Asia-Pacific
Economic Cooperation

Performance-Based Navigation Regulatory Review and Evaluation Program (PBNRREVP)

Manila, The Philippines

Transportation Working Group (TPTWG)
Aviation Experts Group (AEG)

November 2012

APEC Project TPT 06/2011A

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APEC#212-TR-01.4

TABLE OF CONTENTS

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1. INTRODUCTION

APEC, through the Transportation Working Group (**TPTWG**), is funding the Performance-Based Navigation Regulatory Review and Evaluation Program (PBNRREVP) which aims to assist developing APEC member economies with meeting the requirements of the International Civil Aviation Organization (**ICAO**) to file a Performance-Based Navigation (PBN) Implementation Plan, and actively engage in following through with all aspects of implementation, particularly establishing the proper regulatory safety oversight of related procedures.

To execute this program APEC has contracted the Ambidji Group to coordinate the work of a team of experts on Performance-Based Navigation to share safety oversight training and best practices with Civil Aviation Authority of the Philippines (**CAAP**) staff and other local stakeholders.

This report documents the visit to The Philippines by an APEC team of experts between 5 and 9 November 2012.

1.1. Background

Performance-Based Navigation has enormous, proven benefits to the aviation community, for conserving resources (i.e. saving fuel), reducing the environmental impact (i.e. reduced CO_2 emissions and noise in populated areas due to more efficient flight routing), and reducing accidents (i.e. stabilized instrument procedures and increased accurate flight positioning). However, many APEC member economies are proceeding very slowly with implementation, primarily due to lack of information or misinformation regarding international and domestic requirements for implementing related technologies and procedures.

To date, the ICAO Performance-Based Navigation (**PBN**) Task Force has made significant progress in developing PBN implementation guidance and establishing broad regulatory requirements. It has set ambitious regional goals for procedural implementation and regulatory oversight of related activities to be carried out by individual economies. The Task Force has set deadlines for submitting plans to ICAO by the end of 2016 in line with ICAO Assembly Resolutions, established a PBN flight procedural design office in Beijing as a resource to all Asian ICAO states and acted as ICAO's review board for evaluating the quality and feasibility of each State's PBN Implementation Plans.

Despite this level of ICAO support, many developing APEC member economies are still struggling with successful PBN implementation plans, specifically the components of safety regulatory oversight, development of PBN procedures that would fit their airspace needs and establishing required equipage for local fleets.

1.2. Project Objectives

The overall project objective is to address the primary impediments to developing and implementing a robust PBN Implementation Plan. These include: a lack of clear guidance for regulatory oversight needs, standards and best civil aviation authority practices; difficulty developing the PBN procedures; and safely implementing procedures once developed. Emphasis will be placed on providing additional guidance to assist in understanding the already-established international regulatory requirements and clarifying what domestic regulations and policy guidance needs to be developed for successful implementation.

There are three key objectives to this project:

1. Ensure that the Philippines PBN Implementation Plan is mature, includes all necessary Basic Plan Elements (**BPE**) outlined in the Asia-Pacific Regional PBN Implementation Plan and meets the needs of local aviation stakeholders:

2. Create an action plan for participants to follow through with PBN implementation activities that includes further development of regulations and guidance material that may be needed; and

3. Training with respect to identifying common implementation challenges and how to overcome them with respect to developing PBN procedures, flight validation, and the development of a common set of recommendations and strategies based on experience that can be used by the participants to ensure successful PBN implementation.

1.3. APEC Team

The APEC Team consists of PBN experts including:

- Mr Robert Kennedy (Ambidji Group) Project Co-ordinator;
- Mr Noppadol Pringvanich, Director, Procedure Design for Air Navigation Services, AEROTHAI and Manager, ICAO Asia Pacific Flight Procedures Programme, Beijing;
- Mr Kazuto Shiba, Manager Route Planning, All Nippon Airways Co., Ltd (**ANA**); and
- Mr Tass Hudak, The Mitre Corporation.

2. TERMS OF REFERENCE

Based on discussions with CAAP staff and taking into account the considerable amount of PBN development work already completed in the Philippines, the Terms of Reference were developed to include the following:

1. Review CAAP PBN operational regulatory documentation and recommend any required amendments.
2. Review the CAAP Flight Standards Inspectorate Service (**FSIS**) procedures for administration of PBN approvals and surveillance and provide training or other assistance as required.
3. Work with FSIS inspectors to review existing airline PBN operating approvals (including operating manuals, procedures and flight crew training) to determine if any action is required on the part of the CAAP and airlines to meet current industry standards for PBN operations.
4. Work with CAAP staff to assist in developing regulatory material to manage validation of instrument flight procedures.
5. Review the Aerodromes and Air Navigation Safety Oversight Office (**AANSOO**) PBN regulatory documentation and recommend any required amendments.
6. Review the PBN standard operating procedures and training provided to Air Traffic Services (**ATS**) staff (including AANSOO officers) and recommend any additional actions required
7. Work with CAAP staff to assist in developing policy and regulatory material for the administration of third party procedure designers.

A copy of the Terms of Reference is included at Appendix A.

3. PROGRAM

The program of activity was completed as set out in the table below.

<table>
<tr><th colspan="6">APEC PBN VISIT</th></tr>
<tr><th colspan="6">SCHEDULE</th></tr>
<tr><th>Timing</th><th>Day 1 (Mon)</th><th>Day 2 (Tues)</th><th>Day 3 (Wed)</th><th>Day 4 (Thur)</th><th>Day 5 (Fri)</th></tr>
<tr><td>0900
1015</td><td>Registration and Opening Ceremony</td><td rowspan="2">Flight Operations
Review existing PBN Regulatory Documentation (Agenda Item 1)</td><td rowspan="2">Flight Operations
Review existing airline operating approvals (Agenda Item 3)</td><td rowspan="2">Air Traffic Services
Review PBN ATS regulatory documentation and procedures (Agenda Item 5)</td><td rowspan="2">Procedure Design
Develop policy and regulatory material for 3rd party designers (Agenda Item 7)</td></tr>
<tr><td>1030
1200</td><td>Program Outline Briefing</td></tr>
<tr><td>1200
1300</td><td>LUNCH</td><td>LUNCH</td><td>LUNCH</td><td>LUNCH</td><td>LUNCH</td></tr>
<tr><td>1300
1415</td><td rowspan="2">Review of PBN Implementation Plan and PBN Achievements in the Philippines</td><td rowspan="2">Flight Operations
Review PBN Approvals administration procedure (Agenda Item 2)</td><td rowspan="2">Flight Operations
Flight Validation Regulations and Oversight (Agenda Item 4)</td><td rowspan="2">Air Traffic Services
Review PBN ATS training and operating procedures (agenda Item 6)</td><td>Conclusion and Debriefing</td></tr>
<tr><td>1430
1600</td><td>APEC Team Departs</td></tr>
</table>

Program Attendance

The program was very well attended with a total of 48 persons including 33 CAAP staff and 15 airline representatives.

Feedback from attendees was very positive indicating that respondents considered the Program to be extremely useful. Notable amongst the comments received is the view that continued training and regular review is required to assist in maintaining The Philippines PBN Implementation Programme.

A copy of the participant survey and summary of the feedback received is included at Appendix I.

Day 1: Review of PBN Implementation in The Philippines

Following team and attendee introductions an overview of the program agenda was completed. A review was conducted of PBN Implementation in The Philippines and CAAP staff provided a number of presentations.

Flight Procedure Design

The design of PBN Instrument Flight Procedures (**IFP**) is on track in accordance with the priorities determined by the Flight Procedures Program (**FPP**)/ Cooperative Development of Operational Safety and Continued Airworthiness Programme (**COSCAP**) PBN Implementation Workshop conducted in Manila in October 2011.

Three airports remain to be completed in 2012, seven airports are to be completed in 2013 and ten airports are to be completed in 2014.

Eight flight procedure designers have completed PBN training at the Singapore Aviation Academy, Ecole Nationale de L'Aviation Civile (**ENAC**) in Toulouse, and ICAO Flight Procedures Program (**FPP**) Beijing. On-the-Job (**OJT**) Training is ongoing. Flight procedure designers have completed Obstacle Survey and Ground Validation training with Japan International Cooperation Agency (**JICA**) and two airspace concept workshops have been conducted in Manila and Davao.

PBN concept training for Air Traffic Controllers has been conducted. Specific training in PBN procedures has been conducted at airports where PBN procedures have been implemented.

Simulator training for Required Navigation Performance Approach (**RNP APCH**) procedures has been completed with Philippine Air Lines (**PAL**) and Cebu Pacific Air.

Several pilots from the Flight Inspection and Calibration Group (**FICG**) attended the FPP Flight Validation Pilot Course conducted in Manila in June 2012.

ATS has been handling many issues that are properly the responsibility of the FSIS. There is a need for training of Flight Operations Inspectors in order to take over this role.

Implementation of PBN at a number of airports is delayed pending validation of instrument flight procedures. Validation has been delayed due unserviceability of the FICG aircraft and the installation of Global Navigation Satellite System (**GNSS**) receiver in the CAAP Cessna 206 (**C206**) aircraft.

At Ninoy Aquino International Airport (**NAIA**) Standard Instrument Departure (**SID**) and Standard Terminal Arrival (**STAR**) procedures are only being used at certain times. The Terminal Area (**TMA**) in Puerto Princesa requires expansion and there is a need for a Memorandum of Agreement (**MoA**) between Manila ACC and Approach Control.

Air Traffic Controllers (ATC) requires further training. Procedures for Iloilo, Puerto Princesa, and NAIA have not been fully implemented because ATCs are not well prepared to handle the mixed equipage environment. It is not clear to ATC which airlines are currently authorised to conduct PBN operations and co-ordination is required to permit airlines to use PBN procedures in Visual Meteorological Conditions (VMC) for training and familiarisation prior to full implementation.

Problems continue with obstacle surveys. Only two surveys out of 14 required surveys have been completed. It was noted that a procedure designer can verify obstacle data with a handheld Global Positioning System (**GPS**) receiver and other means to verify height that are not "certified" by other means.

Automation of data management is required to replace the current manual system.

Cases where obstacles penetrate the Visual Segment Surface (**VSS**) are presenting some difficulty.

Recommendation:

- *Procedures are established for qualified flight validation pilots to evaluate the significance of VSS penetrations and determine any mitigation required.*

Philippines PBN Implementation Plan Review

The latest version of the Philippines PBN Implementation Plan was reviewed. The Philippines PBN Implementation Plan has been assessed by the ICAO Regional PBN Task Force as robust which is a significant achievement.

Recommendations:

- *The Philippines PBN Implementation Plan is updated as follows: Navigation specifications should conform to Edition 4 of ICAO Doc 9613 PBN Manual.*

  *The graphic on Page 13 of the PBN Implementation Plan should be updated to replace Area Navigation (**RNAV**) 2 with Required Navigation Performance (**RNP**) 2;*

  The CAAP policy that no new Non-direction Beacons (NDB) would be installed and no existing NDBs will be replacing when they reach the end of their life should be included.

- *CAAP issues an Aeronautical Information Circular (**AIC**) to advise operators that SIDs and Stars will be re-issued as RNP 1, providing sufficient time for operators to comply.*
- *Implementation of RNAV 1 SIDs and STARs in The Philippines with the requirement for GNSS equipage should be replaced by RNP 1.*

Philippines National PBN Working Group

A National PBN Working Group had been established but meetings have been held irregularly.

Recommendations:

- *The National PBN Working Group convenes regularly to review PBN Implementation progress.*
- *One of the tasks of the Working Group should be to review and update the PBN Implementation Plan.*

Operations

Regulatory documentation relating to PBN Operational Approval has been published and will be reviewed during the APEC Team visit. No operational approvals have been issued using the new regulatory documentation. The APEC Team advised that authority to fly a PBN procedure is given by the operator having an appropriately annotated Operations Specification (**OPSPEC**).

Although some Philippine carriers have PBN OPSPECs the issue of PBN approvals is not supported by available records detailing the process for authorisation.

No operational approvals have been issued by the Flight Operations Division (**FOD**) which is responsible for all operators except Philippine Air Lines and Cebu Pacific Air Airlines. No FOD inspectors have been trained in PBN operational approval.

Comment was made by participants that there is a need to review each of the airports on the revised priority list to improve collaboration between all stakeholders so that input may be provided to resolve operational issues.

