



PROCESS & APPLICATION
PERFORMANCE BASED NAVIGATION (PBN)

Purpose— The purpose of this advisory circular (AC) is to provide guidance to aircraft operators regarding the—

- 1) **International standards for Performance Based Navigation (PBN); and**
- 2) **Requirement to have RCAA approval for operations involving performance based navigation.**

Emphasis should be on maintaining and ensuring total system performance, accuracy, availability, reliability, and integrity for the intended operations.

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- Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.
- Where an AC is referred to in a 'Note' below the regulation, the AC remains as guidance material,
- ACs should always be read in conjunction with the referenced regulations.

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SECTION 1 POLICY & GENERAL INFORMATION

1.1 STATUS OF THIS AC

This is issuance [2]2018 of this AC.

1.2 BACKGROUND

1.2.1 CONCEPT

- A. The PBN concept specifies aircraft RNAV system performance requirements in terms of accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular Airspace Concept.
- B. The PBN concept represents a shift from sensor-based to performance-based navigation.

1.2.2 NAVIGATION SPECIFICATIONS

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 in ICAO Doc 9613, Volume II.
- Additional practical guidance is found in ICAO Doc 9997.

1.2.3 FLEXIBILITY

- A. Under PBN, generic navigation requirements are defined based on the operational requirements.
- B. Technologies can evolve over time without requiring the operation itself to be revisited, as long as the requisite performance is provided by the RNAV system.

Operators are able to evaluate the available technologies and navigation services options and choose the most logical solution.

This process of evolution will be evaluated and may be included in the applicable navigation specification.

1.2.4 ADVANTAGES TO STATES & OPERATORS

PBN offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria—

- 1) Reduces need to maintain sensor-specific routes and procedures, and their associated costs.
- 2) Avoids need for development of sensor-specific operations with each new evolution of navigation systems, which would be cost-prohibitive.
- 3) Allows more efficient use of airspace (route placement, fuel efficiency, noise abatement).
- 4) Clarifies the way in which RNAV systems are used.
- 5) Facilitates the operational approval process for operators by providing a limited set of navigation specifications intended for global use.

1.2.5 STATE OF THE OPERATOR FOCUS

In this advisory circular, the guidance is approached from the point of view of the State of the Operator, who is internationally obligated to approve performance based navigation operations for its operators and to ensure—

- 1) The aircraft and navigation equipment conform to the navigation specifications;
- 2) The operator has established procedures, controls and process measures to ensure that their personnel should be able to comply in all aspects to the navigations specifications; and
- 3) That pilots and other personnel are trained and competent to comply with the applicable navigation specifications.

1.3 APPLICABILITY

The requirement for RCAA approval before operations in defined PBN airspace applies to operators of Rwanda-registered aircraft involved in general aviation, aerial work and commercial air transport.

1.4 RELATED REGULATIONS

- RCAR Part 6 includes requirements for instruments and equipment for performance based navigation

- RCAR Part 10 includes the requirements for performance based navigation.
- RCAR Part 10 includes the requirements for RCAA approval of AOC performance based navigation.

1.5 RELATED PUBLICATIONS

These ICAO publications are source documents for this advisory circular—

- 1) International Civil Aviation Organization (ICAO)
 - ◆ Doc 9613-AN/937 – Performance Based Navigation Manual (PBN)
 - ◆ Doc 9997 – Performance Based Navigation (PBN) Operational Approval Manual
 - ◆ Annex 6, Part 1, International Commercial Air Transport – Aeroplanes
 - ◆ Annex 6, Part 3, International Operations – Helicopters

Copies may be obtained from Document Sales Unit, ICAO, 999 University Street, Montreal, Quebec, Canada H3C 5H7.

1.6 DEFINITIONS & ACRONYMS

1.6.1 DEFINITIONS

The following definitions apply to this advisory circular—

- 1) **Aircraft-Based Augmentation System (ABAS).** An augmentation system that augments and/or integrates the information obtained from the other GNSS elements with information available on board the aircraft.
 - ◆ The most common form of ABAS is receiver autonomous integrity monitoring (RAIM).
- 2) **Airspace Concept.** An Airspace Concept provides the outline and intended framework of operations within an airspace.
 - ◆ Airspace Concepts are developed to satisfy explicit strategic objectives such as improved safety, increased air traffic capacity and mitigation of environmental impact etc.
 - ◆ Airspace Concepts can include details of the practical organisation of the airspace and its users based on particular CNS/ATM assumptions. e.g. ATS route structure, separation minima, route spacing and obstacle clearance.
- 3) **Approach procedure with vertical guidance (APV).** An instrument procedure which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.
- 4) **Area navigation (RNAV).** A method of navigation which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained navigation aids, or a combination of these.
 - ◆ Area navigation includes Performance Based Navigation as well as other RNAV operations that do not meet the definition of Performance Based Navigation.
- 5) **Area navigation route.** An ATS route established for the use of aircraft capable of employing area navigation.
- 6) **Cyclic Redundancy Check (CRC)** A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data.
- 7) **Navigation Function.** The detailed capability of the navigation system (such as the execution of leg transitions, parallel offset capabilities, holding patterns, navigation data bases) required to meet the Airspace Concept.

- 8) **Navigation Specification.** A set of aircraft and air crew requirements needed to support Performance based navigation operations within a defined airspace.
- 9) **Performance Based Navigation.** Performance Based Navigation specifies system performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.
- 10) **Receiver Autonomous Integrity Monitoring (RAIM):** A form of ABAS whereby a GNSS receiver processor determines the integrity of the GNSS navigation signals using only GPS signals or GPS signals augmented with altitude (baro aiding).
- 11) **RNAV Operations.** Aircraft operations using area navigation for RNAV applications.
- 12) **RNAV System:** A navigation system which permits aircraft operation on any desired flight path within the coverage of station-referenced navigation aids or within the limits of the capability of self-contained aids, or a combination of these.
 - ◆ A RNAV system may be included as part of a Flight Management System (FMS).
- 13) **RNP Route.** An ATS Route established for the use of aircraft adhering to a prescribed RNP Specification.
- 14) **RNP System.** An area navigation system which supports on-board performance monitoring and alerting.
- 15) **RNP Operations.** Aircraft operations using a RNP System for RNP applications.
- 16) **Satellite based augmentation system (SBAS).** A wide coverage augmentation system in which the user receives augmentation from a satellite-based transmitter.
- 17) **Standard instrument arrival (STAR).** A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.
- 18) **Standard instrument departure (SID).** A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences

1.6.2 ACRONYMS & ABBREVIATIONS

The following acronyms apply to this advisory circular—

- 1) **AC** – Advisory Circular
- 2) **AOC** – Air Operator Certificate
- 3) **ABAS** –Aircraft-based Augmentation System
- 4) **APV** – Approach Procedure with Vertical Guidance
- 5) **ATS** – Air Traffic Services
- 6) **CRC** – Cyclic Redundancy Check
- 7) **DME** – Distance Measuring Equipment
- 8) **DTED** – Digital Terrain Elevation Data
- 9) **EASA** – European Aviation Safety Agency
- 10) **ECAC** – European Civil Aviation Conference
- 11) **EUROCAE** – European Organization for Civil Aviation Equipment
- 12) **EUROCONTROL** – European Organisation for the Safety of Air Navigation

- 13) **FAA** – Federal Aviation Administration
- 14) **FTE** – Flight Technical Error
- 15) **FMS** – Flight Management System
- 16) **FRT** – Fixed Radius Transition
- 17) **GBAS** – Ground-based Augmentation System
- 18) **GNSS** – Global Navigation Satellite System
- 19) **GPS** – Global Positioning System
- 20) **INS** – Inertial Navigation System
- 21) **IRS** – Inertial Reference System
- 22) **IRU** – Inertial Reference Unit
- 23) **JAA** – Joint Aviation Authorities
- 24) **LNAV** – Lateral Navigation
- 25) **MEL** – Minimum Equipment List
- 26) **NSE** – Navigation System Error
- 27) **OEM** – Original Equipment Manufacturer
- 28) **PBN** – Performance Based Navigation
- 29) **RAIM** – Receiver Autonomous Integrity Monitoring
- 30) **RCAR** – Rwanda Civil Aviation Regulations
- 31) **RF** – Radius to Fix
- 32) **RNAV** – Area Navigation
- 33) **RNP** – Required Navigation Performance
- 34) **RTCA** – Radio Technical Commission on Aeronautics
- 35) **SBAS** – Satellite-based Augmentation System
- 36) **SID** – Standard Instrument Departure
- 37) **STAR** – Standard Terminal Arrival
- 38) **TLS** – Target Level of Safety
- 39) **TSE** – Total System Error VNAV Vertical Navigation
- 40) **VOR** – Very High Frequency Omni-directional Radio Range

SECTION 2 PERFORMANCE BASED NAVIGATION CONCEPTS

Performance based navigation is now a well-developed program that is incorporated into the ICAO Standards and Recommended Practices of Annex 6. The development of this concept resulted in the revision of the definitions of RNAV and RNP to accommodate a more flexible approach to international navigation.

