NAMIBIAN CIVIL AVIATION AUTHORITY

Advisory Pamphlet (AP)

1/1/2/4/3-1

02/2021

RNP 0.3 OPERATIONS

GUIDANCE TO APPROVAL PROCESS

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4. RNP 0.3 Operations Guidance to Approval Process is set out in the Schedule attached hereto.

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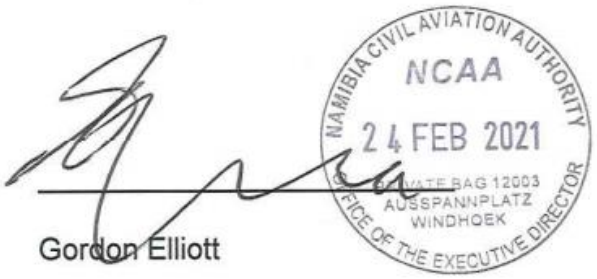
Effective date: 26th February 2021



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SCHEDULE

RNP 0.3 OPERATIONS APPROVAL PROCESS

This Advisory Pamphlet (AP) establishes guidance for RNP 03 operations approval requirements for aircraft and operators.

NAMCARs Part 90 requires that where an aircraft is configured to use performance based navigation the owner or operator may only operate that aircraft in designated airspace or in accordance with established procedures. The owner or operator shall require an approval from the Executive Director.

The requirements of aircraft and operators approval for RNP APCH operations down to LP (localizer performance) and LPV (localizer performance with vertical guidance) minima, using the global navigation satellite system (GNSS) augmented by the satellite-based augmentation systems (SBAS), are established in this advisory pamphlet AP 1/1/2/4/3-1.

REGULATORY REFERENCE

NAMCAR Part 90

REGULATORY GUIDANCE MATERIAL

Advisory Pamphlet FSS-AOC-AP 120: PBN Approval Process - General Information

RELATED DOCUMENTS

ICAO Annex 6 Operation of Aircraft Part I and Part III

ICAO Doc 9613 Performance Based Navigation (PBN) Manual

ICAO Doc 8168 Aircraft 0perations Volume I: Flight procedures

EASA AMC Part SPA Sub-Part B

FAA AC 90-105A Appendix D Qualification for RNP 0.3 Rotorcraft Operations

1 INTRODUCTION

1.1 Background

The helicopter community identified a need for a specification that has a single accuracy of 0.3 NM for all phases of flight, recognizing that such a specification would enable a significant part of the IFR helicopter fleet to obtain benefits from PBN. Specifically, the operations they had in view included:

a) Reduced protected areas, potentially enabling separation from fixed wing traffic to allow simultaneous non-interfering operations in dense terminal airspace;

b) Low-level routes in obstacle-rich environments reducing exposure to icing environments;

c) Seamless transition from en route to terminal route;

d) More efficient terminal routing in an obstacle-rich or noise-sensitive terminal environment, specifically in consideration of helicopter emergency service IFR operations between hospitals;

e) Transitions to helicopter point-in-space approaches and for helicopter departures; and

f) Helicopter en-route operations are limited by range and speed and can often equate to the dimensions of terminal fixed wing operations.

The large majority of IFR helicopters are already equipped with TSO C145/146 systems and moving map displays, and require autopilot including stability augmentation for IFR certification.

While this specification has been defined primarily for helicopter applications, this does not exclude the application to fixed wing operations where demonstrated performance is sufficient to meet the functional and accuracy requirements of this specification for all phases of flight.

Fulfilling the accuracy requirements of this specification may be achieved by applying operational limitations, which could include but are not necessarily limited to the maximum permitted airspeed and requirements for autopilot coupling. The latter requirement does not impact the helicopter eligibility since an autopilot is needed as part of the IFR helicopter certification.

A number of navigation systems using GNSS for positioning will be capable of being approved for RNP 0.3 operations if suitably integrated into the FGS/flight display system. However, this specification takes advantage of known functionality and the on-board performance monitoring and alerting capability of many TSO-C145/C146 GPS systems which are installed in a wide range of IFR helicopters.

