice



21/12/2022

Signed by
Director of Civil Aviation

Date

Revision History

Revision 1	Original version
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RNP 2 Navigation Specification



1. Application

These requirements apply to:

- (a) every operator of an aircraft operating under instrument flight rules using an RNP 2 navigational procedure or route (RNP 2 operations);
- (b) every en-route operation with little or no ground NAVAID infrastructure, limited or no ATS surveillance, and low to medium density traffic; and
- (c) every operation that requires a lateral navigation accuracy (TSE) of 2 NM, which is expected to be achieved at least 95 % of the flight time by the population of aircraft operating within the airspace, route or procedure.

2. Operational Approval Requirements

- (a) Description of aircraft equipment:
 - (a) The operator must ensure that relevant documentation acceptable to the Director must be available to establish that the aircraft is equipped with an RNP system with a demonstrated RNP 2 capability.
 - (b) The operator must have a configuration list and, if necessary, an MEL detailing the required aircraft equipment for RNP 2 operations.
- (b) Training documentation:
 - (1) An air operator certificated under Part 119 must have a training programme addressing the operational practices, procedures and training phases related to RNP 2 operations.
 - (2) A private operator carrying out operations under Part 91 must be familiar with the practices and procedures referred to in clause 5 of this notice.
- (c) Operations manuals and checklists:

- (1) An air operator certificated under Part 119 must ensure that its operations manuals and checklists address the operational procedures referred to in clause 4 of this notice.
 - (2) The operator must ensure that appropriate manuals must contain navigation operating instructions and contingency procedures where specified.
 - (3) The operator must submit their manuals and checklists to the Director for review as part of the application process.
- (d) MEL considerations:
- (1) Operators must adjust the MEL, or equivalent, to allow for RNP 2 operations, and specify the required dispatch conditions.
 - (2) Operators must ensure that any MEL revisions necessary to address RNP 2 operations is approved by the Director.
- (e) Continuing airworthiness:

The operator must -

- (1) submit to the Director the continuing airworthiness instructions applicable to the aircraft's configuration and the aircraft's qualification for RNP 2 navigation procedure or route; and
- (2) submit to the Director their maintenance programme, including a reliability programme for monitoring the equipment.

3. Aircraft Requirements

- (a) The operator must ensure that the following requirements for specific navigation systems are met:
 - (1) RNP 2 applications in oceanic or remote airspace must have at least 2 long-range navigation systems.
 - (2) On-board performance monitoring and alerting is required.
- (b) The operator must ensure that the following requirements regarding on-board performance monitoring and alerting are met:

(1) Accuracy:

During operations in airspace or on routes designated as RNP 2 –

- (i) the lateral TSE must be within ± 2 NM for at least 95% of the total flight time;
- (ii) the along-track error must also be within ± 2 NM for at least 95 % of the total flight time; and
- (iii) to satisfy the accuracy requirement, the 95 % FTE must not exceed 1 NM.

(2) Integrity:

The aircraft navigation equipment must be designed and installed to ensure that the probability of a loss of function occurring is less than 1×10^{-5} per hour.

(3) Continuity:

- (i) For oceanic or remote continental airspace applications, loss of function is a major failure condition.
- (ii) Navigation equipage for oceanic/remote continental RNP 2 operations requires dual independent GNSS long-range navigation systems with FDE to meet the continuity requirement.
- (iii) Integration of positioning data from other sensors may be allowed if it does not cause the TSE to be exceeded.
- (iv) For continental applications, loss of function is a minor failure condition if the operator can revert to a different navigation system and proceed to a suitable airport.

(4) On-board performance and monitoring:

The RNP system, or the RNP system and pilot in combination, must provide an alert if the accuracy requirement is not met, or if the probability that the lateral TSE exceeds 4 NM is greater than 1×10^{-5} .

