CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

Notice of Requirement NTC 91.263

Revision 1

RNP 1 Navigation Specification

Preliminary

The Director of Civil Aviation issues the following requirements ("the requirements"), conditions and restrictions relating to the use of the RNP 1 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 1 operations, determined by the Director under rule 91.263, regarding:

i. The application of the RNP 1 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 the RNP 1 operations.

Rule 91.263(b) requires compliance with the requirements in this notice to ensure the safe operation of aircraft using RNP 1 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

RNP1 Navigation Specification

1. Application

These requirements apply to:

(a) every operator of an aircraft operating under instrument flight rules using a RNP 1 navigational procedure or route (RNP 1 operations); and

(b) every operation connecting the en-route structure and terminal airspace with little or no ATS surveillance, with low to medium density traffic; and

(c) every operation that requires a lateral navigation accuracy (TSE) of 1 nautical mile, 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:

(1) The operator must ensure that relevant documentation acceptable to the Director is available to establish that the aircraft is equipped with an RNP system with a demonstrated RNP 1 capability, including any limitations of functionality and performance.

(2) The operator must have a configuration list and, if necessary, an MEL detailing the required aircraft equipment for RNP 1 operations.

(b) Training documentation:

(2) An air operator certificated under Part 119 or 129 must have a training programme addressing the operational practices, procedures and training phases related to RNP 1 operations.

(3) A private operator under Part 91 must be familiar with the practices and procedures referred to in clause 4 of this notice.

(c) Operations manuals and checklists:

(1) An air operator certificated under Part 119 or 129 must ensure that its operations manuals and checklists address information or guidance on operational procedures referred to in clause 4 of this notice.

(2) The operator must ensure that the appropriate manuals 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 1 operations, and specify the required dispatch conditions.

(2) Any MEL revisions necessary to address RNP 1 operations must be 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 1 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 aircraft's on-board performance, monitoring and alerting systems meet the following standards:

(1) Accuracy:

During operations in airspace or on routes designated as RNP 1 –

(i) the lateral TSE must be within ±1 NM for at least 95% of the total flight time;

(ii) the along-track error must also be within ±1 NM for at least 95 % of the total flight time; and

(iii) to satisfy the accuracy requirement, the 95 % FTE must not exceed 0.5 NM.

(2) Integrity:

The aircraft navigation equipment must be designed and installed to ensure that the probability of a major failure condition such as the malfunction of the equipment occurring is less than 1×10^{-5} per hour.

(3) Continuity:

Loss of function is considered 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 2 NM is greater than 1×10^{-5}.

(5) Signal-In-Space:

If using GNSS, the aircraft navigation equipment must provide an alert if the probability of SIS errors causing a lateral position error greater than 2 NM exceeds 1×10^{-7} per hour.

(b) The operator must ensure that the following requirements for specific navigation systems are met:

(1) Positioning data from other types of navigation sensors, other than GNSS, may be integrated with the GNSS data if the other positioning data do not cause position errors exceeding the TSE budget.

(2) Means are to be provided to deselect the other navigation sensor types.

(c) The operator must ensure that the following functional requirements are met:

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

(1) Navigation data, including a failure indicator, must be displayed on a lateral deviation display (CDI, EHSI) 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.

(2) The following system functions are required as a minimum within any RNP 1 equipment -

(i) 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 ATS routes can be retrieved and loaded into the RNP system;

(ii) the stored resolution of the data must be sufficient to achieve negligible PDE;

(iii) the database must be protected against pilot modification of the stored data;

(iv) the means to display the validity period of the navigation data to the pilot;

(v) 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 route to be flown; and

(vi) the capacity to load from the database into the RNP 1 system the entire segment of the SID or STAR to be flown.

(3) The means to display the following items, either in the pilot's primary field of view, or on a readily accessible display page-

(i) the active navigation sensor type;

(ii) the identification of the active (To) waypoint;

(iii) the ground speed or time to the active (To) waypoint; and

(iv) the distance and bearing to the active (To) waypoint.

(4) The capability to execute a "direct to" function.

(5) The capability for automatic leg sequencing with the display of sequencing to the pilot.

(6) The capability to load and execute an RNP 1 SID or STAR from the on-board database, by procedure name, into the RNP system.

(7) The aircraft must have the capability to automatically execute leg transitions and maintain tracks consistent with the following ARINC 424 path terminators, or their equivalent -

(i) IF;

(ii) CF;

(iii) DF;

(iv) TF.

(8) The aircraft must have the capability to automatically execute leg transitions consistent with VA, VM and VI ARINC 424 path terminators, or must be able to be manually flown on a heading to intercept a course or to go direct to another fix after reaching a procedure-specified altitude.

(9) The aircraft must have the capability to automatically execute leg transitions consistent with CA and FM ARINC 424 path terminators, or the RNP system must permit the pilot to readily designate a waypoint and select a desired course to or from a designated waypoint.

(10) The capability to display an indication of the RNP 1 system failure, in the pilot's primary field of view.

(d) Contingency navigation systems:

(1) For private operations under Part 91, the aircraft must be equipped with at least one independent alternative navigation system appropriate to enable the extraction and recovery of the aircraft.

(2) For commercial operations conducted under a Part 119 or 129 air operator certificate, the aircraft must be equipped with at least one independent alternative navigation system appropriate to allow continued safe navigation on the route being flown.

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.

(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) Since GNSS integrity (RAIM or SBAS signal) is required by ICAO Annex 10, its availability must be determined as appropriate.

(4) For aircraft navigating with SBAS receivers, operators must check for appropriate GPS RAIM availability in areas where the SBAS signal is unavailable.