Recommendations:

- *CAAP and Airlines review PBN documentation, training and operations in order to ensure continued conformance to the ICAO Performance-Based Navigation Manual.*
- *Inspectors from the FOD undertake PBN Operational Approval training as soon as possible.*
- *CAAP considers initially limiting PBN approach and departure operations to Visual Meteorological Conditions (VMC) for a period of time to enable ATC and airlines to become familiar with PBN operations.*

Air Traffic Services

Air Traffic Services (**ATS**) has not yet updated the CAAP Air Traffic Services Manual to provide for PBN operations.

AANSOO is considering drafting a regulation for the approval and oversight of procedure design organisations both government and private.

Discussion

Validation: The validation process as described in ICAO Doc 9906 *Quality Assurance Manual for Flight Procedure Design* was explained by the APEC Team. The APEC Team advised that flight validation with an aircraft is required unless it can be determined that all aspects of the procedure can be validated by other means.

It was agreed that in The Philippines flight validation will usually be required as it is unlikely that this condition can be met. The APEC Team explained that operators do not need to validate procedures except in the case of RNP AR, where individual Flight Management System (FMS)/airframe combinations can have significant consequences on the procedure performance.

The APEC Team advised that irrespective of the person that conducted the validation (CAAP/Airline/Third Party) that the responsibility to ensure the process was completed remains with the State. It was also noted that the State has the power to change the regulation and issue guidance on when flight validation is required.

Recommendation:

- *CAAP establishes a process for the administration of instrument flight procedure validation.*

GNSS Availability Prediction: The requirement for CAAP to provide an RNP availability prediction service was discussed and several systems operating in a number of economies were considered. It was noted that prediction for RNP 1 or greater operations may be obviated by an analysis for the Philippines Flight Information Region (**FIR**) that prediction is not required provided a minimum number of satellites are in service. Prediction for approach operation would still be required.

Recommendations:

- *The Philippines participate in the Regional programme being developed by AEROTHAI and ICAO.*
- *CAAP should determine if a public service is to be provided or operators will be required to provide their own prediction services.*

ICAO PBN Documentation Update

Mr Noppadol Pringvanich demonstrated the use of the ICAO *PBN in a Box* electronic information package and the availability of ICAO PBN documents on the ICAO website including the recent publication of ICAO Doc 9997 PBN Operational Approval Manual.

Revisions to ICAO Doc 9613 *PBN Manual* were explained including:

- RNP 2 en-route and oceanic operations
- RNP 0.3 intended primarily for helicopter operations
- RF leg support for RNP 1 and RNP APCH
- Advanced RNP
- Renaming Basic RNP 1 to RNP 1.

Flight Validation Aircraft

After the plenary session the APEC Team visited the FICG facilities at NAIA to inspect the installation of GNSS in the Cessna C206 aircraft.

Day 2/3: Flight Operations Regulatory Development

The second and third days of the Program were allocated to assisting with the development of the CAAP regulatory framework to support implementation of PBN.

PBN Regulatory Provisions

The following PBN regulatory documents have been issued in The Philippines:

- Philippines Civil Aviation Regulations (PCAR) Parts 7, 8 and 9 contain sections relating to PBN.
  - Part 7 *Instrument and Equipment*
  - Part 8 *Operations*
  - Part 9 *Air Operator Certification and Administration*.
- Advisory Circular (**AC**) 08-007 *Application and Process: Performance-Based Navigation*
- Manual of Special Operations Approvals Chapter 5

PBN Operations

Manila (NAIA): The situation at NAIA where operations are dependent upon PBN approaches when the ILS is not available was discussed. Currently, although PBN approaches are available, only a few operators are approved to conduct RNP APCH operations. CAAP should consider mandating PBN approach capability as a requirement for operations at NIAA.

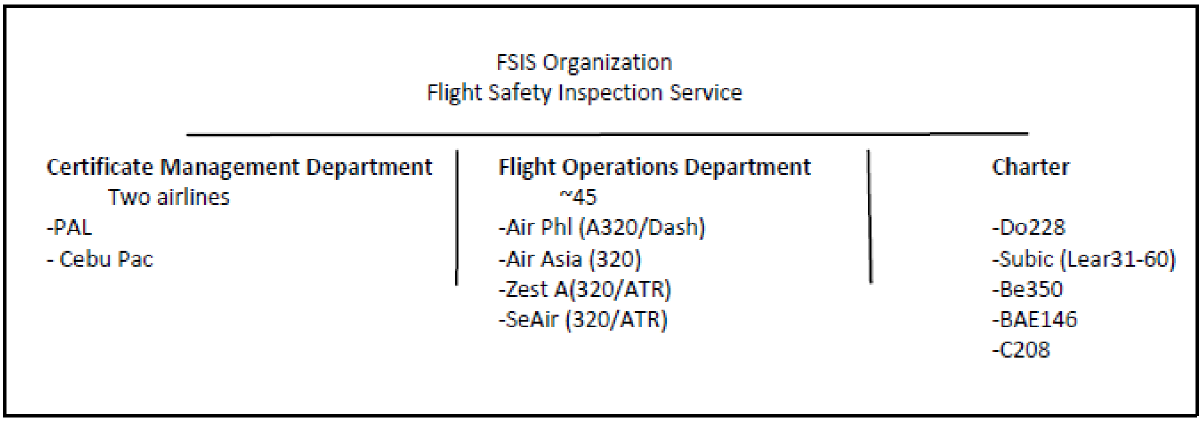
Recommendation:

- *CAAP publishes a notice (AIC) to advise operators of minimum equipment/PBN requirement to operate in Manila airspace by a date to be determined by CAAP.*

Operations Inspectors: Although Chapter 5 of the Manual of Special Operations Approvals contains qualification requirements for operations inspectors who administer PBN approvals there is no clear guidance on how operations inspectors are qualified.

FSIS Operational Responsibilities: The structure and responsibility for PBN Operational Approval by FSIS was reviewed. PAL and Cebu Pacific Air are the responsibility of the Certification Management Department (CMD), and a number of Inspectors have attended COSCAP Operational Approval Training.

The Flight Operations Department (FOD) is responsible for a large number of operators (refer to diagram) but no FOD inspectors have been trained in PBN Operational Approval.



Recommendations:

- *FOD inspectors attend the next available Operational Approval Course as a matter of urgency.*
- *Certificate Management Division (**CMD**) inspectors who have completed training provide assistance and On-the-Job Training (**OJT**) experience for FOD inspectors.*

Note: Discussions between CAAP and FPP/COSCAP have been initiated and it is proposed that CAAP hosts a COSCAP PBN Operational Approval Course early in 2013. The course is to be open to other States in the Region.

PBN Approval Status of Airlines

Philippines Airlines: PAL has some PBN approvals although only the Airbus A320 aircraft appear to be approved for RNP APCH. Annotations of approval in some cases do not conform to the PBN Manual.

Cebu Pacific Air: A320/321 aircraft are approved for:

- RNP 10
- RNAV 5
- RNP 1
- RNP APCH.

Other major operators such as Zest and Air Philippines do not have operations specifications indicating operational approval for RNP APCH.

Records of the approval process are not available to enable determination of the approval process that was applied to the granting of existing PBN approvals. It was agreed by both CAAP and representatives of the airlines that it is timely to conduct a review of existing approvals to ensure continued conformance with ICAO guidance.

Recommendations:

- *CAAP with the co-operation of the airlines conducts a review of existing PBN approvals*
- *CAAP review the Operating Specification PBN endorsements to conform to ICAO Navigation Specification abbreviations.*
- *CAAP does not withdraw any existing approvals pending the review.*
- *CAAP conducts the review within a reasonable time frame such as the end of 2013.*

PBN Operations by Persons Not Operating Under an AOC

Provision for PBN operations not conducted under an AOC was discussed. Several examples of arrangements existing in other States were considered. Amendment is required to PCAR Part 8 to authorise PBN operations in these cases provided:

1. The pilot has completed training for the PBN operation;
2. The aircraft meets the relevant equipment requirements.

Review of Regulatory Documents

The relevant sections of CAAP regulatory documents were reviewed and amendments, where necessary, were proposed. Copies of the relevant sections of these documents including proposed amendments are included in the Appendices to the Report as follows:

Philippines Civil Aviation Regulations

- Part 7 *Instrument and Equipment* — Appendix C;
- Part 8 *Operations* — Appendix D;
- Part 9 *Air Operator Certification and Administration* — Appendix E;
- Advisory Circular (**AC**) 08-007 *Application and Process: Performance-Based Navigation* — Appendix F;

- Draft Policy Statement: *Flight Validation* Appendix G;
- Manual of Special Operational Approvals, Chapter 5 No Appendix (see detailed commentary below).

Recommendation:

- *That the regulatory document updates are implemented and reviewed by the Regulatory Standards Department (RSD).*

Advisory Circular (AC) 08-007: AC 08-007 contains detailed requirements for PBN operations. A comprehensive review of the AC was completed and numerous recommendations for amendment were drafted.

Manual of Special Operational Approvals, Chapter 5 Performance-Based Navigation Approvals: The provisions in Chapter 5 of the Manual were reviewed and it was noted that this document applied principally to the regulator (CAAP) whereas the AC 08-007 applies to the operator.

It was noted that CAAP regulatory and guidance information uses the word "Certified" where ICAO uses “Approval”. The APEC Team and participants agreed that in the Philippines the terms "Certified" and "Approved" in the context of operations may be used interchangeably.

It was noted that Chapter 5 is basically a copy of the text contained in AC 08-007 and that the amendments proposed to the AC should be repeated in the Manual of Special Operations.

FICG Draft Flight Validation Policy Document: The FICG draft Flight Validation Policy Statement was reviewed and edited. The policy document is specifically intended to address the flight validation of PBN procedures. The Flight Validation Policy is to be incorporated in the Air Navigation Services Regulations.

The APEC Team provided a briefing on the validation of flight procedures in accordance with the guidance provided in ICAO Doc 9906 *Instrument Quality Assurance Manual for Flight Procedure Design Volume 5*.

It was noted that there is a distinction between regulation and policy and that some rewording may be needed before finalising this draft regulation.

The group discussed the availability of data used for flight validation including the use of manually entered data which is the only method available to FICG, and the use of a test database on floppy disk which is generally available for airlines with the support of third party designers, such as *Quo Vadis*.

The wording in the policy statement with regard to the assignment of responsibility for various stages of the validation process was discussed.

The assignment of overall responsibility for procedure development to a “sponsor” was discussed at length. It was agreed that it is necessary to assign the responsibility to ensure that validation including flight validation is complete. While the actual flight validation may be carried out by a third party it is the responsibility of the FICG to ensure that flight validation is properly completed.

AANSO is responsible for ensuring proper validation of IFPs is conducted

Recommendation:

- *The requirement for navigation aid (navaid) analysis is removed as it is not relevant to PBN operations in The Philippines.*

Day 4 Air Traffic Services

Attendees: Representatives of the following sections were present.

- ATS Planning;
- FICG;
- ATS Training and Progression (and Administration);
- Approach Division;
- Approach Radar;
- AANSO;
- Flight Procedure Design;
- Manager for ATC; and
- Air Asia.

Operator PBN Capability: Concern was expressed that when the ILS is out of service at Manila ATC may not be aware of the PBN capability of operators and CAAP Flight Operations had been asked to provide a list of capable operators. The response from flight operations and a number of OPSPECs were examined. It was evident that the information provided to ATS was not complete or accurate and that some OPSPECs were not correctly annotated and, therefore, operational capability was not clearly established.

Mandate for PBN Capability: The APEC Team suggested that the consequences of outages to conventional navaids at Manila may warrant the mandating of RNP APCH capability so that operations can be continued with minimum disruption. Examples of other States' proposals for requiring PBN capability such as Hong Kong and Indonesia were provided.

New ICAO Flight Plan Coding: The provisions for identifying specific PBN operational capability on the new ICAO flight plan effective 15 November 2012 were explained. ATS had expressed some concerns previously in regard to identifying operator capability to conduct PBN operations. It was explained that with the introduction of the new flight plan format ATC will be able to determine capability directly from the flight plan/flight progress strip and it will not be necessary in future to ask the operator or CAAP flight operations for information on PBN capability.

Initially The Philippines will not have a converter available to read flight plan codes so the system will need to be manual.