2.1 GENERAL

2.1.1 COMMON FEATURES

Both RNAV and RNP specifications include requirements for certain navigation functionality. At the basic level, these functional requirements may include—

- 1) Continuous indication of aircraft position relative to track to be displayed to the pilot flying on a navigation display situated in his primary field of view
- 2) Display of distance and bearing to the active (To) waypoint
- 3) Display of ground speed or time to the active (To) waypoint
- 4) Navigation data storage function.
- 5) Appropriate failure indication of the RNAV system, including the sensors.

More sophisticated navigation specifications include the requirement for navigation data bases and the capability to execute data base procedures.

2.1.2 PRIMARY DIFFERENCES BETWEEN RNAV & RNP

- A. The primary difference between these two designations is—
- RNP specifications include a requirement for on-board performance monitoring and alerting.
 - RNAV specifications do not include a requirement for on-board performance monitoring and alerting.
- B. This difference and other differences are outlined in the following table—

	RNAV Specification	RNP Specifications	
		RNP X Specification not requiring RF or FRT	RNP X specification requiring RF, FRT
NSE <i>(Monitoring and Alerting)</i>	NSE only observed by pilot cross checks; No alerting on position error	Alerting on position accuracy and integrity	
FTE <i>(Monitoring)</i>	Managed by on-board system or crew procedure.	Managed by on-board system or crew procedure.	
PDE <i>(Monitoring)</i>	Generally negligible; the desired path is not defined on fly-by, fly-over, and conditional turns.	Generally negligible; path defined on RF and FRT.	
NET EFFECT ON TSE	TSE distribution not bounded. In addition, the wide variation in turn performance results in need	TSE distribution bounded but extra protection of the route needed on turns;	TSE distribution bounded; no extra protection of the route needed on turns if turns defined by RF or FRT.

2.1.3 ON-BOARD MONITORING

- A. On-board performance monitoring and alerting is the main element which determines if the navigation system complies with the necessary safety level associated to a RNP application.
- This performance relates to both lateral and longitudinal navigation performance.
- B. On-board performance monitoring and alerting allows the flight crew to detect that the navigation system is not achieving, or cannot guarantee the required integrity, the navigation performance required for the operation.

2.2 PBN DESIGNATIONS

The designations for both RNP and RNAV are expressed as suffixes—

- A RNP specification is designated as RNP X (e.g. RNP 4).
 - A RNAV specification is designated as RNAV X (e.g. RNAV 1).
 - If two navigation specifications share the same value for X, they may be distinguished by use of a prefix. e.g. Advanced-RNP 1 and Basic-RNP 1.
 - RNP approach navigation specifications are designated using RNP as a prefix and an abbreviated textual suffix e.g. RNP APCH or RNP AR APCH.
- For both RNP and RNAV designations, the expression 'X' (where stated) refers to the lateral navigation accuracy in nautical miles that is expected to be achieved.
- Approach navigation specifications cover all segments of the instrument approach.
 - There are no RNAV approach specifications.

2.2.1 ICAO TERMINOLOGY VS CERTAIN STATES

- A. The following table clarifies some differences of terminology between the ICAO nav designations and existing RNAV practices—

ICAO	Europe	United States
RNAV 1	P-RNAV	US RNAV Type B
RNAV 2		US RNAV Type A
RNAV 5	B-RNAV	

- B. The United States and member States of the European Civil Aviation Conference (ECAC) currently use regional RNAV specifications with designators that differ from the ICAO applications.
- US and European RNAV applications are expected to migrate towards the ICAO nav specifications.
- C. The US applications and European applications will continue to be used only within these States.

2.2.2 RNAV 10 = RNP 10

- A. The designation RNP 10 has been used for years to define long range oceanic navigation requirements.
- Under the PBN concepts, RNP 10 actually conforms to the RNAV 10 navigation specification.
- B. Because the designator RNP 10 appears in numerous published documents and charts, RNP 10 will be retained in its current designation form.
- C. Under PBN, RNP 10 and RNAV 10 will be used synonymously to define these types of RNAV operations.

2.3 ICAO NAVIGATION SPECIFICATIONS

2.3.1 LIST OF NAVIGATION SPECIFICATIONS

The following navigation specifications will require approval by the RCAA before entry into airspace defined for the navigation performance requirements—

- 1) RNAV 10
- 2) RNAV 5
- 3) RNAV 2
- 4) RNAV 1
- 5) RNP 4
- 6) RNP-2
- 7) Advanced RNP
- 8) RNP-1
- 9) RNP-0.3
- 10) RNP APCH
- 11) RNP AR APCH

- The official ICAO navigation specifications for these designations are located in Doc 9613, Volume II.
- Operators are expected to ensure that their proposed operation will conform to the applicable nav specification(s) prior to submission of the application to the RCAA.

When preparing for RNP approach operations, the operators should also consult AC 10-018 for guidance for Baro-VNAV approvals.

2.3.2 SEPARATE APPROVAL FOR EACH NAVIGATION SPECIFICATION

- A. The RCAA will review and approve each navigation specification authorized for the specific aircraft and operator.
- B. Navigation accuracy is the underlying basis for the navigation specifications, but operators should be aware that navigation accuracy is only one of the many performance requirements included in a navigation specification

- C. Because specific performance and functionality requirements are defined for each navigation specification, an aircraft approved for a RNP specification is not automatically approved for all RNAV specifications.

The designations for navigation specifications are a "short-hand" title for all of the performance and functionality requirements.

- Similarly, an aircraft approved for a RNP or RNAV specification having stringent accuracy requirement (e.g. RNP 0.3 specification) is not automatically approved for a navigation specification having a less stringent accuracy requirement (e.g. RNP 4).

- D. It may seem logical, for example, that an aircraft approved for Basic RNP-1 be automatically approved for RNP-4; however, this is not the case.

Aircraft approved to the more stringent accuracy requirements may not necessarily meet a navigation specification having a less stringent accuracy.

- These nav specifications differ regarding performance and functionality.

2.3.3 SEPARATE CERTIFICATION & DEMONSTRATION

- A. The following navigation specifications may be evaluated during an operator's initial certification—

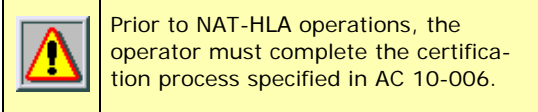
- 1) RNAV 5
- 2) RNAV 2
- 3) RNAV 1
- 4) RNP 1
- 5) RNP APCH

- If the operator desires that these evaluation be conducted during initial certification, an application with appropriate documentation must be submitted.
- Each of these evaluations will only be initiated based on the operator's application.

- B. The approval of all other navigation specifications will require a separate, focused evaluation and demonstration of capability.