1.2 Purpose

This guidance may be used for aircraft/helicopter RNP 0.3 operations en route and in the terminal airspace of airports as well as operations to and from heliports and for servicing offshore rigs. RNP 0.3 accuracy may also be needed en-route to support operations at low level in mountainous remote areas and, for airspace capacity reasons, in high density airspace.
This navigation specification provides guidance to implementation of RNP 0.3 and is applicable to departure, en-route, arrival (including the initial and intermediate approach segments), and to the final phase of the

missed approach. This navigation specification addresses continental, remote continental and offshore operations. Route length restrictions may be applicable for en-route operations meeting RNP 0.3.

Notes:

1. *This specification may be applied in ATM environments both with and without ATS surveillance.*

2. *While operational approval primarily relates to the navigation requirements of the airspace, operators and pilots are still required to take account of all operational documents relating to the airspace that are required by the appropriate State authority before conducting flights into that airspace.*

3. *This specification does not cover the final approach phase from the Final Approach Fix to the initial segment of the missed approach. The RNP APCH specification should be applied for this phase.*

2. CONSIDERATIONS

2.1 NAVAID infrastructure considerations

The RNP 0.3 specification is based upon GNSS; its implementation is not dependent on the availability of SBAS.

DME/DME based RNAV systems will not be capable of providing RNP 0.3 performance. States must also not use RNP 0.3 in areas of known navigation signal (GNSS) interference. Operators relying on GNSS are required to have the means to predict the availability of GNSS fault detection (e.g. ABAS RAIM) to support operations along the RNP 0.3 ATS route. The on-board RNP system, GNSS avionics, the ANSP or other entities may provide a prediction capability.

Prediction will not be required where the navigation equipment can make use of SBAS augmentation and the planned operation will be contained within the service volume of the SBAS signal.

2.2 Communications and ATS surveillance considerations

The application of this navigation specification is not dependent upon the availability of ATS surveillance or communications.

2.3 Additional considerations

Additional flight crew operational procedures and operational limitations may be required to ensure that FTE is bounded and appropriate alerting is available to meet the requirements of the RNP 0.3 specification for all phases of flight. Therefore, this performance should only be requested where it is operationally needed.

2.4 Publication

The departure and arrival procedure design should comply with normal climb and descent profiles for the operation considered and identify minimum segment altitude requirements. The navigation data published in the AIP for the procedures and supporting NAVAIDs must meet the requirements of Annex 15. All procedures must be based upon WGS 84 coordinates.

3. NAVIGATION SPECIFICATION

3.1 Background

A specific operational approval is required as demonstration of meeting RNP 0.3 operational regulations and other documentation required documentation.

3.2 Approval process

Aircraft are certified by their State of Manufacture. Operators shall be issued approval in accordance with compliance with applicable operating regulations related requirements. This navigation specification provides the technical and operational criteria for the approval.

Notes:

1. *Where appropriate, refer to previous operational approvals in order to expedite approval where performance and functionality are applicable to the current request for operational approval.*

a. Aircraft eligibility

The aircraft eligibility must be determined through demonstration of compliance against the relevant airworthiness criteria and requirements in this pamphlet. The OEM or the holder of installation approval for the aircraft, e.g. STC holder, will demonstrate compliance to the appropriate authority (e.g. EASA, FAA) and the approval can be documented in manufacturer documentation (e.g. service letters). Manufacturer documentation may be acceptable where AFM entries are not available or conclusive.

Note.— Requests for approval to use optional functionality (e.g. RF legs) should address the aircraft and operational requirements as described in the appropriate functional ICAO guidance.

b. Operational approval

i. The operator must have a configuration list and, if necessary, an MEL detailing the required aircraft equipment for RNP
ii. 0.3 operations.

iii. Commercial operators must have a training programme addressing the operational practices, procedures and training items related to RNP 0.3 operations (e.g. initial, upgrade or recurrent training for pilots, dispatchers or maintenance personnel).

Note.— Operators need not establish a separate training programme if they already integrate RNAV training as an element of their training programme. However, the operator should be able to identify the aspects of RNP 0.3 operations covered within their training programme.

iv. Private operators must be familiar with the practices and procedures identified below under “Pilot knowledge and training”.

v. OMs and checklists for commercial operators must address information/guidance on the SOP as detailed below. The appropriate manuals should contain navigation operating instructions and contingency procedures, where specified. When required, the operator must submit their manuals and checklists for review as part of the application process.

vi. Private operators should operate using the practices and procedures identified in “Pilot knowledge and training” below.

vii. Any MEL revisions necessary to address provisions for RNP 0.3 operations must be approved. Operators must adjust the MEL, or equivalent, and specify the required dispatch conditions.

viii. The operator must submit the continuing airworthiness instructions applicable to the aircraft’s configuration and the aircraft’s qualification for this navigation specification. Additionally, there is a requirement for the operator to submit their maintenance programme, including a reliability programme for monitoring the equipment.