There is some concern that the new flight plan PBN coding will create workload issues however it was explained that workload will be reduced as there will not be a need for communication with individual aircraft to determine capability. Eventually in the same way that ILS VOR and DME are standard equipment PBN capability will be common.

ATC Training: Training for ATCs has been provided at airports where PBN procedures are being implemented. To date the training has been provided by flight procedure designers although there are plans for this work to be undertaken by the ATC training section.

At present a "train the trainer" model is being applied to provide training initially only to ATS managers, who are expected to take this knowledge back to their area of responsibility.

The APEC Team outlined the training required for air traffic controllers and noted that “core training” has not yet been provided in The Philippines. ATS expects to have a core training program for controllers by 2013.

Recommendation:

- *All ATCs receive PBN core training as soon as possible.*

Manual of Air Traffic Services (MATS): It was explained that there are no regulations that need to be drafted with respect to ATS but the MATS needs to be amended to include PBN operating procedures. There are some specific procedures relating to PBN that must be included in the MATS such as vectoring procedures, phraseology, separation standards, etc. The Philippines MATS has not yet been amended.

Safety Management: It was emphasised that the safety management applicable to PBN applied to the management of implementation not to the navigation systems which have already been demonstrated to be safe.

ATS Oversight: In order for the AANSOO to provide competent oversight of PBN operations and flight procedure design and implementation there is an urgent need for AANSOO staff to undertake appropriate training.

ICAO Mandate for PBN Implementation: A question was asked in regard to the requirement to implement PBN. The APEC Team outlined the content of ICAO Assembly Resolution A37-11 which urges States to implement PBN on efficiency and safety grounds.

Airspace Design: There was discussion with regard the need to redesign airspace to accommodate PBN operations. It was noted that 2 airspace design workshops had been conducted in The Philippines. The design of airspace appears to have been delegated to the Flight Procedure design office, however the APEC Team considers that ATS should take responsibility for airspace management.

Integrity Prediction Services: Concerns were raised in regard to the responsibility of ATS to provide a publicly available integrity prediction (RAIM) service and several options were discussed. The APEC Team explained that while integrity prediction was fundamentally the responsibility of the operator, many States had opted for providing a public service for the use of all operators.

It had been earlier identified in the Philippine Implementation Plan that it may be possible to ensure satisfactory GNSS availability in the Philippines FIR by an analysis of satellite coverage, avoiding the need for prediction services for individual operations. It was also noted that prediction for approach operations are still required and that RNP AR APCH requires that the operator conduct integrity prediction for the specific aircraft type and equipment.

Day 5: Flight Procedure Design

Attendees: Representatives of the following sections were present.

- IFP Designers;
- CMD POI;
- FOD Safety Inspectors;
- Ms Celine Baillard, Quo Vadis.

IFP Design Regulatory Structure: The group discussed the need for a regulatory environment that ensures that both the government design office and commercial designers conform to the guidance in ICAO Doc 9906 *Quality Assurance Manual for Flight Procedure Design*.

IFP Design Oversight: The need for the oversight of IFP designers was identified, although it is of concern that AANSOO does not have any staff qualified to provide the necessary oversight. AANSO needs to develop their expertise in order to provide proper oversight

The Airspace and Flight Procedures Division (**AFPDD**) is developing their Operations Manual to conform to the guidance in ICAO Doc 9906.

Administration of Third Party Designers: Several models employed by a number of States were discussed. The process used in Australia (Civil Aviation Safety Regulations CASR Part 173), which requires the State, as well as third party design organisations, to obtain an IFP design certificate was explained.

The Federal Aviation Administration (**FAA**) and the Australian Civil Aviation Safety Authority (**CASA**) process for accepting procedures for publication based on the continued authority of third party procedure designers was outlined.

Essentially a suitable system must provide for at least two qualified IFP design personnel to design and independently check each design.

It was noted that *Quo Vadis*, who are currently designing procedures at 6 airports in The Philippines does not have a Letter of Authorisation (**LOA**) from another State for the design of IFPs however *Quo Vadis* procedure designers hold a certificate issued by the Directorate General of Civil Aviation (**DGCA**) France. *Quo Vadis* confirmed that they conform to the requirements of ICAO Doc 9906. It was also noted that CAAP has a Memorandum of Understanding (**MoU**) with DGCA France with regard to the support for *Quo Vadis* procedure design in The Philippines which provides for designs to be certified by the DGCA and accepted by CAAP. *Quo Vadis* also provides all information to CAAP to enable checking and verification of designs.

CAAP advised that the present arrangements with *Quo Vadis* are considered satisfactory pending development of Philippine regulatory requirements.

It was pointed out that although *Quo Vadis* is providing validation of designs that CAAP remains responsible and must ensure that all validation activities are completed to CAAP requirements.

Flight Validation: It was agreed that the FICG is responsible to ensure that all procedures are validated irrespective of the party that actually carries out the validation tasks. For procedures designed by AFPDD flight validation will normally be conducted by FICG. Where third party designers are involved the FICG may carry out flight validation or supervise validation carried out by others.

The issue of conducting flight validation on a revenue flight was discussed although there was no agreement on policy. It was suggested by the APEC Team that if CAAP did not wish to approve validation on a revenue flight that validation could be economically carried out during the turn-around for a commercial operation without passengers. It was noted that much of the flight validation can often be completed in a simulator and only limited on-site flying is normally required.

Recommendations:

- *The Philippines adopt a similar structure to other States to authorise the design of IFPs including procedures designed by third party designers.*
- *In the interim, CAAP issues a limited authority to designers subject to formal approval by a reasonable date by which time all design organisations should be required to obtain formal authorisation by CAAP within two years.*

4. SUMMARY

The PBNRREVP Team visit to The Philippines has been an excellent opportunity to review the considerable progress already made in The Philippines and to move forward with the development of a sound regulatory environment for the implementation of PBN.

The Program was very well supported and all sections of the CAAP and a number or airlines contributed enthusiastically.

While progress has been made in The Philippines there remains considerable work to be completed. The design of IFPs is proceeding on target to achieve the timeline set by ICAO for PBN implementation; however there are significant issues relating to flight operations, particularly within the Flight Operations Department and AANSOO.

CAAP has developed a regulatory framework which provides a good foundation. The APEC PBNRREVP Team site visit, supported by excellent participation of CAAP staff and airline personnel, has enabled considerable progress to be made in the further development of the regulatory provisions. The APEC Team regulatory review has resulted in the recommendation of a number of amendments to the Philippine Civil Aviation Regulations, Advisory Circular 08-007 and the Manual of Special Operations Approvals.

5. KEY ACTION ITEMS

Action is required in the following key areas:

1. Training for flight operations inspectors in the Flight Operations Department is urgently required.
2. Amendment to PCARs, AC 08-007 and Manual of Special Operational Approvals Chapter 5 is required.
3. CAAP should consider the mandating of PBN capability in order to minimise disruption at key airports when conventional navigation systems are unavailable.
4. CAAP should establish a regulatory process to ensure that procedure design, including design by internal and third party designers is completed in accordance with ICAO Doc 9906 *Quality Assurance Manual for Flight Procedure Design.*
5. The training of ATC staff must be completed as planned and in a timely manner to ensure that there is no delay to the implementation of PBN procedures.
6. The Philippines PBN Working Group should convene regularly to support and monitor the implementation of PBN.
7. CAAP should publish information to advise the Industry (domestic and foreign) of the Philippines PBN Implementation strategy and timeline.
8. CAAP should actively encourage air operators to obtain PBN operational approval in order to obtain tangible benefits from the PBN Implementation Program.

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APPENDIX A

Philippines PBNRREVP Terms of Reference

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PROPOSED TERMS OF REFERENCE

PERFORMANCE BASED NAVIGATION REGULATORY REVIEW AND EVALUATION PROGRAM

Manila Philippines 5th - 9th November 2012

ASIA-PACIFIC ECONOMIC COOPERATION (APEC)

17 October, 2012

AMBIDJI

A.C.N. 053 868 778

Melbourne, Australia

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TABLE OF CONTENTS

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PROPOSED TERMS OF REFERENCE

APEC PBNRREVP IN PHILIPPINES

1. INTRODUCTION

APEC, through the Transportation Working Group, is funding the "Performance Based Navigation Regulatory Review and Evaluation Program (PBNRREVP) which aims to assist developing APEC economies with meeting the International Civil Aviation Organization (ICAO)'s requirements to submit a Performance Based Navigation (PBN) implementation plan, and actively engage in following through with all aspects of implementation, particularly establishing the proper regulatory safety oversight of related procedures.

To execute this program, APEC has contracted with the Ambidji Group to coordinate the work of a team of experts on Performance Based Navigation to share safety oversight training and best practices with CAAP staff and other local stakeholders.

The project managers wish to invite the Civil Aviation Authority of the Philippines (CAAP) to host a one week site visit by an APEC team of PBN experts between 5th November to 9th November 2012.

This document represents the proposed program for the APEC Team site visit which has been developed to build upon recent PBN training and workshop activities that have been completed in the Philippines.

2. BACKGROUND

Performance Based Navigation has proven enormous benefits to the aviation community, both for conserving resources (i.e. saving fuel), reducing the environmental impact (i.e. reduced CO_2 emissions and noise in populated areas due to more efficient flight routing), and reducing accidents (i.e. stabilized instrument procedures and increased accurate flight positioning). However, many APEC economies are proceeding very slow with implementation, primarily due to lack of information or misinformation regarding international and domestic requirements for implementing related technologies and procedures. To date, the ICAO Performance Based Navigation (PBN) task force has made significant progress in developing PBN implementation guidance and establishing broad regulatory requirements. It has set ambitious regional goals for procedural implementation and regulatory oversight of related activities to be carried out by individual economies. The task force has set deadlines for submitting plans to ICAO by the end of 2010 in line with ICAO Assembly Resolutions, established a PBN flight procedural design office in Beijing as a resource to all Asia Pacific ICAO states, and acted as ICAO's review board for evaluating the quality and feasibility of each state's PBN implementation plans.

Despite this level of ICAO support, many developing APEC economies are still struggling with successful PBN implementation plans, specifically the components of safety regulatory oversight, development of PBN procedures that would fit their airspace needs, and establishing required equipage for local fleets.

3. Scope of Work

The site visit portion of this project will include a gap analysis on regulatory matters concerning proper PBN implementation and an evaluation of PBN implementation plans with respect to conforming to international standards, and best practices for managing and safely overseeing the PBN implementation process at the government level.

4. Project Objectives

The overall project objective is to address the primary impediments to developing and implementing a robust PBN implementation plan. These include: a lack of clear guidance for regulatory oversight needs, standards, and best civil aviation authority practices; difficulty developing the PBN procedures; and safely implementing procedures once developed. Emphasis will be placed on providing additional guidance to assist in understanding the already-established international regulatory requirements and clarifying what domestic regulations and policy guidance needs to be developed for successful implementation.

There are three key objectives to this project:

1. Ensure that the Philippines PBN implementation plan is mature, include all necessary Basic Plan Elements (BPEs) outlined in the Asia-Pacific Regional PBN Implementation Plan, and will meets the needs of local aviation stakeholders:

2. Create an action plan for participants to follow through with PBN implementation activities that includes further development of regulations and guidance material that may be needed; and

3. Training with respect to identifying common implementation challenges and how to overcome them with respect to developing PBN procedures, flight validation, and the development of a common set of recommendations and strategies, based on experience that can be used by the participants to ensure successful PBN implementation.

5. APEC TEAM

The APEC Team consists of PBN experts including:

- Mr Robert Kennedy (Ambidji Group) who will act as Project Co-ordinator
- Mr. Noppadol Pringvanich, Director, Procedure Design for Air Navigation Services, AEROTHAI and Manager, ICAO Asia Pacific Flight Procedures Programme, Beijing
- Mr. Kazuto Shiba, Manager Route Planning, All Nippon Airways Co., Ltd (ANA)
- Mr. Tass Hudak, The Mitre Corporation

6. PROPOSED TOPICS

Based on discussions with CAAP staff and taking into account the considerable amount of PBN development work already completed in the Philippines, the following topics are proposed:

1. Review CAAP PBN operational regulatory documentation and recommend any required amendments.
2. Review the CAAP FSIS procedures for administration of PBN approvals and surveillance and provide training or other assistance as required.
3. Work with FSIS inspectors to review existing airline PBN operating approvals (including operating manuals, procedures and flight crew training) to determine if any action is required on the part of the CAAP and airlines to meet current industry standards for PBN operations.
4. Work with CAAP staff to assist in developing regulatory material to manage validation of instrument flight procedures.
5. Review AANSOO PBN ATS regulatory documentation and recommend any required amendments.
6. Review the PBN standard operating procedures and training provided to ATS staff (including AANSOO officers) and recommend any additional actions required
7. Work with CAAP staff to assist in developing policy and regulatory material for the administration of third party procedure designers.