2.4 SEPARATE NAT-HLA EVALUATION

- A. The NAT-HLA specification has been intentionally excluded from the PBN navigation specifications by ICAO because the regulatory requirement pre-dates the PBN concept and is formalized in separate ICAO documents and in States' regulations and technical guidance.
- B. Aircraft operating in the North Atlantic High Level Airspace



2.5 AIRSPACE CONCEPTS BY AREA OF OPERATION

2.5.1 OVERVIEW OF NAV SPECIFICATIONS TO AIRSPACE

The following table shows the application of navigation specifications to phase of flight—

Navigation specification	Flight Phase							
	En-route oceanic/remote	En-route continental	Arrival	Approach				Departure
				Initial	Intermediate	Final	Missed	
RNAV 10	10							
RNAV 5 ^a		5	5					
RNAV 2 ^b		2	2					2
RNAV 1 ^b		1	1	1	1		1 ^c	1
RNP 4	4							
RNP 2	2	2						
Advanced RNP ^d	2 ^e	2 or 1	1	1	1	0.3	1 ^c	1
RNP 1			1 ^f	1	1		1 ^c	1 ^e
RNP 0.3 ^g		0.3	0.3	0.3	0.3	—	0.3	0.3
RNP APCH				1	1	0.3 ^h	1 ^c or 0.3 ⁱ	
RNP AR APCH				1-0.1	1-0.1	0.3-0.1	1-0.1 ^j	

Notes:

- a) RNAV 5 is an en-route navigation specification which may be used for the initial part of a STAR outside 30 NM and above MSA.
- b) RNAV 1 and RNAV 2 are issued as a single approval.
- c) Applies only once 50 m (40 m Cat H) obstacle clearance has been achieved after the start of climb.
- d) A-RNP also permits a range of scalable RNP lateral navigation accuracies.
- e) Optional; requires higher continuity.
- f) Beyond 30 NM from the airport reference point (ARP), the accuracy value for alerting becomes 2 NM.
- g) The RNP 0.3 specification is primarily intended for helicopter operations.
- h) The RNP APCH navigation specification is divided into two sections. RNP 0.3 is applicable to RNP APCH Section A (LNAV and LNAV/VNAV). Different angular performance requirements are applicable to RNP APCH Section B (LP and LPV).
- i) This value applies during the initial straight ahead missed approach segment for RNP APCH Section B (LP and LPV).
- j) If less than RNP 1 is required in the missed approach, the reliance on inertial to cater for loss of GNSS in final means that accuracy will slowly deteriorate, and any accuracy value equal to that used in final can be applied only for a limited distance.

2.5.2 OCEANIC & REMOTE CONTINENTAL

- A. Oceanic and Remote continental Airspace Concepts are currently served by two navigation applications, RNAV 10 and RNP 4.
- B. Both these navigation applications rely primarily on GNSS to support the navigation element of the Airspace Concept.
 - In the case of the RNAV 10 application, no form of ATS Surveillance service is required.
 - In the case of the RNP 4 application, ADS contract (ADS-C) is used.

2.5.3 CONTINENTAL EN ROUTE

- A. Continental En Route Airspace Concepts are currently supported by RNAV applications.
 - RNAV 5 (currently termed B-Nav) is used in the Middle East (MID) and European Region (EUR).
 - In the United States, an RNAV 2 application (currently termed RNAV Type A) supports an En Route continental Airspace Concept.

At present, these Continental RNAV applications support Airspace Concepts which include radar surveillance and direct controller pilot communication (voice).

2.5.4 TERMINAL AIRSPACE: ARRIVAL & DEPARTURE

- A. Existing Terminal Airspace Concepts, which include arrival and departure, are supported by RNAV applications.
- B. The European Region (EUR) and the United States currently use—
 - The European Terminal Airspace RNAV application is known as P-RNAV (Precision RNAV).
 - The US Terminal Airspace Application is known as US RNAV Type B.
- C. The ICAO RNAV 1 specification shares a common navigation accuracy with both P-RNAV and US RNAV Type B.
 - RNP-1 has been developed primarily for application in non-radar, low-density terminal airspace.
 - Operators should expect, additional RNP applications for this phase of flight in the future.

But neither of the regional navigation specifications satisfy the full requirements of the RNAV 1 specification published in ICAO Doc 9613, Volume II.

2.5.5 APPROACH

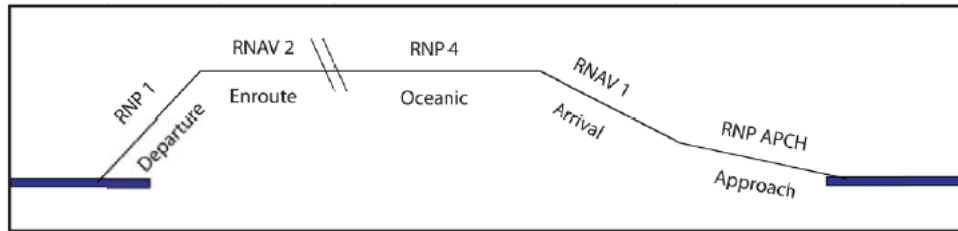
- A. Approach concepts cover all segments of the instrument approach, including—
 - 1) Initial;
 - 2) Intermediate;
 - 3) Final; and
 - 4) Missed approach.
- B. Under the PBN concept, these segments call for RNP specifications requiring a navigation accuracy of 0.3 NM to 0.1 NM or lower.
- C. Three general applications of RNP are characteristic of this phase of flight—
 - 1) New procedures to runways never served by an instrument procedure;
 - 2) Procedures either replacing or serving as backup to existing instrument procedures based on different technologies: and

Refer to Doc 9613 for the navigation specifications for RNP APCH and RNP AR APCH.

- 3) Those developed to enhance airport access in demanding environments.

2.5.6 APPLICATION OF NAV SPECIFICATION TO FLIGHT PHASE

- A. The following graphic demonstrates how an operator may apply more than one navigation specification during a single flight—



- B. An operator should make similar evaluations of all proposed operations to determine the minimum navigation specifications that should be requested from the RCAA during certification.

SECTION 3 OPERATIONAL APPROVAL PROCESS

3.1 GENERAL INTERNATIONAL REQUIREMENTS

3.1.1 COMPLETE CERTIFICATION REQUIREMENTS

Prior to operating a civil aircraft of Rwanda registry in airspace for which a must first—

- 1) Satisfactorily complete the process for granting of the proper authorizations;
- 2) Obtain RCAA-approval document for the specific aircraft or fleet.

3.1.2 CERTIFICATION EVALUATION REQUIRED

In making this certification evaluation, RCAA shall take into account the—

- 1) Type(s) of enroute and approach operations proposed;
- 2) Suitability of the aircraft, instruments and equipment for those operations;
- 3) Procedures for conformance with navigation specifications; and
- 4) Qualification of operator personnel for such operations

3.1.3 CRITERIA FOR GRANTING THE APPROVAL DOCUMENT

RCAA shall be satisfied that the—

- 1) The aircraft, instruments and equipment were designed and airworthiness-tested for the PBN operations proposed by the operator;
- 2) Operator has instituted appropriate procedures and training in respect to maintenance programmes and practices necessary to ensure the continued airworthiness of the aircraft, instruments and equipment involved in the proposed PBN operations.
- 3) Operator has instituted adequate and appropriate operational procedures to ensure the safe accomplishment of the PBN operations;

- The criteria specified in this paragraph will be applied after certification to all inspections involving PBN operations.
- Consistent satisfactory performance is absolutely necessary for continued PBN approval.

- 4) Operator has ensured that all flight crew and flight dispatcher participants in the proposed PBN operations are trained and qualified; and
- 5) The operator has demonstrated that its personnel can conduct the PBN operations consistently and safely

3.2 GENERAL RWANDA REQUIREMENTS

3.2.1 CERTIFICATION PROCESS

- A. While all certification proceeds through the same 5-phase process, whether is a single document or a completely new airline, the lines between the phases do blur in a simple certification.
- B. Granting of PBN is a simple process. The applicant will provide the required formal application as prescribed by RCAA.
- C. The certification team will then accomplish the document conformance.
- D. Document conformance is considered complete when all submitted documents have been—
 - 1) Evaluated;
 - 2) Found to be acceptable for use in aviation; and
 - 3) Issued a formal instrument of approval or acceptance.