Note.— The operator should confirm with the OEM, or the holder of the installation approval for the aircraft, that acceptance of subsequent changes in the aircraft configuration, e.g. SBs, does not invalidate current operational approvals.

3.3 Aircraft requirements

a. The following systems meet the accuracy, integrity and continuity requirements of these criteria;

i) Aircraft with E/TSO-C145a and the requirements of E/TSO-C115B FMS, installed for IFR use in accordance with FAA AC 20-130A;

ii) Aircraft with E/TSO-C146a equipment installed for IFR use in accordance with FAA AC 20-138 or AC 20-138A; and

iii) Aircraft with RNP 0.3 capability certified or approved to equivalent standards (e.g. TSO-C193).

b. General

On-board performance monitoring and alerting is required. This section provides the criteria for a TSE form of performance monitoring and alerting (as described in ICAO Doc 9613 Volume II, Part A, Chapter 2, 2.3.10) that will ensure a consistent evaluation and assessment of compliance for RNP 0.3 applications.

The aircraft navigation system, or aircraft navigation system and the pilot in combination, is required to monitor the TSE, and to provide an alert if the accuracy requirement is not met or if the probability that the lateral TSE exceeds two times the accuracy value is larger than 10^{-5}. To the extent operational procedures are used to satisfy this requirement, the crew procedure, equipment characteristics, and installation should be evaluated for their effectiveness and equivalence. Examples of information provided to the pilot for awareness of navigation system performance include “EPU”, “ACTUAL”, “ANP” and “EPE”. Examples of indications and alerts provided when the operational requirement is or can be determined as not being met include “UNABLE RNP”, “Nav Accur Downgrad”, GNSS alert limit, loss of GNSS integrity, TSE monitoring (real time monitoring of NSE and FTE combined), etc. The navigation system is not required to provide both performance and sensor-based alerts, e.g. if a TSE based alert is provided, a GNSS alert may not be necessary.

c. On-board performance monitoring and alerting

Accuracy: During operations in airspace or on ATS routes designated as RNP 0.3, the lateral TSE must be within ±0.3 NM for at least 95 per cent of the total flight time. The along-track error must also be within ±0.3 NM for at least 95 per cent of the total flight time. To meet this performance requirement, an FTE of 0.25 NM (95 per cent) may be assumed.

Note.— For all RNP 0.3 operations, the use of a coupled FGS is an acceptable means of complying with this FTE assumption (see RTCA DO-208, Appendix E, Table 1). Any alternative means of FTE bounding, other than coupled FGS, may require FTE substantiation through an airworthiness demonstration.

Integrity: Malfunction of the aircraft navigation equipment is classified as a Major failure condition under airworthiness regulations (i.e. 1×10^{-5} per hour).

Continuity: For the purpose of this specification, loss of function is a major failure condition for remote continental and offshore operations. The carriage of dual independent long-range navigation systems may satisfy the continuity requirement. Loss of function is classified as a minor failure condition for other RNP 0.3 operations if the operator can revert to a different available navigation system and proceed to a suitable airport.

SIS: The aircraft navigation equipment shall provide an alert if the probability of SIS errors causing a lateral position error greater than 0.6 NM exceeds 1×10^{-7} per hour.

d. Bounding FTE for equipment not monitoring TSE performance

RNP 0.3 operations require coupled FGS to meet the allowable FTE bound unless the manufacturer demonstrates and obtains airworthiness approval for an alternate means of meeting the FTE bound. The following may be considered as one operational means to monitor the FGS FTE.

i. FTE should remain within half-scale deflection (unless there is other substantiated FTE data);

ii. Pilots must manually set systems without automatic CDI scaling to not greater than 0.3 NM full-scale prior to commencing RNP 0.3 operations; and
iii. Aircraft with electronic map display, or another alternate means of flight path deviation display, must select appropriate scaling for monitoring FTE.