7. Delivery Method

Apart from Day 1 which will be a general and open session, it is proposed that all other sessions will be conducted as “round the table” working groups. This format is intended to permit on-the-job style training and mentoring for the responsible personnel. Where necessary the APEC team will provide briefings and technical advice on specific subjects.

8. Schedule

The proposed schedule is as follows. If required session times can be re-arranged to suit the availability of key staff.

Day I is intended to be a general session and an opportunity for stakeholders to provide input to the APEC team. The proposed activities will be briefed and any additional topics identified which may need to be included in the program.

APEC PBN VISIT

SCHEDULE

Timing	Day 1 (Mon)	Day 2 (Tues)	Day 3 (Wed)	Day 4 (Thur)	Day 5 (Fri)
0900 1015	Registration and Opening Ceremony	*Flight Operations* Review existing PBN Regulatory Documentation (Agenda Item 1)	*Flight Operations* Review existing airline operating approvals (Agenda Item 3)	*Air Traffic Services* Review PBN ATS regulatory documentation and procedures (Agenda Item 5)	*Procedure Design* Develop policy and regulatory material for 3rd party designers (Agenda Item 7)
1030 1200	Program Outline Briefing				
1200 1300	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH
1300 1415	Review of PBN Implementation Plan and PBN Achievements in the Philippines	*Flight Operations* Review PBN Approvals administration procedure (Agenda Item 2)	*Flight Operations* Flight Validation Regulations and Oversight (Agenda Item 4)	*Air Traffic Services* Review PBN ATS training and operating procedures (agenda Item 6)	Conclusion and Debriefing
1430 1600					APEC Team Departs

9. ATTENDANCE

The success of the APEC Team visit depends upon the attendance of CAAP and stakeholder personnel with direct responsibility for the tasks to be reviewed.

The following key personnel should attend.

- **DAY 1:** All stakeholders including:
  AANSOO/ATS staff
  FSIS including CMD and FOD flight safety inspectors
  Flight Procedure Design
  Airline operator senior pilots/training staff
- **DAY 2/3:** Flight Operations Inspectors from CMS and FOD
  Airline senior operational pilots and training staff
  Flight validation pilots (as required)
- **DAY 4:** AANSOO Safety Inspectors
  ATS senior operational and training staff
- **DAY 5:** Flight Procedure design staff
  CMD and FOD flight operations inspectors
  Concluding Session: Open to all stakeholders

10. REFERENCE DOCUMENTATION

Any relevant existing regulatory or guidance documentation should be forwarded to the APEC Team for review prior to the site visit.

11. ASSISTANCE TO THE TEAM MEMBERS BY CAAP

The APEC Team site visit will be fully funded by APEC. However it is requested that CAAP will contribute to the program by providing the venue for the site visit, transport to/from the APEC Team hotel, and lunch/refreshments daily for the APEC Team and CAAP/Stakeholder participants.

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APPENDIX B

Philippines PBN Implementation Plan

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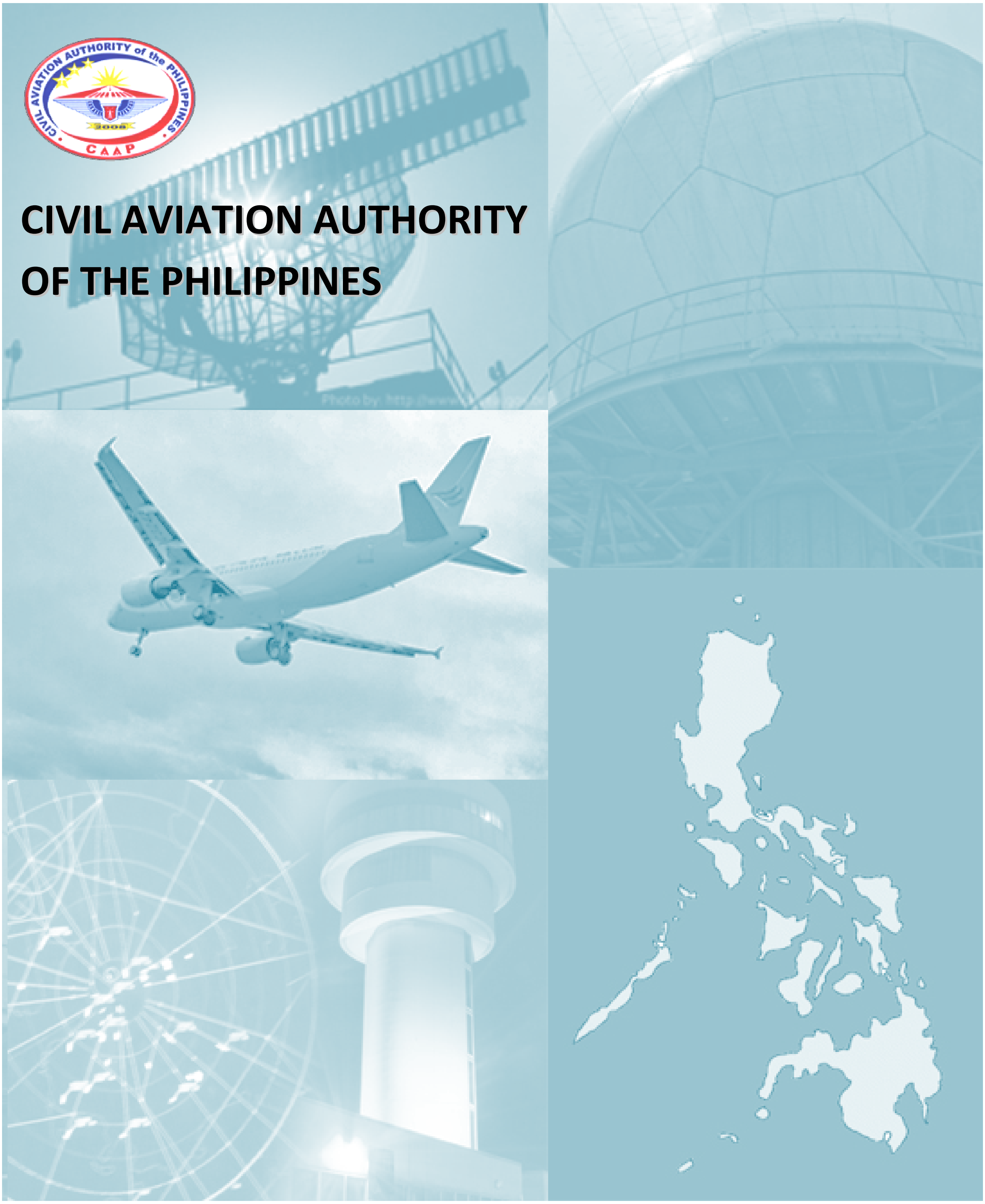
CIVIL AVIATION AUTHORITY OF THE PHILIPPINES



PBN Implementation Plan

VERSION 2.0 AIRSPACE & FLIGHT PROCEDURE DESIGN DIVISION – AIR TRAFFIC SERVICE

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Contents

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Introduction

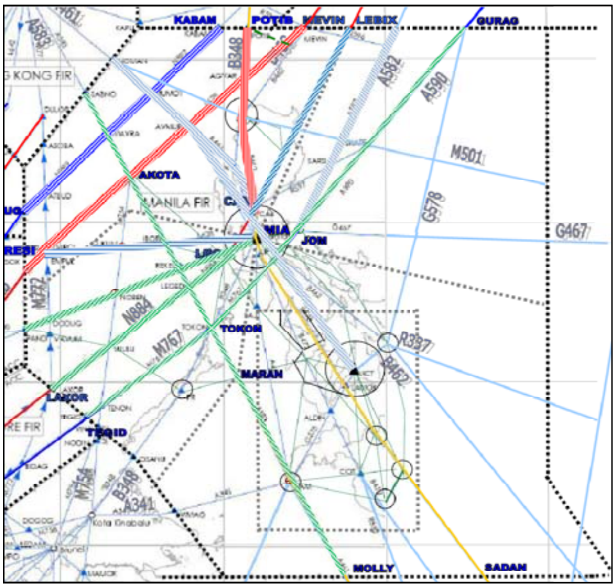
Airspace Capacity

The relentless increase of oil prices and the global financial meltdown did not dampen the air traffic growth in the Philippines. The country's premier airport, Ninoy Aquino International Airport (NAIA), posted 6.46% increase in aircraft movement for the year 2010. Aircraft movement in NAIA has more than doubled in the last ten years.

Traffic in NAIA reaches its maximum capacity during peak hours resulting to flight delays. This increase in international and domestic traffic not only in NAIA but in other airports in the country can be attributed to the aggressive promotion of low cost air travel attracting more passengers who used to take the services of the shipping lines.

In order to decongest traffic in NAIA, ATC procedures and infrastructure improvements are currently being implemented. Runway 13 of NAIA has been upgraded to allow instrument operations. Simultaneous operations between Runway 06/24 and Runway 13 became possible with the implementation of LAHSO operations which allowed aircraft weighing 25,000 kilograms and below to land on Runway 13 during VMC thereby increasing runway capacity.

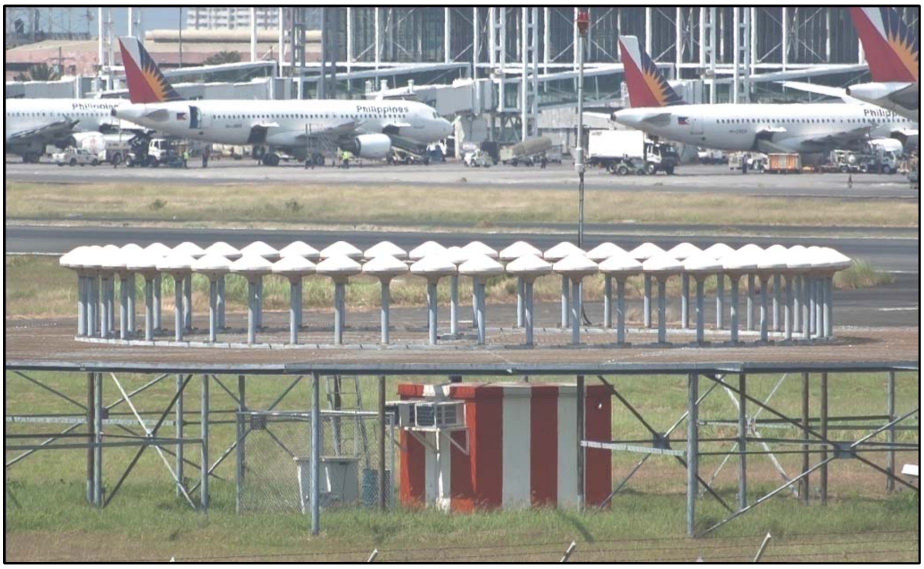
Air Traffic Flow Management (ATFM) was implemented on the second quarter of 2010 with the same objective of increasing airport capacity while still ensuring safety and efficiency of operations.

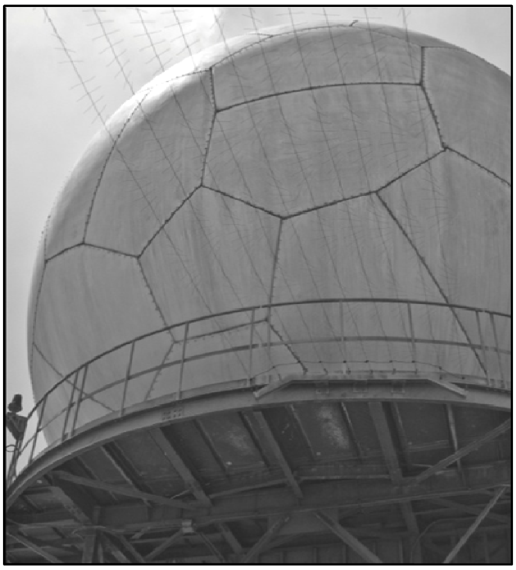


Dependency to Ground Navigational Aids

In June 2010, the outage of the Manila DVOR/DME and ILS system brought air traffic to a halt . The very low visibilty did not help the situation. Scores of flight have to be diverted to nearby airports displacing thousands of air travellers for days. Normal flights to Manila resumed when authorities assured that a safe landing can be made.