3.2.2 INSPECTION & DEMONSTRATION

- A. The specific aircraft to be used will be inspected for PBN equipment capability and reliability.
- B. If there is any doubt that the operator's personnel and equipment may not be capable of meeting the required navigation performance, the applicant will be issued an LOA to conduct PBN operations under the close supervision of RCAA inspector personnel.

Past performance of the operator's personnel with the PBN operations to meet the navigation specifications will be a key factor in the type of demonstration required.
- C. The demonstrated navigation performance will be considered before granting the PBN approval(s).

3.2.3 FINAL CERTIFICATION ACTIONS

- A. This is the period of time that RCAA completes the necessary documentation to formalize the approval of the applicant for PBN approvals in specific aircraft type(s) and, if necessary, in specific airspace.
- B. That approval will be in the form of—
 - 1) For general aviation operators; an LOA valid for a period of 12 months; and
 - 2) For AOC holders, a revision to the Aircraft Display operations specification (for each type of aircraft).

SECTION 4 CONTENTS OF FORMAL APPLICATION PACKAGE

4.1 GENERAL REQUIREMENTS

The following documents will be considered individually—

- 1) The completed PBN application form;
- 2) A completed PBN Conformance Checklist;
- 3) Operations Manual (or revisions) that include PBN policies and procedures appropriate the desired navigation specification(s);
- 4) Operations Manual - D (or revisions) that include training programs appropriate to the desired navigation specification(s);
- 5) Maintenance Control Manual (or revisions) that include general maintenance procedures related to aircraft PBN airworthiness and current status;
- 6) Summary of relevant past operating history (where available);

The RCAA will provide a copy of the PBN Application form and PBN Conformance Checklist during the Pre-Application Meeting.

4.2 FOR AIRCRAFT TYPE

The following documents must be submitted for each aircraft type—

- 1) Description of aircraft Type Certificate data;
- 2) Operations Manual - B (or revisions) that include PBN procedures and limitations appropriate the desired navigation specification(s);
- 3) Proposed Minimum Equipment List (MEL) revisions for PBN, if applicable; and
- 4) Current Master Minimum Equipment List (MMEL);

4.3 FOR INDIVIDUAL AIRCRAFT

The following documents must be submitted for each individual aircraft—

- 1) Completed copy of aircraft PBN conformity checklist;
- 2) AFM (or approved AFM supplement) demonstrating that aircraft is eligible for the desired PBN navigation specification(s);
- 3) If applicable, modification documents demonstrating that the aircraft is eligible for the desired PBN nav specs.

The RCAA will provided a copy of the Aircraft PBN Conformity Checklist during the Pre-Application Meeting.

4.4 FOR NAVIGATION EQUIPMENT

The following documents related to the specific PBN equipment required should be submitted with the application—

- 1) Maintenance Program with appropriate provisions for desired PBN navigation specification(s);
- 2) Database integrity procedures (may be in maintenance control manual); and
- 3) Database supplier subscription and approval.

4.5 AVAILABLE FOR CONSULTATION

The following documents (for each type of aircraft and equipment necessary for the PBN operations) must be available at the applicant's facilities for consultation—

- 1) Maintenance manuals;

- RCAA inspectors shall have unobstructed ability to refer to these documents.
- If this criteria is not met, copies of these manuals will be required to be submitted to the RCAA offices as a part of the application.

- 2) Standard practices manuals; and
- 3) Illustrated parts catalogues.

SECTION 5 AIRWORTHINESS CONSIDERATIONS

5.1 AIRWORTHINESS DEMONSTRATIONS

- A. Airworthiness demonstration of aircraft equipment is usually accomplished in support of operational authorizations on a one-time basis at the time of Type Certification (TC) or Supplemental Type Certification (STC).

Unless otherwise accepted by the RCAA, each aircraft should meet relevant criteria specified by the applicable aircraft manufacturer or avionics manufacturer for associated systems and equipment, such as

 - Valid Type Certificated
 - Appropriate STC records
 - Compliance, assessment of status of any engineering orders, ADs, service bulletins or other compliance requirements.
- B. This demonstration is based upon the airworthiness criteria in place at that time.
- C. The operating rules will continuously apply over time and may change after airworthiness demonstrations are conducted, or may be updated consistent with safety experience, additional operational credit or constraints may apply to operators or aircraft as necessary for safe operations.
- D. The criteria related primarily to the airworthiness demonstration of systems or equipment is assumed through the proper validation of the data provided by the State of Design (or Manufacture) airworthiness demonstration.

5.2 CONTINUING AIRWORTHINESS/MAINTENANCE

5.2.1 MAINTENANCE PROGRAM

- A. Unless otherwise approved by RCAA, each operator should have an approved maintenance program.
- B. The approved maintenance program should include any necessary provisions to address the PBN navigation specification(s) in accordance with the operator's intended operation and the—
 - 1) Manufacturers recommended maintenance program;
 - 2) MRB requirements or equivalent requirements; or
 - 3) Any subsequent Manufacturer, State of Design or RCAA designated requirements (e.g., ADs, mandatory service bulletins).

Emphasis should be on maintaining and ensuring total system performance, accuracy, availability, reliability, and integrity for the intended operations.

5.2.2 MAINTENANCE PROGRAM PROVISIONS

- A. The maintenance program should be compatible with an operator's organization and ability to implement and supervise the program.
- B. Maintenance personnel should be familiar with—
 - 1) The operator's approved program;
 - 2) Their individual responsibilities in accomplishing that program; and
 - 3) The availability of any resources within or outside of the maintenance organization that maybe necessary to assure program effectiveness.

- ◆ Examples include getting applicable information related to the manufacturer's recommended maintenance program and getting information referenced in this AC such as service bulletin information).
- C. Provision for PBN operations may be addressed as a specific program or may be integrated with the general maintenance program.
- D. Regardless whether the maintenance program is integrated or is designated as a specific program for PBN, the maintenance program should at least address the following—
- 1) Maintenance procedures necessary to ensure continued airworthiness relative to PBN operations;
 - 2) A procedure to revise and update the maintenance program;
 - 3) A method to identify, record or designate personnel currently assigned responsibility in managing the program, performing the program, maintaining the program, or performing quality assurance for the program;
 - 4) This includes identification of any service provider or sub-contractor organizations, or where applicable, their personnel;
 - 5) Verification should be made of the PBN equipment, systems and configuration status for each aircraft brought into the maintenance or PBN program.
 - 6) Identification of modifications, additions, and changes which were made to qualify aircraft systems for the intended operation or minima, if other than as specified in the AFM, TC or STC.
 - 7) Identification of additional maintenance requirements and log entries necessary to change PBN equipment status;
 - 8) Any discrepancy reporting procedures that may be unique to the PBN program.
 - ◆ If applicable, such procedures should be compatibly described in maintenance documents and operations documents;
 - 9) Procedures which identify, monitor and report PBN system and component discrepancies for the purpose of quality control and analysis;
 - 10) Procedures which define, monitor and report chronic and repetitive discrepancies;
 - 11) Procedures which ensure aircraft remain out of PBN status until successful corrective action has been verified for chronic and repetitive discrepancies;
 - 12) Procedures which ensure the aircraft system status is placarded properly and clearly documented in the aircraft log book, in coordination with maintenance control, engineering, flight operations, and dispatch, or equivalent;
 - 13) Procedures to ensure the downgrade of an aircraft PBN capability status, if applicable, when maintenance has been performed by persons other than those trained, qualified, or authorized to use or approve procedures related to PBN operations;
 - 14) Procedures for periodic maintenance of systems ground check, and systems flight check, as applicable;
 - ◆ For example, following a heavy maintenance, suitable checks may need to be performed prior to maintenance release.