(5) Signal-In-Space:

- (i) If using GNSS, the aircraft navigation equipment must provide an alert if the probability of SIS errors causing a lateral position error greater than 4 NM exceeds 1×10^{-7} per hour.
- (ii) Positioning data from other types of navigation sensors (other than GNSS) may be integrated with the GNSS data provided the other positioning data do not cause position errors exceeding the TSE budget. Otherwise, means must be provided to deselect the other navigation sensor types.

(6) Functional Requirements:

The following navigation displays and functions installed per FAA Advisory Circular AC 20-130A and AC 20-138() or equivalent airworthiness installation advisory material are required:

- (i) Navigation data, including a failure indicator, must be displayed on a lateral deviation display (CDI, EHSD) and/or a navigation map display. These must be used as primary flight instruments for the navigation of the aircraft, for manoeuvre anticipation and for failure/status/integrity indication.
- (ii) The following system functions are required as a minimum for any equipment used in RNP 2 operations -
 - (A) a navigation database, containing current navigation data officially promulgated for civil aviation, which can be updated in accordance with the AIRAC cycle and from which RNP 2 routes can be

- retrieved and loaded into the RNP system;
- (B) the stored resolution of the data referred to in paragraph (i) must be sufficient to achieve negligible PDE, and the database must be protected against pilot modification of the stored data;
 - (C) the means to display the validity period of the navigation data to the pilot;
 - (D) the means to retrieve and display data stored in the navigation database relating to individual waypoints and NAVAIDs, to enable the pilot to verify the RNP 2 route to be flown; and
 - (E) for RNP 2 tracks in oceanic or remote continental airspace using flexible tracks, a means to enter the unique waypoints required to build a track assigned by the ATS provider;
- (iii) the means to display the following items, either in the pilot's primary field of view, or on a readily accessible display page -
- (A) the active navigation sensor type;
 - (B) the identification of the active (To) waypoint;
 - (C) the ground speed or time to the active (To) waypoint; and
 - (D) the distance and bearing to the active (To) waypoint;
- (iv) the capability to execute a "direct to" function;
- (v) the capability for automatic leg sequencing with the display of sequencing to the pilot;
- (vi) the capability to automatically execute waypoint transitions and maintain track consistent with the RNP 2 performance requirements;

- (vii) the capability to display an indication of the RNP 2 system failure, in the pilot's primary field of view;
- (viii) if the optional parallel offset function is implemented the following applies -
 - (A) the system must have the capability to fly parallel tracks at a selected offset distance;
 - (B) when executing a parallel offset, the navigation accuracy and all performance requirements of the original route in the active flight plan apply to the offset route;
 - (C) the system must provide for entry of offset distances in increments of 1 NM, left or right of course;
 - (D) the system must be capable of offsets of at least 20 NM;
 - (E) when in use, the system must clearly announce the operation of offset mode;
 - (F) when in offset mode, the system must provide reference parameters such as cross-track deviation, distance-to-go, time-to-go relative to the offset path and offset reference points;
 - (G) the system must announce the upcoming end of the offset path and allow sufficient time for the aircraft to return to the original flight plan path; and
 - (H) once the pilot activates a parallel offset, the offset must remain active for all flight plan route segments until the system deletes the offset automatically; the pilot enters a new direct-to routing, or the pilot manually cancels the offset.

4. Operating Procedures

- (a) The operator must ensure that the following requirements regarding pre-flight planning are met:
 - (1) The on-board navigation data must be current and include appropriate procedures for carrying out RNP 2 operations.
 - (2) The availability of the NAVAID infrastructure, required for the intended routes, including any non-RNAV contingencies, must be confirmed for the period of intended operations using all available information.
 - (3) The availability of GNSS integrity such as RAIM or SBAS signal as required by ICAO Annex 10 must be determined as appropriate.
 - (4) For aircraft navigating with SBAS receivers, appropriate GPS RAIM availability in areas where the SBAS signal is unavailable must be checked.
- (b) ABAS availability:
 - (1) Operators relying on GNSS must have the means to predict the availability of GNSS fault detection such as ABAS RAIM to support operations along the RNP 2 operation.
 - (2) In the event of a predicted, continuous loss of appropriate level of fault detection of more than 5 minutes for any part of the RNP 2 operation, the operator must revise the flight plan.
- (c) General operating procedures:
 - (1) Pilots must comply with any instructions or procedures identified by the manufacturer as necessary to comply with the performance requirements in this notice.
 - (2) Operators and pilots must not request or file RNP 2 procedures unless they satisfy the requirements of this notice.
 - (3) If an aircraft that does not meet the requirements of this notice receives a clearance from ATC to conduct an RNP

