AERONAUTICAL INFORMATION CIRCULAR (AIC)

AIC 01/2021

Email: cnoronha@aactl.gov.tl

DATE: 07 OCT 2021

PERFORMANCE BASED NAVIGATION IN TIMOR-LESTE

1 INTRODUCTION

1.1 This AIC supports the recently endorsed Timor-Leste PBN Plan V2.0

1.2 This AIC describes the application of ICAO's performance based navigation (PBN) provisions in Timor-Leste airspace and the methods in which approvals shall be obtained for PBN operations.

1.3 This AIC details the information concerning Timor-Leste's transition to PBN as the primary means of navigation, as well as the means of obtaining approval for PBN operations.

2 BACKGROUND

2.1 The PBN concept specifies that aircraft RNAV system performance requirements be defined in terms of the accuracy, integrity, availability, continuity and functionality, which are needed for the proposed operations in the context of a particular airspace concept. The PBN concept represents a shift from sensor-based to performance-based navigation. Performance requirements are identified in

navigation specifications, which also identify the choice of navigation sensors and equipment that may be used to meet the performance requirements. These navigation specifications are defined at a sufficient level of detail to facilitate global harmonization by providing specific implementation guidance for States and operators.

2.2 Under PBN, generic navigation requirements are defined based on operational requirements. Operators then evaluate options in respect of available technology and navigation services, which could allow the requirements to be met. An operator thereby has the opportunity to select a more cost-effective option, rather than a solution being imposed as part of the operational requirements. Technology can evolve over time without requiring the operation itself to be reviewed, as long as the expected performance is provided by the RNAV system.

2.3 As part of the future work of ICAO, it is anticipated that other means for meeting the requirements of the navigation specifications will be evaluated and may be included in the applicable navigation specifications, as appropriate.

2.4 PBN offers several advantages over the sensor-specific method of developing airspace and obstacle clearance criteria, i.e.:

a. reduces the need to maintain sensor-specific routes and procedures, and their associated costs;

b. avoids the need for developing sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive;

c. allows for more efficient use of airspace (route placement, fuel efficiency and noise abatement);

d. clarifies how RNAV systems are used; and

e. facilitates the operational approval process for operators by providing a limited set of navigation specifications intended for global use.

2.5 Within an airspace concept, PBN requirements will be affected by the communication, surveillance and ATM environments, the navaid infrastructure, and the functional and operational capabilities needed to meet the ATM application. PBN performance requirements also depend on what reversionary, non-RNAV means of navigation are available and what degree of redundancy is required to ensure adequate continuity of functions.

3 BENEFITS OF PBN

3.1 Under PBN, airspace and route design consider the aircraft operations in the region, and the capability of aircraft flying in it. Aircraft and flight crew must meet performance standards for the route, which may change with the flight phase and the class of airspace in which the aircraft is flying.

3.2 ICAO (Assembly Resolution 37-11) recognises the safety and efficiency benefits that PBN can provide. These include:

- Straight in approaches provide significant safety improvements over circling approaches
- Vertical guidance provides additional safety benefits
- Integrated RNP STARS/Approaches and SIDs provide for more efficient fuel efficient flight paths for operators

3.3 RNP operations provide significant benefits to operators, ANSPs and the environment. Some of the benefits of RNAV and RNP over conventional navigation are shown in the diagram below:

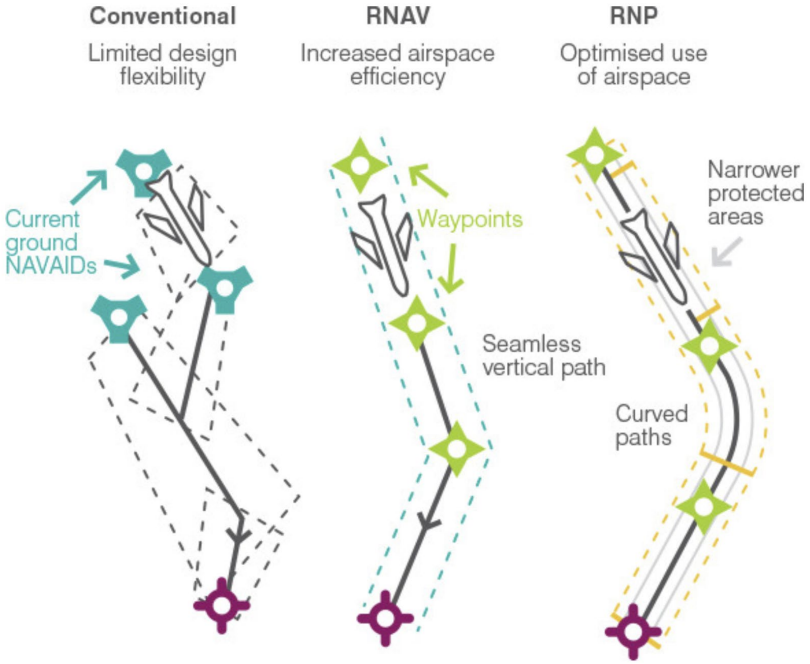

Figure 1: Benefits of RNAV/RNP

4 TIMOR-LESTE MINIMUM NAVIGATION NETWORK

4.1 Timor-Leste currently has a network of ground based navigational aids, these will be maintained and will be known as the Minimum Navigation Network (MNN).

5 PBN SPECIFICATIONS AND PROCEDURES

5.1 The PBN specifications that will be deployed in Timor-Leste have been extracted from ICAO Doc 9613 PBN Manual Edition 4.

5.2 Selection of a navigation specification is based on available infrastructure and the cost and benefits that can be achieved.

5.3 From 2nd December 2021, IFR aircraft operating within Timor-Leste airspace are required to be capable of operating to the applicable RNP specification applicable to their required operations, as shown in the table below:

Flight Phase	Navigation Specification	Navigation Type
Oceanic[1]	RNAV10	LNAV
	RNP10	LNAV
Domestic Enroute	RNP2	LNAV
Arrival Procedures	RNP1	LNAV
Approach Procedures	RNP APCH	LNAV
	RNP APCH+BARO VNAV[2]	LNAV/VNAV
	RNP AR APCH[3]	LNAV/VNAV
Departure Procedures	RNP1	LNAV
	RNP AR DP[4]	LNAV

Table 1: RNP Specifications

[1] It is not expected that Timor-Leste will have declared Oceanic airspace for the duration of this plan

[2] RNP APCH+BARO VNAV referred to as APV

[3] RNP AR APCH approval allows authorised operators to fly either a published RNP AR APCH or a proprietary approach that may be based upon a certain airframe/engine combination

the procedure

[4] RNP AR DP allows an authorised operator to fly either a published RNP AR DP or a proprietary departure that may be based upon a certain airframe/engine combination

6 AIRCRAFT EQUIPMENT

6.1 Aircraft equipment shall meet at least one of the standards specified below:

- (E)TSO-C145
- (E)TSO-C146
- (E)TSO-C196a

6.2 Air Transport Operations shall either be equipped with two independent GNSS systems that allow completion of the flight in the event of the failure of one system. Where an operator has MEL approvals are in place for operations with one GNSS system, this shall also be approved in Timor-Leste airspace.

6.3 Other operations may be equipped with a single GNSS system. Where a VOR/DME is not installed to allow for the MNN to be used to continue a flight, a suitable alternate must be carried.

6.4 Installed GNSS equipment shall meet the specified TSO requirements and able to support ADSB operations.

7 APPROVAL PROCESS

7.1 Currently, Timor-Leste does not have the technical capability to assess operators for their compliance with ICAO requirements, as such foreign operators will be able to apply for permissions in Timor-Leste based upon their operating States approvals.

7.2 **Scheduled Services**- For operators of scheduled services, the operator shall provide to AACTL the approvals held for PBN operations in the State of Operation. Where this includes RNP-AR approvals, these shall also be provided to AACTL. Based on the States approval, AACTL shall also authorise in writing, approval for PBN and RNP-AR (where applicable) operations in Timor-Leste airspace, including any requirements or restrictions.