Unless otherwise accepted by the RCAA, each aircraft should meet relevant criteria specified by the applicable aircraft manufacturer or avionics manufacturer for associated systems and equipment.

15) Provision should be made for periodic operational sampling of suitable performance.

- ◆ A recording procedure for both satisfactory and unsatisfactory results should be included.
- ◆ Fleet sampling is not generally acceptable in lieu of specific aircraft assessment.
- ◆ At least one satisfactory low visibility system operational use, or a satisfactory systems ground check, should be accomplished within 30 days, for an aircraft to remain in the desired PBN status.

At least one satisfactory operation under each approved specific nav spec should have been accomplished within a specified period approved for that operator, unless a satisfactory systems ground check has been accomplished.

5.3 INITIAL & CONTINUING MAINTENANCE TRAINING

- A. Operator and contract maintenance personnel should receive initial and continuing training as necessary for an effective program, including—
- 1) Mechanics;
 - 2) Maintenance controllers;
 - 3) Avionics technicians;
 - 4) Personnel performing maintenance inspection or quality assurance; and
 - 5) Other engineering personnel if applicable.
- B. The training curriculum should include specific aircraft systems and operator policies and procedures applicable to PBN operations.

5.3.1 CONTINUING TRAINING

A. Continuing training should be accomplished—

- 1) At least annually; and
- 2) When a person has not been involved in the maintenance of the specified aircraft or systems for an extended period of more than 6 months.

The RCAA recommends that the operator provide a special certification of maintenance personnel for PBN duties.

B. The training should at least include, as applicable—

- 1) An initial and recurrent training program for appropriate operator and contract personnel;
- 2) Personnel considered to be included are maintenance personnel, quality and reliability groups, maintenance control, and incoming inspection and stores, or equivalent organizations.
- 3) Training should include both classroom and at least some “hands-on” aircraft training for those personnel who are assigned aircraft maintenance duties. Otherwise, training may be performed—
 - ◆ In a classroom
 - ◆ By computer based training
 - ◆ In simulators
 - ◆ in an airplane or in any other effective combination of the above
 - ◆ consistent with the approved program, and considered acceptable to RCAA.
- 4) Subject areas for training should include—
 - ◆ Operational concepts

- ◆ Aircraft types and systems affected
 - ◆ Aircraft variants and differences where applicable
 - ◆ Procedures to be used;
 - ◆ Manual or technical reference availability and use
 - ◆ Processes, tools or test equipment to be used
 - ◆ Quality control
 - ◆ Methods for testing and maintenance release
 - ◆ Sign-offs required
 - ◆ Proper Minimum Equipment List (MEL) application
 - ◆ General information about where to get technical assistance as necessary,
 - ◆ Necessary coordination with other parts of the operator's organization (e.g., flight operations, dispatch), and
 - ◆ Any other maintenance program requirements unique to the operator or the aircraft types or variants flown (e.g., human factors considerations, problem reporting)
- 5) Procedures for the use of outside vendors or vendor's parts that ensures compatibility to program requirements and for establishing measures to control and account for parts overall quality assurance
 - 6) Procedures to ensure tracking and control of components that are "swapped" between systems for trouble shooting when systems discrepancies can not be duplicated.

These procedures should provide for total system testing and/or removal of aircraft from PBN status.
 - 7) Procedures to assess, track and control the accomplishment of changes to components or systems pertinent to low visibility operations
 - ◆ For example, ADs, service bulletins, engineering orders, RCAR requirements
 - 8) Procedures to record and report PBN operation(s) that are discontinued/ interrupted because of system(s) malfunction
 - 9) Procedures to install, evaluate, control, and test system and component software changes, updates, or periodic updates
 - 10) Procedures related to the MEL remarks section use which identify PBN related systems and components, specifying limitations, upgrading and downgrading
 - 11) Procedures for identifying PBN related components and systems as "RII" items, to provide quality assurance whether performed in-house or by contract vendors.

5.4 TEST EQUIPMENT/CALIBRATION STANDARDS

- A. Test equipment may require periodic re-evaluation to ensure it has the required accuracy and reliability to return systems and components to service following maintenance.
- B. A listing of primary and secondary standards used to maintain test equipment which relate to PBN operations should be maintained.

- It is the operator's responsibility to ensure these standards are adhered to by contract maintenance organizations.
 - Traceability to a national standard or the manufacturer's calibration standards should be maintained.

5.5 MAINTENANCE RELEASE PROCEDURES

- A. Procedures should be included to upgrade or downgrade systems status concerning PBN operations capability.
- B. The appropriate level of testing should be specified for each component or system.
- C. The manufacturer's recommended maintenance program or maintenance instructions should be considered when determining the role built-in-test-equipment (BITE) should play for return to service (RTS) procedures or for use as a method for PBN status upgrade or downgrade.
- D. Contract facilities or personnel should follow the operator's RCAA-approved maintenance program to approve an aircraft for maintenance release.

The method for controlling operational status of the aircraft should ensure that flight crews, maintenance and inspection departments, dispatch and other administrative personnel as necessary are appropriately aware of aircraft and system status.



The operator is responsible for ensuring that contract organizations and personnel are appropriately trained, qualified, and authorized.

5.6 PERIODIC AIRCRAFT SYSTEM EVALUATIONS

- A. The operator should provide a method to continuously assess or periodically evaluate aircraft system performance to ensure satisfactory operation for those systems applicable to PBN operations.
- An acceptable method for assuring satisfactory performance of a low visibility flight guidance system (e.g., autoland or HUD) is to periodically use the system and note satisfactory performance.
- B. Periodic flight guidance system/autopilot system checks should be conducted in accordance with—
- Procedures recommended by the airframe or avionics manufacturer; or
 - An alternate procedure approved by the RCAA.
- C. For periodic assessment, a record should be established to show—
- 1) When and where the flight guidance/autopilot system was satisfactorily used, and
 - 2) If performance was not satisfactory, to describe any remedial action taken.

Use of the flight guidance/automatic landing system by the flight crews should be encouraged to assist in maintaining its availability and reliability.

A record of that check such as a logbook entry or computer ACARS record showing satisfactory performance within the previous—

- 6 months for RNP 10, or
- 30 days for RNP AR APRCH.

5.7 CONFIGURATION CONTROL/SYSTEM MODIFICATIONS

- A. The operator should ensure that any modification to systems and components approved for low visibility operations are not adversely affected when incorporating software changes, service bulletins, hardware additions or modifications.
- B. Any changes to system components should be consistent with the aircraft manufacturer's, avionics manufacturer's, industry or RCAA accepted criteria or processes

5.8 RECORDS

- A. The operator should keep suitable records (e.g., both the operator's own records and access to records of any applicable contract maintenance organization).
- B. Contract maintenance organizations should have appropriate records and instructions for coordination of records with the operator.

These records ensure that both the operator and RCAA can determine the appropriate airworthiness configuration and status of each aircraft intended for PBN operation.

5.9 AIRWORTHINESS APPROVAL PROCESS

- A. The Airworthiness approval process assures that each item of the RNAV equipment installed is of a kind and design appropriate to its intended function and that the installation functions properly under foreseeable operating conditions.
- B. Additionally, the airworthiness approval process identifies any installation limitations that need to be considered for operational approval.
- Such limitations and other information relevant to the approval of the RNAV system installation are documented in the AFM, or AFM Supplement as applicable.
- C. Information may also be repeated and expanded upon in other documents such as Pilot Operating Handbooks (POHs) or Flight Crew Operating Manuals (FCOMs).

5.10 APPROVAL OF RNAV SYSTEMS FOR RNAV-X OPERATION

- A. The RNAV system installed should be compliant with a set of basic performance requirements described in the "navigation specification" which defines accuracy, integrity and continuity criteria.
- B. The RNAV system installed should be compliant with a set of specific functional requirements described in the navigation specification.
- C. For a multi-sensor RNAV system, an assessment should be conducted to establish which sensors are compliant with the performance requirement described in the navigation specification.
- D. The RNAV system installed should have a navigation data base and should support each specific path terminator as required by the navigation specification.
- E. The navigation specification generally indicates if a single or a dual installation is necessary to fulfil availability and/or continuity requirements.
- The Airspace Concept and Navaid infrastructure are key elements to decide if single or dual installation is necessary.