Automatic monitoring of FTE is not required if the necessary monitoring can be achieved by the pilot using available displays without excessive workload in all phases of flight. To the extent that compliance with this specification is achieved through operational procedures to monitor FTE, an evaluation of the pilot procedures, equipment characteristics, and installation must ensure their effectiveness and equivalence, as described in the functional requirements and operating procedures.

PDE is considered negligible if the quality assurance process is applied at the navigation database level (7.3.6) and if operating procedures (7.3.4) are applied.

e. Functional requirements

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

Paragraph	*Functional requirement*	*Explanation*

a)	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.	Non-numeric lateral deviation display (e.g. CDI, EHSI), with a to/from indication and a failure annunciation, for use as primary flight instruments for navigation of the aircraft, for manoeuvre anticipation, and for failure/status/integrity indication, with the six attributes detailed in ICAO Doc 9613, Chapter 7 RNP 0.3. .
		. As an alternate means of compliance, a navigation map display can provide equivalent functionality to a lateral deviation display, with appropriate map scales and giving equivalent functionality to a lateral deviation display. The map scale should be set manually to a value appropriate for the RNP 0.3 operation.
b)	The following system functions are required as a minimum within any RNP 0.3 equipment.	1) The capability to continuously display to the pilot flying, (and the pilot-not-flying) for two crew operations) on the primary flight instruments for navigation of the aircraft (primary navigation display), the computed path and aircraft position relative to the path 2) 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 IFR procedures and ATS routes or waypoint data corresponding to the coordinates of significant points on ATS routes, can be retrieved and loaded into the RNP system. 3) The means to display the validity period of the navigation data to the pilot. 4) 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 ATS route to be flown. 5) Capacity to load from the database into the RNP system the entire IFP and the ATS route to be flown.
c)	The means to display the following items, either in the pilot's primary field of view, or on a readily accessible display page.	1) The active navigation sensor type. 2) The identification of the active (To) waypoint.
		3) The ground speed or time to the active (To) waypoint. 4) The distance and bearing to the active (To) waypoint.
d)	The capability to execute a "Direct to" function.	

e)	The capability for automatic leg sequencing with the display of sequencing to the pilot.	
f)	The capability to execute RNP 0.3 terminal procedures extracted from the on-board navigation database, including the capability to execute fly-over and fly-by turns.	
g)	The capability to automatically execute leg transitions and maintain tracks consistent with the following ARINC 424 path terminators, or their equivalent. These must include IF, CF, CA, DF, and TF	*Note.— Path terminators are defined in ARINC 424, and their application is described in more detail in RTCA documents DO-236B and DO-201A.*
h)	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.	
i)	The capability to automatically execute leg transitions consistent with CA and FM ARINC 424 path terminators, or the RNAV system must permit the pilot to readily designate a waypoint and select a desired course to or from a designated waypoint.	
j)	The capability to load an ATS route from the database, by name.	
k)	The capability to display an indication	
	of the RNP 0.3 system failure, in the pilot's primary field of view.	
l)	The system shall be capable of loading numeric values for courses and tracks from the on-board navigation database.	

3.4 Operating procedures

a. Requirement for operational approval

Airworthiness certification and recognition of RNP 0.3 aircraft qualification alone does not authorize RNP 0.3 operations. Operational approval is also required to confirm the adequacy of the operator's normal and contingency procedures for the particular equipment installation applied to an RNP 0.3 operation.

b. Preflight planning

Operators and pilots intending to conduct operations on RNP 0.3 ATS routes, including SIDs and STARs, initial and intermediate approach, **should file the appropriate flight plan suffixes**. The on-board navigation data must be current and include appropriate procedures.