While the present situation can be managed, operational difficulties have been observed. The mounting complaints about delays in queuing either at the end of the runway waiting for departure clearance or holding/waiting in flight for landing require a comprehensive approach to improve the situation .





ICAO Mandate

The 36th Session of the ICAO Assembly held in Montreal in September of 2007 adopted Resolution A36-23 urging all States to implement RNAV and RNP air traffic services (ATS) routes and approach procedures in accordance with ICAO PBN concept described in the *Performance Based Navigation Manual* (Doc 9613).

During the 44th Director General Civil Aviation Conference of Asia and Pacific Region on October 2007 held in Xi'an, China, Action Item 44/6 urged States to implement PBN as per ICAO guidance material and to support the Asia-Pacific PBN Task Force established by APANPIRG/18.

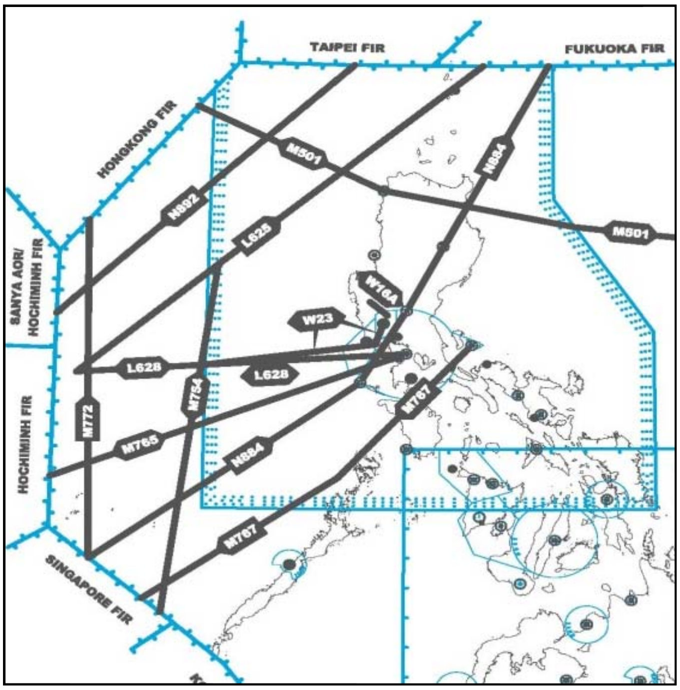
PBN Concept

Performance Based Navigation (PBN) is a concept that encompasses both area navigation (RNAV) and Required Navigation Performance (RNP) and revises the current RNP concept.

The development of PBN concept recognized that advanced aircraft RNAV systems provide enhanced and predictable level of navigation performance accuracy which, together with an appropriate level of functionality, allows a more efficient use of available airspace to be realized.

The PBN concept specifies RNAV and RNP 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, when supported by the appropriate navigation infrastructure.

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.



RNAV enroute procedures were established within the Philippine airspace on November 2001 with the implementation of four (4) one-way parallel RNAV 10 routes. The following year, Reduced Vertical Separation Minima (RVSM) airspace was prescribed within the controlled airspace between FL290 and FL410, except in the Manila South Sector areas that remained between FL310 – FL410.

Since July 2008, eleven (11) RNAV routes have been established. Airways N892, M501, N884, M772, M767 and L625 satisfy the requirements of RNAV 10 specifications while W23 and W16A suits RNAV 5 specifications.

Effective August 26, 2010, lateral separation standard on the four parallel routes with RNP 10 specifications, airways N884, M767, N892 and L625 within the Manila FIR was reduced from 60 NM to 50NM.

Global Harmonization

In 2003, Federal Express Corporation requested the CAAP for the authorization to use RNP 0.3 RNAV (GPS) Approach procedures and RNP 1.0 RNAV (GPS) Standard Instrument Departures (SID) procedures which were flight validated and certified by US Federal Aviation Administration (FAA). The request was approved allowing use of the RNAV procedures to four (4) international airports in the country where the company operates. RNAV (GPS) departure and approach procedures were designed and exclusively available only to FedEx fleet in the following airports: Ninoy Aquino International Airport, Mactan-Cebu International Airport, Diosdado Macapagal International Airport and Subic Bay International Airport which was its hub in Asia at that time.

One of the primary intents of PBN is to unify the system that has been available for over forty years and implemented in a variety of ways

Objectives

worldwide. To be consistent with the PBN objective, the approach procedures developed for and used by FedEx which were designed using US RNP SAAAR (Special Aircraft and Aircrew Authorization Required) criteria were re-assessed in accordance with ICAO PBN Concept described in the Doc 9613 and were submitted for flight validation.

Among the re-assessed procedures were the RNAV (GNSS) approaches for both runways of the NAIA. The two procedures served as alternative procedures during the outage of the ground navigational aids after completing the re-evaluation of the procedure using PANS-OPS criteria and a successful flight validation using one of the local airline aircraft.

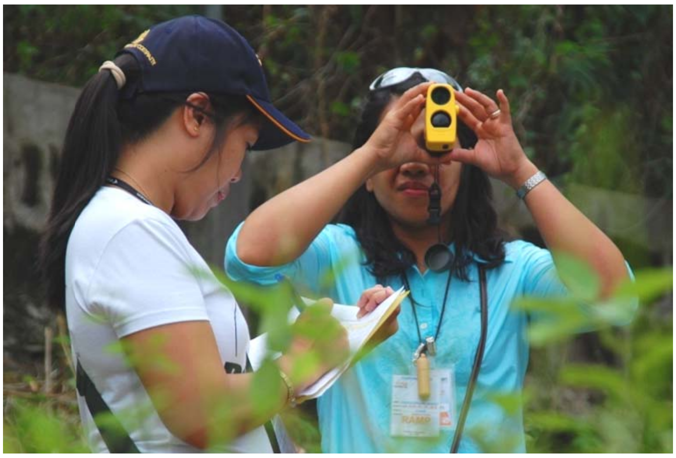
Following the outage of the DVOR at NAIA in June 2010, the CAAP published and allowed local airlines to use RNAV (GNSS) approach procedure starting July 3, 2010 . This procedure served as a contingency measure to allow aircraft operations to continue while the air navigation engineers tried to restore the DVOR to operational status. Flights had to be cancelled or diverted because of the navigational aids outage. On the day that the RNP APCH procedure was implemented, successful landings were recorded.

Objectives of the PBN Implementation Plan

- To take full advantage of the benefits of PBN;
- To be consistent in the implementation of RNAV and RNP ATS Routes and approach procedures with that of the Asia Pacific Region ICAO PBN Implementation Plan;
- To ensure that the implementation of the Navigation aspect of CNS/ATM system is based on established operational requirements;
- To develop a transition strategy from sensor-based navigation to area navigation that will minimize multiple equipment required on board an aircraft and on the ground;
- To provide the time frame for the aviation community to comply with the corresponding requirements of different navigation applications that are defined to facilitate global harmonization of PBN implementation, and,
- Ensure a safe transition from conventional means of navigation to performance-based navigation.

CHALLENGES

Infrastructure Development



Obstacle and Data Survey

The survey of forty-one out of eighty–one airports have been completed in May 2010. However, the GPS raw data requires further processing to meet the criteria set in DOC 9674 where the coordinates must be based from an ITRF station. ETOD database still needs to be developed.

Accessibility

A number of airports in the country are not capable to support IFR operations due: (1) terrain limitations , (2) limited budget to improve runway conditions,(3) no available aerodrome lighting system and (4) no air traffic service in place. These limitations result to either flight cancellation or diversion to other airport in cases of low visibility or inclement weather.

CAAP is planning to upgrade select airports such as Dumaguete, Legaspi and Naga to accommodate operators' requests to allow jet aircraft operations during IMC. RNP AR approach procedure will be considered in the design of procedures for specific airports to enhance airport accessibility.

Fleet readiness

Consultative meetings with local airline operators have been conducted since 2007 to determine the airlines' capability to perform RNAV procedures. Successive surveys were conducted in 2009 and 2010. In 2009, only two (2) out of the five (5) local airlines signified capability to meet the navigational accuracy requirements. By the end of 2010, 90% of domestic registered aircraft are ready and equipped with GNSS avionics necessary to perform RNAV procedures.

In contrast, general aviation operators are appealing for consideration taking into account the huge investment necessary for refurbishing the aircraft to meet RNAV requirements.

Taking into consideration aircraft that do not meet the RNAV requirements, conventional navigation will still be authorized. CAAP will set timelines for operators to comply with the RNAV requirements

and ensure that operation in mixed navigation environment, that is, RNAV and non-RNAV, is still in accordance with international standards without sacrificing efficiency and viability.

Available CNS infrastructure

Different RNAV navigation specification requires different navigation infrastructure. RNAV operations require sufficient radar coverage to augment on-board aircraft equipment to assure safety of operations. CAAP's radar surveillance capability is still limited . Only four international airports out of 15 instrument airports are equipped with terminal radar surveillance facilities. These airports are Ninoy Aquino International Airport, Mactan-Cebu International Airport, Subic Bay International Airport and Diosdado Macapagal International Airport. Enroute control provided by Mactan ACC in the southern portion of the Manila FIR is not covered by radar.

GNSS RAIM Prediction Requirements

The requirement for GNSS prediction, monitoring of the status of GNSS and issuance of timely warning of outages is outlined in the PBN Manual. However, the location of the Philippines have sufficient satellite coverage so prediction information may not be necessary.

Training

Flight Procedure Designers

Implementing the PBN Roadmap entails creation of departure, arrival and instrument approach procedures. Building procedure designers

competency have been priority and is ongoing. States with advanced expertise in procedure design offered technical assistance. Further training shall be availed to address airports which may require RNP AR procedures.

ATC, Aircrew and Regulators' Training

Implementation of RNAV procedures require training hundreds of air traffic controllers to safely and effectively transition from conventional navigation to performance-based navigation. The transition period is significant, expecting mixed-equipage aircraft in the same airspace. Air traffic controllers' training will be conducted to increase their awareness of the aircraft capabilities and requirements, improve situational awareness and enhance decision-making skills.

Aircrew training is mandatory when applying for approval for PBN operations.

Regulators' training is most important as they will bear the responsibility of developing the PBN Operational Approval Manual as well as its implementation for operators to comply.

Decommissioning of VOR Stations

Aircraft upgrade is expensive and down time for the installation of equipment and software updates varies depending on the aircraft age. It is expected that operators will appeal for more time before they can comply with PBN specifications. Non-compliant aircraft will continue to use guidance provided by VORs. The decommissioning of the said stations will rely in the ability of all stakeholders, particularly the general aviation operators, to equip the aircraft to become RNAV capable.

The decommisioning shall consider the development of RNAV as well as back-up procedures in case of GNSS malfunction or outage.

There is a need to develop a plan specific to the gradual decommissioning of VOR stations while the RNAV procedures are yet to be fully established in the country.

Development of CAAP PBN Implementation Plan

CAAP PBN Task Force

Some of the country's neighboring States are already reaping the benefits of PBN due to its decision to implement early on. Recently, local airline companies signified a more active participation in the implementation of PBN in the country. Effective implementation requires a collaborative effort from all sectors that will be affected by the change. The proposed involvement of airline companies are a welcome development.

The CAAP has identified all possible stakeholders in the the PBN implementation and conducts consultative meetings to foster a cooperative approach in the PBN implementation from formulating the master plan to identifying strategic objectives to achieve the different timelines set for the APAC region.

In February 10, 2010, in one of the consultative meetings, a working group called CAAP PBN Task Force was established. The Task Force is composed of experts from different field in the aviation industry who will be involved in the PBN implementation. The Task Force shall include air traffic controllers,representatives from airline operators and pilot associations, flight check inspectors, maintenance engineers, airport engineers, Aeronautical Information officers , CAAP regulators with representatives from the Flight Standards Inspectorate Service and Aerodrome and Air Navigation Safety Oversight Office, and flight procedure designers.