For certain RNAV navigation applications, a navigation data base may be optional

5.11 APPROVAL OF RNP SYSTEMS FOR RNP-X OPERATION

- A. The RNP system installed should be compliant with a set of basic RNP performance requirement described in the navigation specification.
- B. The RNP system installed should be compliant with a set of specific functional requirement described in the navigation specification.

The RNP system should include an on board performance monitoring and alerting function.

- C. For a multi-sensor RNP system, an assessment should be conducted to establish sensors which are compliant with the RNP performance requirement described in the RNP specification.
- D. The RNP system installed should have a navigation data base and should support path terminator as required by the navigation specification

SECTION 6 OPERATIONAL APPROVAL

- A. The aircraft must be equipped with an RNAV system enabling the flight crew to navigate in accordance with operational criteria defined in the navigation specification.
- B. The authority must be satisfied that operational programmes are adequate.
- C. Training programmes and operations manuals should be evaluated.

6.1 GENERAL RNAV APPROVAL PROCESS

- A. The operational approval process assumes first that the corresponding installation/airworthiness approval has been granted.
- B. During operation, the crew should respect AFM and AFM supplements limitations.
- C. Normal procedures are provided in the navigation specification and detailed necessary crew action to be conducted during pre-flight planning, prior to commencing the procedure and during the procedure.
- D. Abnormal procedures are provided in the navigation specification.
 - These procedures should detail crew action in case of on-board RNAV system failure and in case of system inability to maintain the prescribed performance of the on board monitoring and alerting function.
- E. The operator should have in place a system for investigation events of affecting the safety of operations to determine its origin (coded procedure, accuracy problem, etc)
- F. Minimum equipment list (MEL) should identify the minimum equipment necessary to satisfy the navigation application

6.2 FLIGHT CREW TRAINING

Each pilot must receive appropriate training, briefing and guidance material in order to safely conduct the operation.

6.3 NAVIGATION DATABASE MANAGEMENT

Any specific requirement regarding the navigation data base should be provided in the navigation specification particularly if the navigation data base integrity should demonstrate compliance with DO 200A/EUROCAE ED 76 (data quality assurance process).

The demonstration required by this paragraph may be documented with a Letter of Acceptance (LOA), or other equivalent means acceptable to the RCAA.

SECTION 7 OPERATIONAL PROCEDURES

7.1 OPERATIONAL PROCEDURES

- A. Appropriate operational procedures based on the approved operator program should be addressed.
- B. Operational procedures should consider the—
 - 1) Pilot qualification and training program;
 - 2) Airplane flight manual;
 - 3) Crew coordination procedures;
 - 4) Monitoring.

Suitable operational procedures must be used by the operator and be used by flight crews prior to conducting PBN operations.

7.1.1 FLIGHT CREW PROCEDURES

- A. Flight crew procedures should complement the technical contents of the navigation specification.
- B. Flight crew procedures are usually embodied in the company operating manual.
- C. These procedures could include, for example, that the flight crew notify ATC of contingencies (equipment failures, weather conditions) that affect the aircraft's ability to maintain navigation accuracy.
- D. These procedures would also require the flight crew to state their intentions, coordinate a plan of action and obtain a revised ATC clearance in such instances.
- E. Depending on the defined airspace, contingency procedures have been established to permit the flight crew to follow such established procedures in the event that it is not possible to notify ATC of their difficulties.

7.1.2 APPLICATION OF AFM PROVISIONS

- A. The operator's procedures for PBN operations should be consistent with any AFM provisions specified in the normal or non-normal procedures sections during airworthiness demonstrations.
 - Adjustments of procedures consistent with operator requirements are permitted when approved by the POI.
- B. Operators should assure that no adjustments to procedures are made which invalidate the applicability of the original airworthiness demonstration.
- C. Where navigation performance for a specific RNP can only be achieved by specific system modes (e.g., coupled flight director or autopilot), the specific modes and associated RNP levels should be applied consistent with the AFM.
- D. Where operations are based on RNP, suitable flight manual provisions for RNP capability and uses should be provided.



If not available in the AFM or Flight Crew Operating Manual (FCOM), RNP operations may be approved on a case by case basis, consistent with "fleet qualification" for RNP criteria.

7.1.3 CREW COORDINATION

- A. Appropriate procedures for crew coordination should be established so that each flight crew member can carry out their assigned responsibilities.

- B. Briefings prior to the applicable takeoff or approach should be specified to assure appropriate and necessary crew communications.
- C. Responsibilities and assignment of tasks should be clearly understood by crew members.


7.1.4 MONITORING

- A. Operators should establish appropriate monitoring procedures for each type of PBN operation.
- B. Procedures should assure that adequate crew attention can be devoted to—
 - Control of aircraft flight path
 - Displacements from intended path
 - Mode annunciations

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APPENDIX A

PBN Application Form

	<p>APPLICATION FOR PERFORMANCE BASED NAVIGATION APPROVAL</p>	<p>INSTRUCTIONS Print or type. Do not write in shaded areas, these are for RCAA use only. Submit original only to the RCAA Flight Safety Services or a RCAA Authorized Person. If additional space is required, use an attachment</p>			
A. APPLICANT INFORMATION:					
1. NAME OF APPLICANT OR HOLDER	2. PERMANENT ADDRESS (Street or Postal Number)				
3. CENTRAL TELEPHONE & FAX NUMBERS	4. CITY	STATE/PROVINCE MAIL CODE COUNTRY			
B. MANAGEMENT CONTACTS:					
1. NAME & TITLE OF OPERATIONS DIRECTOR	PHONE #	E-MAIL			
2. NAME & TITLE OF TRAINING DIRECTOR	PHONE #	E-MAIL			
3. NAME & TITLE OF MAINTENANCE DIRECTOR	PHONE #	E-MAIL			
C. AIRCRAFT TO BE OPERATED:					
1. AIRCRAFT MMS:	2. AIRCRAFT REGISTRATION(S):				
D. SCOPE OF APPLICATION: <input type="checkbox"/> Initial Request <input type="checkbox"/> Additional Request					
ADD	NAVIGATION-RELATED APPROVALS	ADD	NAVIGATION-RELATED APPROVALS	ADD	SPECIAL AREA APPROVALS
<input type="checkbox"/>	1. RNAV10	<input type="checkbox"/>	7. RNP-1	<input type="checkbox"/>	1. NAT / NAM
<input type="checkbox"/>	2. RNAV-5	<input type="checkbox"/>	8. RNP-0.3	<input type="checkbox"/>	2. PAC / RAC
<input type="checkbox"/>	3. RNAV-2	<input type="checkbox"/>	9. RNP-APRCH	<input type="checkbox"/>	3. SAM / RAC
<input type="checkbox"/>	4. RNAV-1	<input type="checkbox"/>	10. RNP-AR-APRCH	<input type="checkbox"/>	4. MID ASIA / RAC
<input type="checkbox"/>	5. RNP-4	<input type="checkbox"/>	11. Baro VNAV	<input type="checkbox"/>	5. NORPAC
<input type="checkbox"/>	6. RNP-2	<input type="checkbox"/>	12. NAT-MNPS	<input type="checkbox"/>	6. CEPAC
E. ADDITIONAL APPLICATION ATTACHMENTS:					
<input type="checkbox"/>	1.PBN Conformance Checklist	<input type="checkbox"/>	5.MEL (with PBN adaptation)	<input type="checkbox"/>	9. Modification Approval Document
<input type="checkbox"/>	2.AFM (or AFM Supplement)	<input type="checkbox"/>	6.Relevant Maintenance Program	<input type="checkbox"/>	10. Database Supplier Approval
<input type="checkbox"/>	3.Relevant Operations Manuals	<input type="checkbox"/>	7.Related Maintenance Procedures	<input type="checkbox"/>	11. Aircraft PBN Conformity Ckfst(s):
<input type="checkbox"/>	4.PBN Crew Training Programs	<input type="checkbox"/>	8.Database Integrity Procedures	<input type="checkbox"/>	12. Other (see reverse):
<i>If more space is needed to list application contents, please enter on reverse.</i>					
F. APPLICABLE AIRCRAFT FLIGHT MANUAL (SUPPLEMENT) SUPPORTING REFERENCE(S): Approved flight manual references for this fleet show the following airworthiness approval(s) for navigation system installation (check all applicable)					
YES	REFERENCE	YES?	REFERENCE	YES	REFERENCE
<input type="checkbox"/>	1. FAA AC 20-130A	<input type="checkbox"/>	7. FAA TSO-C129a+	<input type="checkbox"/>	13. JAA JTSO-2C115()
<input type="checkbox"/>	2. FAA AC 25-15	<input type="checkbox"/>	8. FAA TSO-C115()	<input type="checkbox"/>	14. JAA JTSO-2C129a
<input type="checkbox"/>	3. FAA AC 25-14	<input type="checkbox"/>	9. FAA AC 90-94	<input type="checkbox"/>	15. JAA GEN TGL 10
<input type="checkbox"/>	4. FAA AC 90-45	<input type="checkbox"/>	10. FAA Order 8400-12A	<input type="checkbox"/>	16. JAA AMG 20X2
<input type="checkbox"/>	5. FAA TSO-C145	<input type="checkbox"/>	11. FAA Notice 8110-60	<input type="checkbox"/>	17. ICAO DOC 7030/4
<input type="checkbox"/>	6. FAA TSO-C146	<input type="checkbox"/>	12. RNP-10	<input type="checkbox"/>	18. Other (see reverse):