Note.— Navigation databases are expected to be current for the duration of the flight. If the AIRAC cycle is due to change during flight, operators and pilots should establish procedures to ensure the accuracy of navigation data, including suitability of navigation facilities used to define the ATS routes.

c. RNP 0.3 availability prediction

i. RAIM prediction is not required where the equipment uses SBAS augmentation and the planned operations are within the service volume of the SBAS system. In areas and regions where SBAS is not usable or available, RAIM availability for the intended route should be checked prior to flight. Operators can verify the availability of RAIM to support RNP 0.3 operations via NOTAMs (where available) or through GNSS prediction services. The operating authority may provide specific guidance on how to comply with this requirement. Operators should be familiar with the prediction information available for the intended ATS route. RAIM availability prediction should take into account the latest GNSS constellation NOTAMs and avionics model (when available). The ANSP, avionics manufacturer, or the RNP system may provide this service. In the event of a predicted, continuous loss of RNP 0.3 of more than 5 minutes for any part of the RNP 0.3 operation, the flight planning should be revised (e.g. delaying the departure or planning a different ATS route). If the prediction service is temporarily unavailable, ANSPs may still allow RNP 0.3 operations to be conducted.

ii. RAIM availability prediction software does not guarantee the availability of GNSS. Rather, prediction tools simply assess the expected capability to meet the RNP. Because of potential unplanned failures of some GNSS elements, pilots/ANSPs must consider the loss of RAIM (or GNSS navigation altogether) while airborne may require reversion to an alternative means of navigation. Therefore, pilots should assess their capability to navigate in case of failure of GNSS navigation and consider the actions necessary to successfully divert to an alternate destination.

d. General operating procedures

i. The pilot must comply with any instructions or procedures the manufacturer identifies necessary to comply with the performance requirements in this chapter.

ii. Note.— Pilots are expected to adhere to all AFM/RFM limitations or operating procedures required to maintain RNP 0.3 performance for the ATS route. This shall include any speed restrictions needed to ensure maintenance of RNP 0.3 navigation accuracy.

iii. Operators and pilots should not request or file RNP 0.3 procedures unless they satisfy all the criteria in the relevant CAA documents. If an aircraft not meeting these criteria receives a clearance from ATC to conduct an RNP 0.3 operation, the pilot must advise ATC that he/she is unable to accept the clearance and must request alternate instructions.

iv. The operator must confirm the availability of GNSS for the period of intended operations along the intended ATS route using all available information and the availability of NAVAID infrastructure required for any (non-RNAV) contingencies.

v. At system initialization, the pilot must confirm the navigation database is current and verify that initial position of the aircraft is entered correctly. The pilot must also verify proper entry of their desired ATS route and any ATC changes to that ATS route upon initial clearance and any subsequent change of ATS route. The pilot must ensure the waypoints sequence depicted by their navigation

system matches the ATS route depicted on the appropriate chart(s) and their assigned ATS route.

Note.— The pilot may notice a slight difference between the navigation information portrayed on the chart and their primary navigation display. Differences of 3 degrees or less may result from the equipment manufacturer's application of magnetic variation and are operationally acceptable.

vi. The pilot must not attempt to fly an RNP 0.3 Instrument Flight Procedure unless it is retrievable by name from the on-board navigation database and conforms to the charted procedure. However, the pilot may subsequently modify a procedure by inserting or deleting specific waypoints in response to ATC clearances. The pilot may select the ATS route to be flown for the en-route section of the flight from the database or may construct the ATS route by means of selection of individual en-route waypoints from the database. The manual entry or creation of new waypoints, by manual entry of latitude and longitude or rho/theta values is not permitted. Additionally, pilots must not change any SID or STAR database waypoint type from a fly-by to a fly-over or vice versa.

vii. The pilot should cross-check the flight plan clearance by comparing charts or other applicable resources with the navigation system textual display and the aircraft/rotorcraft map display, if applicable. If required, the pilot should also confirm exclusion of specific NAVAIDs in compliance with NOTAMs or other pilot procedures.

viii. There is no pilot requirement to cross-check the navigation system's performance with conventional NAVAIDs as the absence of an integrity alert is considered sufficient to meet the integrity requirements. However, the pilot should monitor the reasonableness of the navigation solution and report any loss of RNP 0.3 capability to ATC. In addition, the pilot must continuously monitor the lateral deviation indicator (or equivalent navigation map display) during all RNP 0.3 operations.

ix. The pilot is expected to maintain centre line, as depicted by on-board lateral deviation indicators, during all RNP operations unless authorized to deviate by ATC or under emergency conditions. For normal operations on straight segments or FRTs, cross-track error/deviation (the difference between the RNP system computed path and the aircraft position relative to the path) should be limited to ±½ the navigation accuracy associated with the procedure (0.15 NM). Brief deviations from this standard (e.g. overshoots or undershoots) during track changes (fly-by and fly-over turns), up to a maximum of one times the navigation accuracy (i.e. 0.3 NM for RNP 0.3), are allowable.