Planning

One of the PBN Task Force functions is ensuring that the regulations pertaining to PBN implementation is compliant with the State's Civil Aviation Regulation (CAR), ICAO PBN Manual, Civil Aviation Regulation for Air Navigation Services (CARANS) and other related regulations. Safety assessment shall be conducted in different stages of implementation to achieve smooth transition from conventional navigation to performance-based navigation.

Implementation of PBN requires a collaborative effort within the aviation community. The Task Force shall study the request(s) and/or recommendations of the users. The safe, efficient and effective implementation begins with the determination of requirements of the different navigation specification and comparing these with available infrastructure/data at CAAP to arrive with an applicable and feasible plan. The role of the Task Force is to ensure that the commitment described in this implementation plan will be effectively carried out.

Further, balance must be met between meeting the increasing demand for air transportation services and environment-friendly ATM solutions that will improve airspace utilization and access to airports without jeopardizing safety of operations.

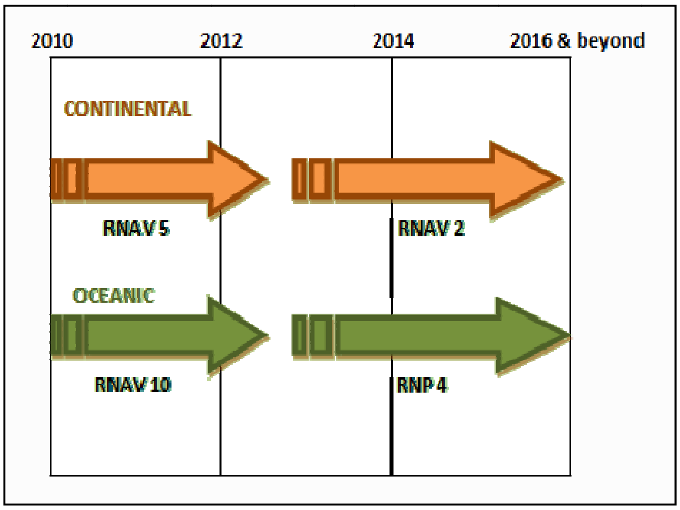
CAAP

PBN Implementation Plan

The CAAP PBN Implementation Plan shall be consistent with the Asia/Pacific Regional Performance-Based Navigation Implementation targets to ensure regional harmonization. Implementation shall be done in three phases: Short-Term, Medium-Term and Long-Term. The goal is to develop consistent RNAV operations from departure to arrival.

Short Term (2010-2012)	Medium Term (2013-2016)	Long Term (2016 and beyond)
➢ Preparation/ Obstacle survey ➢ Establish the National Working Group for PBN **EN ROUTE** **Continental** ➢ RNAV-5 **Oceanic** ➢ RNAV10 **TERMINAL** **RNAV-1 SIDs/STARs in APs with Radar Surveillance capability** ***Airports:*** NAIA, MCIA,DMIA **RNP 1 SID/STAR in Non- Radar APS** ***Airports:*** Davao, Bacolod, Cagayan De Oro, Puerto Princesa and Iloilo **Other APs to be upgraded:** Dumaguete, Tagbilaran and Butuan **APPROACH** ➢ RNP APCH with Baro-VNAV in 50% of instrument runways Listed in Terminal	**EN ROUTE** **Continental** ➢ RNAV-2 ➢ Implementation of additional RNAV/RNP routes **Oceanic** ➢ RNP-4 ➢ 30/30 NM lateral/longitudinal **TERMINAL** **RNAV-1 SIDs/STARs in APs with Radar Surveillance capability** ***Airports:*** SBIA **RNP-1 SIDs/STARs in non-Radar APs** ***Airports:*** Zamboanga, Kalibo,General Santos, Laoag ,Roxas, and Tacloban **AP to be upgraded:** Naga, Legaspi and Cotabato **APPROACH** ➢ RNP APCH with Baro-VNAV in 100% of instrument runways ➢ RNP AR APCH as appropriate	**Performance-Based Operations** ➢ RNP airspace at and above FL290 ➢ Mandate RNP in busy en route and terminal airspace ➢ Introduction of landing capability using GNSS and its augmentation **APPROACH** Other APs catering to aircraft with Maximum certificated take-off mass of 5700 kg or more

ENROUTE



Oceanic Routes

Manila shall continue to work closely with neighboring States to be consistent with the Regions' implementation Plan. RNAV 10 routes will continue to be implemented until 2012 and will switch over to RNP 4 beginning 2013. To mandate RNP airspaces at FL290 and above is among the long term goal being considered in 2016.

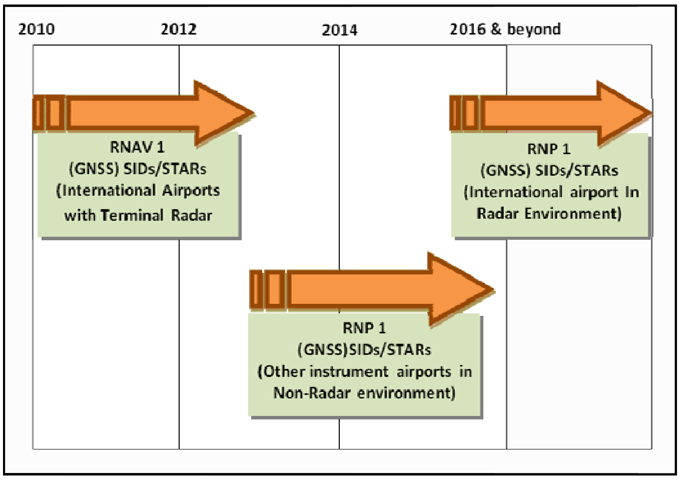
Unidirectional parallel routes between Manila - Bangkok and Manila – Taipei are under study. An ATS Conditional Route has been established named ***Z902***. The route reduces aircraft flying time from Singapore to mainland US and is operational between 1700UTC to 2000UTC. This route was established considering operator request. Philippines participated in the ASPIRE (Asia South pacific Initiative to Reduce Emission) Program conducted in 2009 and will continue to be involved in activities that seek to improve the condition of the environment.

Procedures for large scale weather deviations and strategic lateral offsets in oceanic airspace in the Manila FIR are being developed. This will set an important milestone when established considering that the Philippines is geographically located near the equator and tropical cyclones are normal occurrence throughout the year.

Continental Routes

Manila South Sector routes will be restructured to decongest traffic from the Enroute to Terminal. The route IPATA-BATAY RNAV 5 once established will decongest traffic between Manila ACC and Mactan ACC while DINNO-SAN JOSE RNAV 5 will help air traffic controllers separate aircraft with different speeds. More RNAV 5 routes will be established between 2010 to 2012 to avoid discontinuity of routes . RNAV 2 Routes will be introduced beginning 2013.

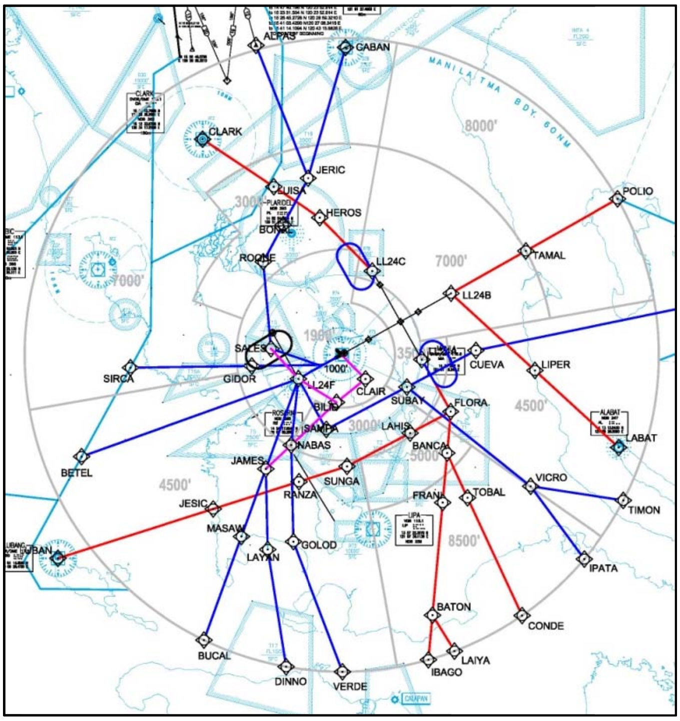
TERMINAL



Easing the congestion of traffic in NAIA will be given priority. Moreover, the application of specific procedures such a continuous descent operations (CDO) will be incorporated in the design which can help operators save on fuel consumption through the application of optimized profile descents.

Short Term

RNAV 1 SIDs and STARs will be introduced to help controllers keep up with the growing traffic demand at the terminal airspace . The RNAV 1 specification will be established between 2010-2012 in the following airports with terminal radar and considering the increasing number of flights in these airports : Mactan-Cebu International Airport, Diosdado Macapagal International Airport and Subic Bay International Airport.



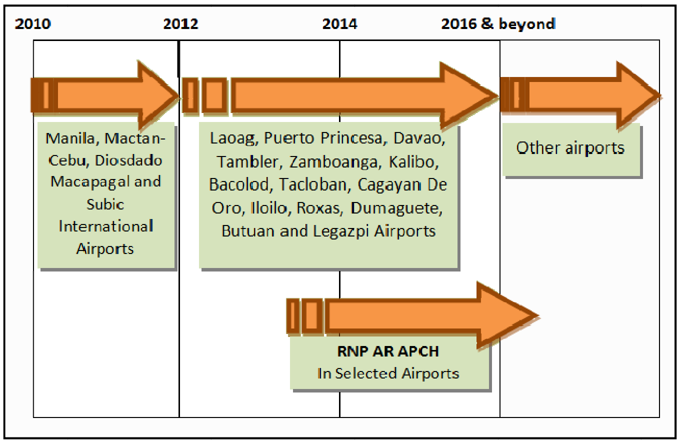
Medium Term

From 2013 to 2016, SID/STAR with RNP 1 specifications will be applied to non-radar terminal airspaces of the following airports: Laoag, Puerto Princesa, Davao, Tambler, Zamboanga, Kalibo, Bacolod, Tacloban, Cagayan De Oro, Iloilo and Roxas . Upon operators' requests, RNP1 departure and arrival routes will be set up in Legaspi, Butuan and Dumaguete APs to improve accessibility in the said airports.

Long Term

Mandating RNP 1 in busy airports such as NAIA, MCIA, and DMIA (which requires higher level of navigational performance and FMS functionality) is among the long term goals of this PBN Plan.

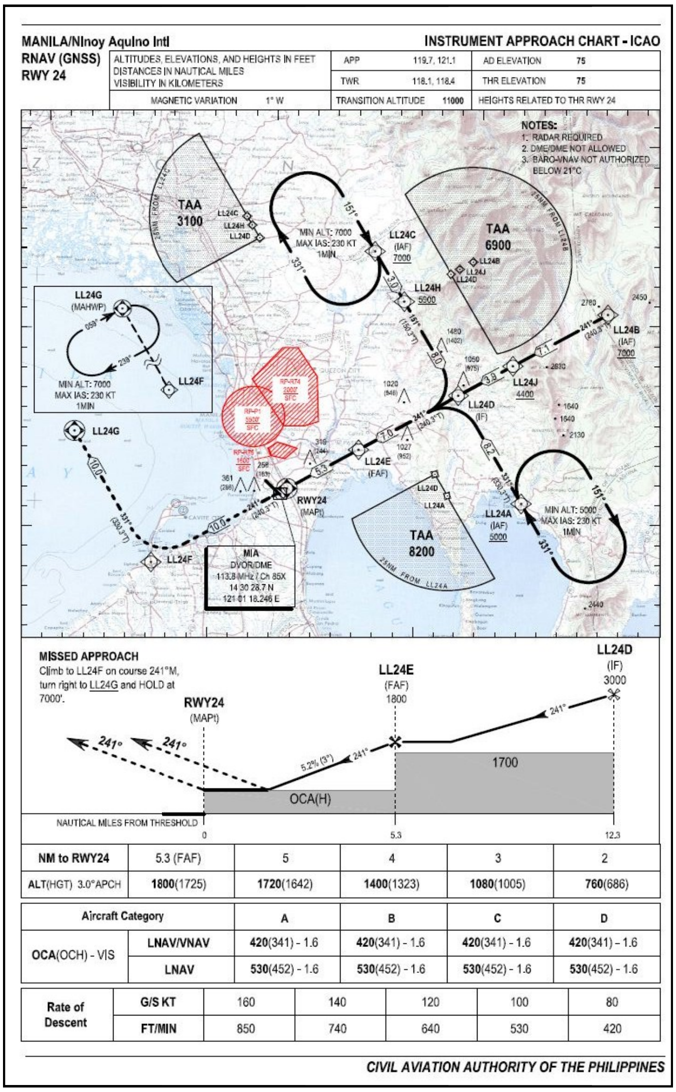
APPROACH



Designing conventional approaches will be kept to a minimum. Mostly RNP APCH has been developed in the year 2010. Non-precision approaches will be maintained throughout the operational life of the navigational aids. ILS approaches will be maintained and a periodic review of the procedures will be conducted every five years or as the need arises.