G. ADDITIONAL INFORMATION PERTINENT TO THIS APPLICATION:
 This space is provided for inclusion of information could not be inserted in the available category and spaces provided on front of form.

H. APPLICANT'S CERTIFICATION - The undersigned certify that all statements and answers provided on this application form and as attachments are complete and true to the best of my knowledge and agree that they are to be considered as part of the basis for issuance of any PBN approval.

<i>A person shall not with intent to deceive or make any false representation for the purpose of procuring for himself or any other person the grant, issue, renewal or variation of any such approval.</i>	DATE	OPERATIONS DIRECTOR SIGNATURE:
	DATE#	TRAINING DIRECTOR SIGNATURE:
	DATE:	MAINTENANCE DIRECTOR SIGNATURE:

I. RCAA CERTIFICATION:

1. APPROVED with the associated authorizations bearing the number shown above.

Initial
 Renewal
 All Requests Granted
 Limitations


2. DISAPPROVED

3. Signature _____ 4. Title _____ 5. Date _____

RCAA Form 580A [2]2018 Control Number:

APPENDIX B

PBN Conformance Checklist

		CONFORMANCE CHECKLIST FOR PERFORMANCE BASED NAVIGATION APPROVAL		INSTRUCTIONS <small>Print or type. Do not write in shaded areas, these are for RCAA use only. Submit original only to the RCAA or a RCAA Authorized Person. If additional space is required, use an attachment</small>	
A. APPLICANT INFORMATION:					
1. NAME OF APPLICANT OR HOLDER			2. DATE OF APPLICATION		
B	MAINTENANCE DOCUMENTS	Applicable?	Not Applicable	Manual Reference <small>(Chapter, Section, Paragraph)</small>	Acceptable?
1	Relevant parts of the MEL have been revised to reflect system requirements (redundancy levels) appropriate to the intended RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Proposed maintenance program includes all RNAV related maintenance requirements prescribed by the manufacturer or design organization?	<input type="checkbox"/>	<input type="checkbox"/>		
C	RNAV MAINTENANCE PROCEDURES	Applicable?	Not Applicable	Manual Reference <small>(Chapter, Section, Paragraph)</small>	Acceptable?
1	Procedures for handling and storage of RNAV database files including uploads to the aircraft?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Procedures for operating equipment for handling of the RNAV database (use of, handling and periodic testing)?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Procedures for downgrading a non-compliant aircraft?	<input type="checkbox"/>	<input type="checkbox"/>		
4	Procedures for monitoring and reporting of repetitive defects?	<input type="checkbox"/>	<input type="checkbox"/>		
5	Procedures for reporting to FOCA?	<input type="checkbox"/>	<input type="checkbox"/>		
D	DATABASE INTEGRITY ASSURANCE PROCEDURES	Applicable?	Not Applicable	Manual Reference <small>(Chapter, Section, Paragraph)</small>	Acceptable?
1	Operator procedures for nav database supplier evaluation?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Operator procedures for integrity checks and use of software tools?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Operator procedures for reporting discrepancies to the database supplier?	<input type="checkbox"/>	<input type="checkbox"/>		
4	Operator procedures for notifying flight crews of irregularities with nav database?	<input type="checkbox"/>	<input type="checkbox"/>		
5	Operator process for updating the navigation database?	<input type="checkbox"/>	<input type="checkbox"/>		
E	RNAV FLIGHT PLANNING PROCEDURES	Applicable?	Not Applicable	Manual Reference <small>(Chapter, Section, Paragraph)</small>	Acceptable?
1	Flight crew verification of aeroplane RNAV/RNP approval.	<input type="checkbox"/>	<input type="checkbox"/>		
2	Flight crew verification of applicable RNAV/RNP time limits.	<input type="checkbox"/>	<input type="checkbox"/>		
3	Flight crew verification of applicable requirements for GPS (RAIM, FDE).	<input type="checkbox"/>	<input type="checkbox"/>		
4	Flight crew reviews operating restrictions related to RNAV/RNP Approval.	<input type="checkbox"/>	<input type="checkbox"/>		

F	RNAV PREFLIGHT PROCEDURES	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Flight crew review of technical log regarding possible RNAV restrictions.	<input type="checkbox"/>	<input type="checkbox"/>		
2	Flight crew external aircraft inspection of navigation system antennas?	<input type="checkbox"/>	<input type="checkbox"/>		
3	If applicable, flight crew uses MEL to assess any maintenance defects that might restrict RNAV operations.	<input type="checkbox"/>	<input type="checkbox"/>		
4	Flight crew verification of NAV database validity/currency.	<input type="checkbox"/>	<input type="checkbox"/>		

G	RNAV ENROUTE PROCEDURES	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Flight crew cross-check procedures to identify NAV errors?	<input type="checkbox"/>	<input type="checkbox"/>		
2	If applicable, Flight crew procedures for use of INS/IRS NAV systems without automatic radio NAV update?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Flight crew procedures for use of GPS?	<input type="checkbox"/>	<input type="checkbox"/>		
4	Flight crew procedures to re-assess minimum NAV equipment and communication requirements before entering a defined area using RNAV.	<input type="checkbox"/>	<input type="checkbox"/>		
5	Flight crew procedures to review possible alternate routings, especially those required by contingency procedures?	<input type="checkbox"/>	<input type="checkbox"/>		
6	Flight crew procedure for positive position check prior to entering the RNAV area?	<input type="checkbox"/>	<input type="checkbox"/>		

H	RNAV ABNORMAL PROCEDURES	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Abnormal procedures applicable to the type of RNAV equipment and defined airspace?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Flight crew notification of ATC of loss of navigation capability?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Flight crew guidance for contingencies which might be encountered?	<input type="checkbox"/>	<input type="checkbox"/>		
4	Flight crew guidance to reversion to and use of other NAV aids in case of RNAV failure?	<input type="checkbox"/>	<input type="checkbox"/>		