Note.— Some systems do not display or compute a path during track changes (fly-by and fly-over turns). As such, the pilots of these aircraft may not be able to adhere to the lateral navigation accuracy requirement (e.g. 0.15 NM) during these turns. However, the pilot is expected to satisfy the operational requirement during intercepts following turns and on straight segments.

x. If ATC issues a heading assignment taking the aircraft/rotorcraft off an ATS route, the pilot should not modify the flight plan in the RNAV system until receiving a new ATC clearance to rejoin the ATS route or the controller confirms a new ATS route clearance. When the aircraft is following an ATC heading assignment, the specified accuracy requirement does not apply.

xi. Manually selecting aircraft bank limiting functions may reduce the aircraft's ability to maintain its desired track and is not recommended. The pilot should recognize manually selectable aircraft bank-limiting functions might reduce their ability to satisfy path requirements of the procedure, especially when executing large angle turns. This should not be construed as a requirement to deviate from flight manual procedures; rather, pilots should be encouraged to avoid the selection of such functions except where needed for flight safety reasons.

e. Aircraft with RNP selection capability

i. The pilot of an aircraft with a manual RNP input selection capability should select RNP 0.3 for all RNP 0.3 ATS routes.

f. RNP 0.3 SID specific requirements

i. Prior to commencing take-off, the pilot must verify the aircraft RNP system is available, operating correctly, and the correct airport/heliport and departure data are loaded and properly depicted (including the aircraft's initial position). A pilot assigned an RNP 0.3 departure procedure and subsequently issued a change to the procedure or a transition from the procedure must verify that the appropriate changes are entered and available for navigation prior to take-off. A final check of proper departure entry and correct route depiction, shortly before take-off, is recommended.

ii. The GNSS signal must be available and acquired by the aircraft's GNSS avionics before the take-off.

iii. Engagement of system after take-off. When required, the pilot must be able to engage (i.e. couple) the FGS prior to reaching the first waypoint defining a procedure requiring RNP 0.3 in accordance with this specification.

g. RNP 0.3 STAR specific requirements

i. Prior to the arrival phase, the pilot should verify loading of the correct terminal route. The active flight plan should be checked by comparing the charts (paper or electronic) with the map display (if applicable) and the MCDU. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, identification of which waypoints are fly-by and which are fly-over or which represent the beginning or end of a radius-to-fix leg segment. An ATS route must not be used if the pilot has any reason to doubt the validity of the ATS route in the navigation database.

Note.— As a minimum, the arrival checks can be a simple inspection of a suitable map display that achieves the objectives of this paragraph.

ii. The creation of new waypoints by manual entry into the RNP 0.3 system by the pilot would not create a valid ATS route and is therefore unacceptable.

iii. Where contingency procedures require reversion to a conventional IFP, the pilot must complete all necessary preparation for such reversion (e.g. manual selection of NAVAID) before commencing any portion of the IFP.

iv. Procedure modifications in the terminal area may take the form of ATC-assigned radar headings or "direct to" clearances, and the pilot must be capable of reacting in a timely fashion. This may include a requirement for the pilot to insert tactical waypoints loaded from the on-board navigation database. The pilot must not make manual entries or modify and create temporary waypoints or fixes that are not provided in the on-board navigation database.

v. The pilot must verify their aircraft navigation system is operating correctly, and the correct arrival procedure (including any applicable transition) is entered and properly depicted. Although a particular method is not mandated, the pilot must adhere to any published altitude and speed constraints associated with an RNP 0.3 operation.

Note: The final approach segment including the initial part of the missed approach should be flown in accordance with RNP APCH requirements.

h. Contingency procedures

The pilot must notify ATC of any loss of the RNP 0.3 capability (integrity alerts or loss of navigation) together with the proposed course of action. If unable to comply with the requirements of an RNP 0.3 ATS route for any reason, the pilot must advise ATC as soon as possible. The loss of RNP 0.3 capability includes any failure

or event causing the aircraft to no longer satisfy the RNP 0.3 requirements of the desired ATS route. In the event of communications failure, the pilot should continue with the published lost communications procedure.