7.3 **Other Operations**- For operators of other than scheduled services, inclusion of the State of Registration approvals in Items 10 and 18 of the ICAO Flight Plan form shall indicate that the aircraft and crew are authorised to operate by the State of Registration under PBN procedures. A separate approval for PBN operations is not required for these operations.

7.4 Applications for RNP and RNP-AR approvals shall be made via the email address in the header of this AIC.

8 ICAO FLIGHT PLAN NOTIFICATION

8.1 Notifications as per the table below shall be used on the ICAO Flight Plan form to indicate State of Operation or Registration approvals for PBN approval to operate in Timor-Leste airspace.

Airspace	PBN Capability	Item 10	Item 18
Oceanic	RNAV10 (RNP10)	GR (and I if applicable)	PBN/A1
Domestic Enroute	RNP2	GR	NAV/RNP2[5]
Terminal	RNP1 (all sensors)	GRDI	PBN/O1
	RNP1 (GNSS)	GR	PBN/O2
Approach	RNP APCH	GR	PBN/S1
	RNP APCH+BARO VNAV	GR	PBN/S2
	RNP AR APCH	GRI	PRB/T1 OPR/(NAME)[6]
Precision Approach[7]	GLS	AGZ	NAV/GLS

Table 2: Flight Plan Notification

[5] ICAO FPL2012 currently does not capture RNP2 Nav specifications, use of Z in Item 10 and NAV/ is required

[6] OPR name is included for RNP AR as the operator must be approved by AACTL

[7] Precision approaches not planned for Timor-Leste in this plan timelines

8.2 The normal flight plan notifications for an IFR flight in Timor-Leste PBN airspace would be:

- Field 10
    - SRGZ
- Field 18
    - RNP APCH authorised:
        - PBN/O2S1
    - RNP APCH+BARO VNAV authorised:
        - PBN/O2S2
    - RNP AR APCH authorised:
        - PBN/O2S2T1
        - OPR/NAME
    - For all IFR operations:
        - NAV/RNP2

9 PBN IMPLEMENATION TIMETABLE

9.1 The full implementation of PBN expected to take until 2028. Projected timelines are shown below.

	Current Capability			Planned Capability			
Airport	**Runway**	**Current**		**RNP APP**	**SID**	**STAR**	**Timeline**
WPDL[8]	08	VOR[9] RNAV[10]		APV RNP AR APCH (Special)	RNP1	RNP1	2021
	26	VOR[11] RNAV[12]		APV RNP AR APCH (Special)	RNP1	RNP1	2021
WPDB	17	NIL[13]		-	-	-	NA
	35	VOR/DME RNAV[14]		APV	RNP1	NIL	2024
WPOC	09	NIL		APV	RNP1	NIL	2022
	27	NIL		APV	RNP1	NIL	2022
WPEC	14	NIL		APV	NIL	NIL	2023
	32	NIL		APV	NIL	NIL	2023

Table 3: PBN Implementation Plan

[8] NDB approach currently approved, however NDB is U/S and not expected to be returned to service, chart not in Edition 2 of AIP

[9] VOR circling approach

[10] Helicopter only

[11] VOR circling approach

[12] Helicopter only

[13] Arrivals RWY 17 not allowed

[14] Suai fixed wing procedure published as RNAV, helicopter procedures published as RNP

10 TRANSITIONAL ARRANGEMENTS

10.1 For scheduled services (as per para 7.2), continued RNP operations (excluding RNP-AR) may continue in Timor-Leste airspace once a written application for approval has been made to AACTL. This shall be indicated by inclusion of the State of Registration approvals in Items 10 and 18 of the ICAO Flight Plan form, which shall indicate that the aircraft and crew are authorised to operate by the State of Registration under PBN procedures.

11 CANCELLATION

11.1 This AIC has information that is long term and as such has no cancellation date.

12 DISTRIBUTION

12.1 Via AACTL website only.