- 2 procedure, the pilot-in-command must advise ATC that he or she is unable to accept the clearance and must request alternate instructions.
- (4) At system initialisation, pilots must -
 - (i) confirm that the aircraft position has been entered correctly;
 - (ii) verify proper entry of their ATC assigned route upon initial clearance and any subsequent change of route; and
 - (iii) ensure that the waypoint sequence depicted by their navigation system matches the route depicted on the appropriate chart(s) and their assigned route.
 - (5) Except as provided in paragraph (6), pilots must not fly an RNP 2 route unless it is retrievable by procedure name from the on-board navigation database and conforms to the charted procedure.
 - (6) The procedure referred to in paragraph (5) may subsequently be modified through the insertion or deletion of specific waypoints in response to ATC clearances.
 - (7) Pilots must not –
 - (i) manually enter or create new waypoints, by manually entering latitude and longitude or rho/theta values; or
 - (ii) change any route database waypoint type from a fly-by to a fly-over or vice versa.
 - (8) For RNP 2 routes, pilots must –
 - (i) use a lateral deviation indicator, flight director, or autopilot in lateral navigation mode; and
 - (ii) for aircraft with a lateral deviation display, ensure that lateral deviation scaling is suitable for the navigation accuracy associated with the route or procedure, such as full-scale deflection: ± 1 NM for

RNP 2 or ± 5 NM in the case of some TSO-C129a equipment, and know their allowable lateral deviation limits.

- (9) The pilot-in-command must ensure that ATC is notified as soon as possible of any loss of the RNP capability such as integrity alerts or loss of navigation, together with the proposed course of action.
- (10) If unable to comply with the requirements of an RNP 2 route for any reason, pilots must advise ATS as soon as possible.
- (11) Loss of RNP capability includes any failure or event causing the aircraft to no longer satisfy the RNP 2 requirements of the route.
- (12) Pilots must not manually select or use the default aircraft bank limiting functions which may reduce the aircraft's ability to maintain the desired track, especially when executing large angle turns.
- (13) Pilots must not deviate from AFM procedures and limit the use of such functions within accepted procedures that meet the requirements for operation on an RNP 2 route.

5. Pilot knowledge and training

- (a) Operators must ensure that pilots are trained and have appropriate knowledge of the topics specific to RNP 2 operations as contained in AC 91-21, or AC 61-17, if applicable.
- (b) Pilots must be appropriately licensed, rated and endorsed on the specific equipment to be used for RNP 2 operations, including knowledge of specific organisational standard operating procedures, if applicable.

6. Navigation database

- (a) The operator must ensure that the navigation database complies with RTCA DO 200A/EUROCAE document ED 76, Standards for Processing Aeronautical Data or an equivalent standard acceptable to the Director.

- (b) The operator must –
 - (1) report any discrepancies that invalidate a RNP route to the navigation database supplier;
 - (2) inform the pilots of the discrepancies; and
 - (3) prohibit the pilots from using the affected route; and
- (c) conduct periodic checks of the operational navigation databases in order to meet existing quality system requirements.

7. Operator to comply with requirements, certain operator be certificated and approved by Director to conduct RNP 2 operations

An operator must not carry out RNP 2 operations unless –

- 1. the operator complies with all the applicable requirements of this notice; and
- 2. for operations conducted under Part 119 or 129, the operator is certificated and approved by the Director to carry out the RNP 2 operations.