(b) ABAS availability:

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 1 SID or STAR.

(c) General operating procedures:

(1) The pilot must comply with any instructions or procedures identified by the manufacturer as necessary to comply with the performance requirements in this navigation specification.

(2) Operators and pilots must not request or file RNP 1 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 1 procedure, the pilot-in-command of the aircraft 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) Pilots must not fly an RNP 1 SID or STAR unless it is retrievable by procedure name from the on-board navigation database and conforms to the charted procedure. However, the procedure may subsequently be modified through the insertion or deletion of specific waypoints in response to ATC clearances.

(6) Pilots must not -

(i) manually enter, or create new waypoints, by manually entering latitude and longitude or rho/theta values; or

(ii) change any SID or STAR database waypoint type from a fly-by to a fly-over or vice versa.

(7) Pilots must cross-check the cleared flight plan by comparing charts or other applicable resources with the navigation system textual display and the aircraft map display, if applicable. If required, the exclusion of specific NAVAIDs should be confirmed.

(8) For RNP 1 routes, pilots must use a lateral deviation indicator, flight director, or autopilot in lateral navigation mode.

(9) Pilots of aircraft with a lateral deviation display must 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 1.

(d) Pilot requirements specific to certain phases of flight:

(1) RNP 1 SID specific requirements:

(i) Before commencing take-off, the pilot must verify that the aircraft's RNP 1's system is available, operating correctly, and that the correct airport and runway data are loaded.

(ii) Before flight, pilots must verify their aircraft navigation system is operating correctly and the correct runway and departure procedure, including any applicable en-route transition, are entered and properly depicted.

(iii) Pilots who are assigned an RNP 1 departure procedure and subsequently receive a change of runway, procedure or transition must verify that the appropriate changes are entered and available for navigation before take-off.

(iv) Pilots must complete a final check of proper runway entry and correct route depiction, immediately before take-off.

(v) Pilots must be able to use RNP 1 equipment to follow flight guidance for lateral navigation such as

lateral navigation not later than 153 m (500 ft) above airport elevation.

(vi) Pilots must use an authorised method such as a lateral deviation indicator or navigation map display/flight director/autopilot to achieve an appropriate level of performance for RNP 1 operations.

(vii) When using GNSS, pilots must ensure that the signal is acquired before the take-off roll commences.

(viii) For aircraft using TSO-C129a avionics, pilots must ensure that the departure airport is loaded into the flight plan in order to achieve the appropriate navigation system monitoring and sensitivity.

(ix) For aircraft using TSO-C145()/C146() avionics, if the departure begins at a runway waypoint, then the departure airport does not need to be in the flight plan to obtain appropriate monitoring and sensitivity.

(x) If the RNP 1 SID extends beyond 30 NM from the ARP and a lateral deviation indicator is used, pilots must ensure that its full-scale sensitivity is selected to not greater than 1 NM between 30 NM from the ARP and the termination of the RNP 1 SID.

(xi) For aircraft using a lateral using a lateral deviation display such as a navigation map display, the scale must be set for the RNP 1 SID, and the flight director or autopilot is to be used.

(2) RNP 1 STAR specific requirements:

(i) Before the arrival phase, the pilot must verify that the correct terminal route has been loaded.

(ii) The pilot must check the active flight plan by comparing the charts with the map display if applicable, and the MCDU which includes

confirming the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over.

(iii) If required by a route, the pilot must check to confirm that updating will exclude a particular NAVAID.

(iv) The pilot must not use a route if doubt exists as to the validity of the route in the navigation database.

(v) The pilot must not create any new waypoints by manual entry into the RNP 1 system as it would invalidate the route.

(vi) Where the contingency procedure requires reversion to a conventional arrival route, the pilot must complete the necessary preparations before commencing the RNP 1 procedure.

(vii) Procedure modifications in the terminal area may take the form of radar headings or "direct to" clearances and the pilot must be capable of reacting in a timely fashion, which may include the insertion of tactical waypoints loaded from the database.

(viii) A pilot must not manually enter or modify the loaded route using temporary waypoints or fixes not provided in the database.

(ix) Pilots must verify that their aircraft navigation system is operating correctly, and the correct arrival procedure and runway, including any applicable transition are entered and properly depicted.

(x) Pilots must observe any published altitude and speed constraints.

(xi) Aircraft with TSO-C129a GNSS RNP systems: If the RNP 1 STAR begins beyond 30 NM from the ARP and a lateral deviation indicator is used, full

scale sensitivity must be manually selected to not greater than 1 NM before commencing the STAR.

(xii) For aircraft using a lateral deviation display such as navigation map display, the scale must be set for the RNP 1 STAR, and the flight director or autopilot must be used.

5. Pilot knowledge and training

(a) Operators must ensure that pilots are trained and have appropriate knowledge of the topics specific to RNP 1 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 RNP1 operations, including knowledge of specific organisational standard operating procedures, if applicable.

6. Navigation database

(a) The operator must ensure that the navigation database comply 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 SID or STAR to the navigation database supplier;

(2) inform the pilots of the discrepancies;

(3) prohibit the pilots from using the affected procedures; and

(4) conduct periodic checks of the operational navigation databases to ensure that the existing quality system requirements are met.

7. Operator to comply with requirements, certain operator be certificated and approved by Director for RNP 1 operations

An operator must not carry out RNP 1 operations unless –

(a) the operator complies with all the applicable requirements of this notice; and

(b) for operations conducted under Part 119 or 129, the operator is certificated and approved by the Director to carry out the RNP 1 operations.