3.5 Pilot knowledge and training

The training programme should provide sufficient training (e.g. simulator, training device, or aircraft) on the aircraft RNP system to the extent that the pilot is familiar with the following:

a) The information in this chapter;

b) The meaning and proper use of aircraft/helicopter equipment/navigation suffixes;

c) Procedure characteristics as determined from chart depiction and textual description;

d) Depiction of waypoint types (fly-over and fly-by) and path terminators (provided in section 1.4.3.4 AIRINC 424 path terminators and any other types used by the operator) as well as associated aircraft/helicopter flight paths;

e) Required navigation equipment and MEL for operation on RNP 0.3 ATS routes;

f) RNP system-specific information:

   i) Levels of automation, mode annunciations, changes, alerts, interactions, reversions, and degradation;

   ii) Functional integration with other aircraft systems;

   iii) The meaning and appropriateness of route discontinuities as well as related flight crew procedures;

   iv) Pilot procedures consistent with the operation (e.g. monitor PROG or LEGS page);

   v) Types of navigation sensors utilized by the RNP system and associated system prioritization/weighting/logic/limitations;

   vi) Turn anticipation with consideration for airspeed and altitude effects;

   vii) Interpretation of electronic displays and symbols used to conduct an RNP 0.3 operation; and

   viii) Understanding of the aircraft configuration and operational conditions required to support RNP 0.3 operations (i.e. appropriate selection of CDI scaling/lateral deviation display scaling);

g) RNP equipment operating procedures, as applicable, including how to perform the following actions:

   i) Verifying currency and integrity of aircraft navigation data;

   ii) Verifying successful completion of RNP system self-tests;

   iii) Entry of and update to the aircraft navigation system initial position;

iv) Retrieving and flying an IFP with appropriate transition;

v) Adhering to speed and/or altitude constraints associated with an RNP 0.3 IFP;

vi) Impact of pilot selectable bank limitations on aircraft/rotorcraft ability to achieve the required accuracy on the planned route;

vii) Selecting the appropriate STAR or SID for the active runway in use and be familiar with flight crew procedures required to deal with a runway change;

viii) Verifying waypoint and flight plan programming;

ix) Flying direct to a waypoint;

x) Flying a course/track to a waypoint;

xi) Intercepting a course/track;

xii) Following vectors and rejoining an RNP ATS route from “heading” mode;

xiii) Determining cross-track error/deviation. More specifically, the maximum deviations allowed to support RNP 0.3 must be understood and respected;

xiv) Inserting and deleting route discontinuities;

xv) Removing and reselecting navigation sensor inputs;

xvi) When required, confirming exclusion of a specific NAVAID or NAVAID type;

xvii) Changing the arrival airport/heliport and the alternate airport;

xviii) Performing a parallel offset function, if the capability exists. The pilot should know how to apply offsets within the functionality of their particular RNP system and the need to advise ATC if this functionality is not available; and

xix) Performing a conventional holding pattern;

h) Operator-recommended levels of automation for phase of flight and workload, including methods to minimize cross-track error to maintain route centre line;

i) R/T phraseology for RNAV/RNP applications; and

j) Contingency procedures for RNAV/RNP failures.

3.6 Navigation database

Navigation data management is addressed in Annex 6, Part 1, Chapter 7. In support of this, the operator must obtain the navigation database from a supplier complying with RTCA DO 200A/EUROCAE document ED 76, Standards for Processing Aeronautical Data, and the database must be compatible with the intended function of the equipment. Regulatory authorities recognize compliance to the referenced standard using an LOA or other equivalent document**.** The operator must report any navigation database discrepancies that invalidate a

SID, STAR or initial/intermediate approach procedure to the navigation database supplier, and the operator must prohibit their pilots from attempting an affected SID or STAR.

Aircraft operators should consider the need to conduct ongoing checks of the operational navigation databases in order to meet existing quality system requirements.

3.7 Oversight of operators

The regulatory Authority may consider any navigation error reports in determining remedial action for an operator. Repeated navigation error occurrences attributed to a specific piece of navigation equipment may result in cancellation of the approval for use of that equipment.

Information that indicates the potential for repeated errors may require modification of an operator's training programme. Information that attributes multiple errors to a particular pilot may necessitate remedial training or licence review.