The initial approach waypoints of RNAV procedures will be designed as overlay of existing initial approach fixes of conventional approach procedures. This will serve as back-up to precision approaches and provide vertical guided approaches for runways without precision approach capability.

It is expected that mixed traffic environment will



keep air traffic controllers busy. The new approach procedures will be designed as an overlay of existing approach procedures to prevent increasing the air traffic controller workload.

During the transition, the new procedures may be implemented during designated hours of the day where RNAV capable aircraft are expected to achieve greater operational benefits.

Short Term

Re-assessment of the existing RNAV (GPS) approach procedures of NAIA, MCIA, DMIA and SBIA using PBN criteria is ongoing. Practicability of the design will be studied considering the design had a specific operator's requirements. The RNP APCH with APV Baro-VNAV will be introduced in the country's international airports between 2010 to 2012.

High traffic domestic airports will be included in the short term priority such as Davao, Butuan, Dumaguete and Tagbilaran airports all located south of Manila . Except for Davao AP, the three airports mentioned have no existing conventional approaches. These airports will be prioritized to increase airport accessibility and to enhance flight safety.

Medium Term

Designing RNP approaches utilizing GNSS will be continued in non-radar airports in the second phase of RNP APCH implementation. Medium to high traffic domestic airports include Puerto Princesa, Cagayan de Oro, Iloilo, Bacolod, Tacloban, Zamboanga, Tambler, Kalibo, Roxas, Cotabato, Laoag and Legaspi Airports.

To improve accessibility to terrain challenged airports , RNP AR approaches with RF turns will be designed if necessary.

Long Term

RNP APCH procedure will be designed for other domestic airports. VFR airports will be upgraded basedon traffic statistics, operator's requests and traffic forecasts.

CAAP will monitor the development of approach technology that use satellite-based navigation such as GBAS and study the feasibility of introducing such technology to the country's airports.

Benefits of PBN

Safety and Accessibility

Developing airport arrival and departure paths in all weather conditions will increase airport accessibility thus avoiding aircraft diversions. Conventional approach procedure can not be established in some airports like Legaspi and Dumaguete Airports because of terrain limitations. The possibility of meeting critical obstacle clearance and environmental requirements through the application of optimized RNAV or RNP paths will allow safe aircraft operations. Since establishing RNAV procedures will not require installing expensive sensors such as VOR or NDB, more airports will be accessible.

APV ,when established in airports, will serve as back-up to airports with precision approaches and for airports without precision approach capability, APV will provide vertically-guided approaches for runways. It will also allow aircraft operations to continue even during outages of ground navigational aids (ILS, VOR or NDB).

A more stabilized approach will be expected since the design of RNP APCH procedure allows the final approach course to be aligned with the runway centerline. Re-designing existing conventional procedures as overlay of RNP APCH will be an option to increase safety of aircraft operations.

Efficiency

Efficient use of airspace may be achieved through RNAV implementation. Establishing RNAV routes is one of the measures considered to address the problem of congestion especially in the airspace of Manila. Reduction of crossing points and installation of check points shall be considered in the design of STARs and SIDs to reduce aircraft proximity incidents. The end of RNAV arrival routes shall be connected to the initial approach fix of the approach procedure providing straight-in approaches thereby increasing operational efficiency.

Through the specified navigational specification, reduced lateral and longitudinal separation between aircraft may be applied to accommodate more traffic. As previously mentioned , 60 NM lateral separation has been reduced to 50 NM in 2010 on the four parallel RNP 10 routes in the Manila FIR which increased airspace capacity.

Economy

Aircraft operators will benefit in the reduced track miles of en-route, departure and arrival routes. Arriving traffic required to execute a procedure/base turn in conventional approaches will be minimized considering that the end of the RNAV arrival route is connected to the initial approach fix thereby reducing track miles.

Continuity of RNAV routes from departure to arrival shall be ensured. The location of ground sensor is insignificant in enroute design allowing for more direct routing.

Continuous Descent Operations (CDO) technique will be considered in the design of arrival routes to maximize the benefit of reducing fuel burn.

Environmental Impact

Any reduction in track miles of any aircraft operation will decrease the amount of fuel burned and carbon emission. The flexibility of the RNAV concept will be maximized so that routes can be designed to avoid noise sensitive areas. Continuous Descent Operations (CDO), shorter distances with optimized climb and descent profiles, will help reduce the impact of aircraft noise within airport vicinity.

Safety Assessment

Safety assessment shall be conducted to evaluate the risks associated with the introduction of new RNAV procedures every airport. The effects of the proposed change will be evaluated to help set the safety objective(s) for every hazard identified and establish the means to mitigate the effect(s) of the foreseen risk(s).

Safety assessment cycle shall be applied to all airports given the uniqueness of situations in each airport.

Pre-Implementation

All stakeholders shall be included in the operational hazard assessment including the effect on ATC and pilots. CAAP shall develop the PBN Operational Approval Manual to ensure that aircraft and aircrews are qualified to fly the new RNAV procedures.

It is important to assess the readiness of ATCs to identify points of confusion and prevent resistance against introduction of new procedures.

Evaluation of ATC competency shall be conducted during the transition period taking into account RNAV and non-RNAV capable aircraft sharing the same airspace.

Surveillance and Monitoring

Continuous surveillance shall be conducted throughout the implementation period to determine whether the goals were reached or not. Factors that caused failure to meet targets on time and to formulate mitigating measures to ensure that the objectives are met to create effective alternatives if the goals are not met as planned.

Post-Implementation

A post-implementation review at the end of each period will be conducted to assess the PBN implementation's success or shortcomings. This will become the basis for the succeeding stage of implementation to refine planning and evaluate whether the objectives of CAAP's PBN Implementation Plan has been achieved.

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APPENDIX C

Draft Amendments to CAR Part 7

Instrument and Equipment

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Part 7 INSTRUMENT AND EQUIPMENT

7.2.9 NAVIGATION EQUIPMENT — GENERAL

a) [AAC] No person may operate an aircraft unless it is equipped with navigation equipment that will enable it to proceed in accordance with-

(1) Its operational flight plan,

(2) The prescribed Performance-Based Navigation Specification, and

(3) The requirements of air traffic services and,

(b) ~~No person may operate an aircraft in Performance-Based Navigation specification airspace unless authorized by CAAP for such operations. (March 21,2011)~~ No person may conduct PBN operations unless authorized for the specific PBN operations by CAAP

Note: ~~See ICAO Doc 9613 for information on the approval process for operations in RNP airspace.~~ See ICAO Doc 9613 for information on aircraft eligibility and ICAO Doc 9997 for information on the approval process for PBN operations.

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APPENDIX D

Draft Amendments to CAR Part 8 Operations

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Part 8 OPERATIONS

8.8.1.31 ~~OPERATIONS IN~~ PERFORMANCE-BASED NAVIGATION (PBN) ~~AIRSPACE~~ OPERATIONS

(a) No operator shall permit, and no pilot shall conduct PBN operations as prescribed in PBN airspace, on routes and flight procedures ~~designated as Performance-based Navigation (PBN) airspace~~, unless so approved in the operator's Operations Specifications.

(b) For flights in defined portions of airspace or on routes where an PBN type has been prescribed, an aircraft shall be provided with navigation equipment which will enable it to operate in accordance with the prescribed ~~RNP type(s)~~ PBN navigation specifications and the ATS requirements as specified in Subparts 7.2.7,7.2.8,7.2.9 and 7.2.10.

(c) An operator shall equip the aircraft as prescribed in subparagraph (b)

(d) Above by incorporating the necessary airworthiness requirements, and submit to the Authority for approval the company manuals and amendments thereof, including the pre-flight and en-route procedures to be followed for such flights, the training and qualifications required of maintenance personnel, flight operations officers/flight dispatchers, and flight crew members; and such other information necessary in the conduct of ~~operations in PBN designated airspace~~ PBN operations. On successful demonstration of competency of ~~operations in PBN designated airspace~~ PBN operations by an operator, the Authority shall authorize such operations.

e) Operators who do not hold an Air Operator Certificate (AOC) may conduct specific PBN operations provided that:

(1) the pilot has completed appropriate training for the specific PBN operations;

(2) the aircraft meets the requirements for the specific PBN operations.

Note: See ICAO Doc ~~9613~~ 9997 for information on the approval process /or operations in PBN airspace.

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APPENDIX E

Draft Amendments to CAR Part 9

Air Operator Certification and Administration

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Part 9 AIR OPERATOR CERTIFICATION and ADMINISTRATION

9.1.1.2 DEFINITIONS

The following definitions should be revised to be consistent with the definitions in ICAO Doc 9613 PBN Manual.

(7) **Area navigation (RNAV).** A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

(42) **Navigation specification**. A set of aircraft and flight crew requirements needed to support performance-based operations within a defined airspace. There are two kinds of navigation specifications:

RNP Specification: A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g.: RNP-4, RNP-APCH.

RNAV Specification: A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g.: RNAV-5, RNAV-1.

(52) **Performance-based navigation (PBN).** Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note: Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity

9.1.1.7 AIR OPERATOR CERTIFICATE (AOC) AND ASSOCIATED OPERATIONS SPECIFICATIONS

The example of an Operations Specification should be amended to include the appropriate PBN Navigation Specifications. Refer Figure 1.

(15) Performance-based Navigation (PBN): one line is used for each PBN specifications authorization (e.g.: ~~RNAV10~~ RNP 10, RNAV1, RNP4), with appropriate limitations or conditions listed in the "Specific Approvals" and/or "Remarks" columns.

(16) Limitations, conditions and regulatory basis for operational approval associated with the Performance-based Navigation specifications (e.g.: GNSS, DME/DME/IRU)

Information on Performance-based Navigation, and guidance concerning the implementation and operational approval process, are contained in the Performance-based Navigation Manual (Doc 9613) and the Performance-Based Navigation Operational Approval Manual (Doc 9997).

An acceptable mean for compliance for PBN operational approval process can be found in AC 08-007.

OPERATIONS SPECIFICATIONS
(subject to the approved conditions in the Operations Manual)

Issuing Authority Contact Details.
Telephone: ____________________; Fax: ____________________; E-mail: ____________________

AOC#: Operator Name: Trading Name Date: Signature:

Aircraft Model:

Types of operation: Commercial air transportation ☐ Passengers; ☐ Cargo; ☐ Other:**…………**

Area of operation:

Special Limitations:

Special Authorizations:	**Yes**	**No**	**Specific Approvals**	**Remarks**
Dangerous Goods	☐	☐		
Low Visibility Operations Approach and Landing Take-off	☐ ☐	☐ ☐	CAT **….** RVR: m I RVR: m	
RVSM ☐ **N/A**	☐	☐		
ETOPS ☐ **N/A**	☐	☐	Maximum Diversion Time:	
Navigation Specifications for PBN Operations	☒	☐	RNP 10 RNAV 5 RNAV 1 and RNAV 2 RNP 4 RNP 2 RNP 1 RNP APCH [LNAV, LNAV/VNAV, LPV, LP][1] A-RNP RNP 0.3 RNP AR APCH	Also valid for B-RNAV routes Also valid for P-RNAV routes/procedures [1]List approach types approved. RNP APCH [LNAV] also valid for approach procedures designated as RNAV (GNSS)
Continuing Airworthiness				
Others	☐	☐		

Figure 1.