I	RNAV TRAINING: FLIGHT CREWS	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Qualification requirements for flight crews for RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Training program requiring initial and recurrent training for flight crew tasks and decisions in RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Flight crew training curriculums which include RNAV training modules with subject elements and minimum events?	<input type="checkbox"/>	<input type="checkbox"/>		
4	Procedures for RNAV qualification under supervision with INAVIC designated representative or qualified crew member as applicable?	<input type="checkbox"/>	<input type="checkbox"/>		
5	Procedures for re-establishing flight crew RNAV qualification / currency after a defined period of in-activity?	<input type="checkbox"/>	<input type="checkbox"/>		

J	RNAV TRAINING: GROUND PERSONNEL	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Qualification requirements for flight dispatchers and other persons supporting RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Training program for ground staff requiring initial and recurrent training for tasks supporting RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Training curriculums for ground staff which include RNAV training modules with subject elements and minimum events?	<input type="checkbox"/>	<input type="checkbox"/>		
K	RNAV TRAINING: MAINTENANCE PERSONNEL	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Qualification requirements for maintenance personnel supporting RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Training program requiring initial and recurrent training for maintenance personnel for tasks supporting RNAV operations?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Training curriculums for maintenance personnel which include RNAV training modules with subject elements and minimum events?	<input type="checkbox"/>	<input type="checkbox"/>		

End of Appendix

APPENDIX C

Individual Aircraft PBN Conformance

		INDIVIDUAL AIRCRAFT CONFORMITY FOR PERFORMANCE BASED NAVIGATION		INSTRUCTIONS <small>Print or type. Do not write in shaded areas, these are for RCAA use only. Submit original only to the Flight Safety Services or a RCAA Authorized Person. If additional space is required, use an attachment</small>	
A. APPLICANT INFORMATION:					
1. NAME OF APPLICANT OR HOLDER			2. DATE OF APPLICATION		
B. AIRCRAFT TO BE OPERATED:					
1. AIRCRAFT MMS:		2. AIRCRAFT REGISTRATION:		3. AIRCRAFT SERIAL NUMBER:	
C. NAVIGATION SYSTEM MANUFACTURER/ MODEL INSTALLED:					
	System #1	System #2	System #3	System #4	
MAKE:					
MODEL:					
TSO:					
D. TYPE DESIGN APPROVAL: The type design approval for this aircraft and system configuration is found in-					
	DOCUMENT		DOCUMENT		DOCUMENT
<input type="checkbox"/>	1. Type Design	<input type="checkbox"/>	4. FAA STC	<input type="checkbox"/>	6. Other CAA STC
<input type="checkbox"/>	2. Service Bulletin	<input type="checkbox"/>	5. JAA STC	<input type="checkbox"/>	7. CAA Major Modification
<input type="checkbox"/>	3. Other:				
E	CONFIGURATION	YES	NO	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	The aircraft complies with the titles and numbers of all modifications, in addition and changes which were made in order to substantiate the incorporation of the CMP standard in the aircraft?	<input type="checkbox"/>	<input type="checkbox"/>		
2	The CMP is established and provided for assessment?	<input type="checkbox"/>	<input type="checkbox"/>		
F	SYSTEMS INSTALLATION	YES	NO	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Single navigation system installed?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Dual navigation systems installed?	<input type="checkbox"/>	<input type="checkbox"/>		
3	Single long-range navigation system installed?	<input type="checkbox"/>	<input type="checkbox"/>		
4	Dual independent long-range navigation systems installed?	<input type="checkbox"/>	<input type="checkbox"/>		
5	Triple independent long-range navigation systems installed?	<input type="checkbox"/>	<input type="checkbox"/>		
G	NAV SYSTEM CAPABILITY	YES	NO	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	The aeroplane position is automatically determined from VOR/DME sensors?	<input type="checkbox"/>	<input type="checkbox"/>		
2	The aeroplane position is automatically determined from INS/IRS systems with automatic updating from suitable radio based navigation equipment?	<input type="checkbox"/>	<input type="checkbox"/>		
3	The aeroplane position is automatically determined from INS/IRS systems without automatic updating from suitable radio based navigation equipment?	<input type="checkbox"/>	<input type="checkbox"/>		

4	The aeroplane position is automatically determined from independent stand-alone) GPS systems?	<input type="checkbox"/>	<input type="checkbox"/>		
5	The aeroplane position is automatically determined from FMS / Multisensor navigation systems integrating	<input type="checkbox"/>	<input type="checkbox"/>		
H	APPLICABLE PBN LIMITATIONS	YES	NO	Applicable Limitation	Acceptable?
1	Will aircraft operation in designated RNAV-5 airspace is limited to a maximum 2-hour time limit because the INS/IRS system installation does not have automatic navigation updating of INS/IRS position?	<input type="checkbox"/>	<input type="checkbox"/>		
2	Will aircraft operations in designated RNP-10 or NAT-MNPS airspace is limited to a maximum 6.2-hour time limit because the INS/IRS system installation does not have automatic navigation updating of INS/IRS position?	<input type="checkbox"/>	<input type="checkbox"/>		
3	For RNAV operations based on stand-alone GPS navigation equipment, the availability of GPS integrity is confirmed and obtained from RAIM prediction program that is provided in the GPS unit in the aeroplane?	<input type="checkbox"/>	<input type="checkbox"/>		
4	For RNAV operations based on stand-alone GPS navigation equipment, the availability of GPS integrity is confirmed and obtained from RAIM prediction program run outside the aeroplane?	<input type="checkbox"/>	<input type="checkbox"/>		
5	The aircraft is limited to RNAV flights where maximum RAIM outages do not exceed 5 minutes if equipped with a stand-alone GPS approved IAW TSO-C129, which does not provide pseudorange step detection and health word checking functions?	<input type="checkbox"/>	<input type="checkbox"/>		
6	For RNP-10 and NAT-MNPS operations with a stand-alone GPS, the GPS integrity is confirmed and obtained from an approved dispatch fault detection and exclusion (FDE) availability prediction program?	<input type="checkbox"/>	<input type="checkbox"/>		
7	Aircraft has dual long range communication (LRCS) equipment (HF Voice / Data Link, SATCOM, etc.) installed and operational for the conduct of extended overwater operations?	<input type="checkbox"/>	<input type="checkbox"/>		

I. ADDITIONAL INFORMATION PERTINENT TO THIS APPLICATION:
 This space is provided for inclusion of information could not be inserted in the available category and spaces provided on front of form.

J. NAVIGATION APPROVALS REQUESTED FOR AIRCRAFT

YES	NAV SPECIFICATION	YES	NAV SPECIFICATION	YES	NAV SPECIFICATION
<input type="checkbox"/>	1. RNAV-10	<input type="checkbox"/>	5. RNP-4	<input type="checkbox"/>	9. RNP-0.3
<input type="checkbox"/>	2. RNAV-5	<input type="checkbox"/>	6. RNP-2	<input type="checkbox"/>	10. RNP APRCH
<input type="checkbox"/>	3. RNAV-2	<input type="checkbox"/>	7. Advanced RNP	<input type="checkbox"/>	11. RNP-AR-APRCH
<input type="checkbox"/>	4. RNAV-1	<input type="checkbox"/>	8. RNP-1	<input type="checkbox"/>	12. Baro-VNAV

K. APPLICANT'S CERTIFICATION— The undersigned certifies that all statements and answers provided on this aircraft conformity report are complete and true to the best of my knowledge and agree that they are to be considered as part of the basis for issuance of any PBN approval.

A person shall not with intent to deceive or make any false representation for the purpose of procuring for himself or any other person the grant, issue, renewal or variation of any such ...approval...

DATE: _____ MAINTENANCE DIRECTOR SIGNATURE: _____

L. PBN CONFORMITY ACCEPTABLE:

1. <input type="checkbox"/> APPROVED (Aircraft added to the operations specifications with PBN authority. <input type="checkbox"/> Initial <input type="checkbox"/> Renewal <input type="checkbox"/> All Requests Granted <input type="checkbox"/> Limitations	2. <input type="checkbox"/> DISAPPROVED
3. Signature of Approving Official	4. Title
5. Date	

End of Advisory Circular