APPENDIX F

Draft Amendments to AC 08-007: Application and Process: Performance-Based Navigation

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SECTION 1 POLICY & GENERAL INFORMATION

1.4 APPLICABILITY

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

1.6 RELATED PUBLICATIONS

These ICAO publications are source documents for this advisory circular—

1) Civil Aviation Authority of the Philippines (CAAP)
   - AC 09-001, AOC Certification
   - ~~AC 08-024, Application & Process: Baro- VNAV operations~~
   -

OPERATIONS SPECIFICATIONS
(subject to the approved conditions in the Operations Manual)

Issuing Authority Contact Details.
Telephone: ____________________; Fax: ____________________; E-mail: ____________________

AOC#: Operator Name: Trading Name Date: Signature:

Aircraft Model:

Types of operation: Commercial air transportation ☐ Passengers; ☐ Cargo; ☐ Other:…………

Area of operation:

Special Limitations:

Special Authorizations:	Yes	No	Specific Approvals	Remarks
Dangerous Goods	☐	☐		
Low Visibility Operations Approach and Landing Take-off	☐ ☐	☐ ☐	CAT …. RVR: m DH: ft RVR: m	
RVSM ☐ **N/A**	☐	☐		
ETOPS ☐ **N/A**	☐	☐	Maximum Diversion Time: minutes	
Navigation Specifications for PBN Operations	☒	☐	RNP 10 RNAV 5 RNAV 1 and RNAV 2 RNP 4 RNP 2 RNP 1 RNP APCH [LNAV, LNAV/VNAV, LPV, LP][1] A-RNP RNP 0.3 RNP AR APCH	Also valid for B-RNAV routes Also valid for P-RNAV routes/procedures [1]List approach types approved. RNP APCH [LNAV] also valid for approach procedures designated as RNAV (GNSS)
Continuing Airworthiness				
Others	☐	☐		

Figure 1: Sample Operations Specification Form

2) International Civil Aviation Organization (ICAO)
- Doc 9613-AN/937 – Performance Based Navigation Manual (PBN)
- Doc 9997-AN/498 – Performance-Based Navigation Operational Approval Manual
- Annex 6, Part 1, International Commercial Air Transport – Aeroplanes
- Annex 6, Part 3, International Operations – Helicopters

2.2.1 ICAO TERMINOLOGY VS CERTAIN STATES

Third column (United States) may not be necessary as US has withdrawn US RNAV specifications.

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

2.2.2 RNAV 10 = RNP 10

A. The designation RNP 10 has been used for years to define long range oceanic navigation requirements.

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 CAAP before entry into airspace defined for the navigation performance requirements—

1) RNP 10

2) RNAV 5

3) RNAV 1 and RNAV 2

4) RNP 4

5) RNP 2

6) ~~Basic~~ RNP 1

7) Advanced RNP ~~1~~

8) RNP APCH

9) RNP 0.3

10) RNP AR APCH

Delete following note:

> When preparing for RNP approach operations, the operators should also consult AC 08-018 for guidance for Baro-VNAV approvals.

2.3.2 SEPARATE APPROVAL FOR EACH NAVIGATION SPECIFICATION

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.

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—

Update the table and notes using new Doc 9613 Vol 2 Table II-A-1-1

NAVIGATION SPECIFICATION	FLIGHT PHASE							
	En Route OCEANIC /REMOTE	En Route Continental	ARR	APPROACH				DEP
				Initial	Interm.	Final	MISSED	
RNAV 10	10							
RNAV 5		5	5					
RNAV 2		2	2					2
RNAV 1		1	1	1	1		1[b]	1
RNP 4	4							
Basic-RNP 1			1[a,c]	1[a]	1[a]		1[ab]	1[a,c]
RNP APCH				1	1	0.3	1	
RNP AR APCH				1-0.1	1-0.1	0.3 – 0.1	1-0.1	

2.5.2 OCEANIC & REMOTE CONTINENTAL

A. Oceanic and Remote continental Airspace Concepts are currently served by ~~two~~ three navigation applications, ~~RNAV~~ RNP 10, ~~and~~ RNP 4 and RNP 2.

~~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).~~ RNAV 5 (B-RNAV in Europe and the Middle East) is available for Continental Airspace subjected to availability of appropriate ground NAVAID infrastructures.
- In the United States, an RNAV 2 application (currently termed RNAV Type A) supports an En Route continental Airspace Concept.
- "RNP 2 is applicable for continental airspace based on GNSS and is intended to support geographical areas with little or no ground NAVAID infrastructure.

Remove text box

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

2.5.4 TERMINAL AIRSPACE: ARRIVAL & DEPARTURE

A. Existing Terminal Airspace Concepts, which include arrival and departure, are supported by RNAV and RNP 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. RNAV 1 and RNAV 2 and RNP 1 are developed to support terminal airspace applications including arrival and departure.

~~The ICAO RNAV 1 specification shares a common navigation accuracy with both PRNAV and US RNAV Type B.~~

- ~~Basic 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.~~

Remove text box

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

APPROACH

A. Approach concepts cover all segments of the instrument approach, including—

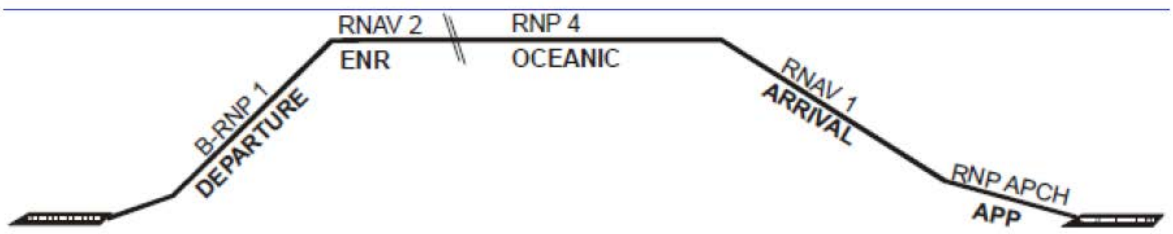
1) Initial;
2) Intermediate;
3) Final; and
4) Missed approach.

B. Under the PBN concept, ~~these~~ the final approach segments call for RNP specifications requiring a navigation accuracy ~~of~~ between 0.3 NM ~~to~~ and 0.1 NM ~~or lower~~.

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—

Change Departure to RNP 1 in diagram



SECTION 3 OPERATIONAL APPROVAL PROCESS

3.1 GENERAL INTERNATIONAL REQUIREMENTS

3.1.1 COMPLETE CERTIFICATION REQUIREMENTS

~~Prior to operating a civil aircraft of Philippine registry in airspace for which a must first~~

To obtain a PBN approval, the following requirements should be satisfied:—

1) Satisfactorily complete the process for granting of the proper authorizations;

2) Obtain CAAP-approval document for the specific aircraft or fleet.

3.1.2 ~~CERTIFICATION~~ EVALUATION REQUIRED

~~In making this certification evaluation,~~ CAAP 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~~

3.2 GENERAL PHILIPPINE 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 blur in a simple certification.

B. Granting of PBN is a simple process. The applicant will provide the required formal application as prescribed by CAAP.

C. The certification team will then accomplish the document conformance to the requirements of ICAO Doc 9613 PBN Manual.

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 CAAP inspector personnel.~~

~~C. The demonstrated navigation performance will be considered before granting the PBN approval(s).~~

After considerable discussion about section 3.2.2 Inspection and Demonstration, the team suggested removal of this section entirely. Equipment compliance should be documented by the operator and submitted for review by the operations inspector. A review of these documents is sufficient to satisfy the approval requirements. No direct inspection is needed.

Also, per paragraph B., no authorizations for non-standard equipment (that without existing certification for a particular operation) should be granted.

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~~ Completed PBN Job Aids as provided in Appendix B.

3) ~~Operations Manual (or revisions) that include PBN policies and procedures appropriate the desired navigation specification(s);~~ Relevant sections of Operations Manual (or revisions) that demonstrate capabilities to conduct appropriate PBN operations.

4) ~~Operations Manual - D (or revisions) that include training programs appropriate to the desired navigation specification(s);~~ Relevant sections of Operations Manual -D (or revisions) that include training programs appropriate to desired PBN navigation specification(s)

5) ~~Maintenance Control Manual (or revisions) that include general maintenance procedures related to aircraft PBN airworthiness and current status~~ Relevant sections of 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);~~

To do - Update Appendix B by using Job Aids from ICAO Doc 9997. Rename Appendix B as PBN Job Aids.

SECTION 5: AIRWORTHINESS CONSIDERATIONS

5.1 Aircraft Eligibility

A) Aircraft eligibility shall be demonstrated in accordance with requirements in ICAO Doc 9613 and ICAO Doc 9997.

(Note: As of November 2012, See ICAO Doc 9613 Vol. 1 Att. C Section 3.3: Aircraft Eligibility and ICAO Doc 9997 Chapter 3 Section 3.1: Aircraft Eligibility.)

5.2 Continuing Airworthiness/Maintenance

A) The approved maintenance program should include any necessary provisions to address the PBN navigation specification(s) in accordance with the operator's intended PBN operations.

1) Operator's Minimum Equipment List (MEL) is updated in accordance with the appropriate requirements for authorized PBN navigation specifications.
2) Operator and contract maintenance personnel authorized to provide maintenance on PBN equipment should receive initial and continuing training as necessary to support authorized PBN operations.
3) Unless otherwise approved by CAAP, each operator should have an approved maintenance program, which may be an existing approved maintenance program.

SECTION 7 OPERATIONAL PROCEDURES

7.1 OPERATIONAL PROCEDURES

A~~. Appropriate operational procedures based on the approved operator program should be addressed~~. The operator should include appropriate operational procedures for authorized PBN operations in the operator's operation manual and training manual

B. Operational procedures should be in accordance with ICAO Doc 9613 and manufacturers' recommendations
~~Operational procedures should consider the –~~
~~1) Pilot qualification and training program;~~
~~2) Airplane flight manual;~~
~~3) Crew coordination procedures;~~
~~4) Monitoring.~~

APPENDIX A
Application for PBN Approval

Front Side of PBN Application Form

APPLICATION FOR PERFORMANCE BASED NAVIGATION APPROVAL

INSTRUCTIONS
Print or type. Do not write in shaded areas, these are for CAAP use only. Submit original only to the CAAP Flight Standards Inspectorate or a CAAP Authorized Person. If additional space is required, use an attachment.

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 M/M/S:	2. AIRCRAFT REGISTRATION(S):

D. SCOPE OF APPLICATION: ☐ Initial Request ☐ Additional Request

ADD	NAVIGATION-RELATED APPROVALS	ADD	NAVIGATION-RELATED APPROVALS	ADD	SPECIAL AREA APPROVALS
☐	1. RNAV/RNP-10	☐	7. RNP-APRCH	☐	1. NAT / NAM
☐	2. RNAV-5	☐	8. RNP-AR-APRCH	☐	2. PAC / RAC
☐	3. RNAV-2	☐	9. Baro VNAV	☐	3. SAM / RAC
☐	4. RNAV-1	☐	10. Unlimited NAT-MNPS	☐	4. MID ASIA / RAC
☐	5. RNP-4	☐	11. Special NAT-MNPS	☐	5. NORPAC
☐	6. RNP-1	☐	12. Other:	☐	6. CEPAC

E. ADDITIONAL APPLICATION ATTACHMENTS:

☐ 1.PBN Conformance Checklist	☐ 5.MEL (with PBN adaptation)	☐ 9. Modification Approval Document
☐ 2.AFM (or AFM Supplement)	☐ 6.Relevant Maintenance Program	☐ 10. Database Supplier Approval
☐ 3.Relevant Operations Manuals	☐ 7.Related Maintenance Procedures	☐ 11. Aircraft PBN Conformity Cklst(s):
☐ 4.PBN Crew Training Programs	☐ 8.Database Integrity Procedures	☐ 12. Other (see reverse):

If more space is needed to list application contents, please enter on reverse.

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)

DELETE SECTION F

YES	REFERENCE	YES	REFERENCE	YES	REFERENCE
☐	1. FAA AC 20-130A			☐	13. JAA JTSO-2C115()
☐	2. FAA AC 25-15			☐	14. JAA JTSO-2C129a
☐	3. FAA AC 25-14			☐	15. JAA GEN TGL 10
☐	4. FAA AC 90-45			☐	16. JAA AMC 20X2
☐	5. FAA TSO-C145	☐	11. FAA Notice 8110.60	☐	17. ICAO DOC 7030/4
☐	6. FAA TSO-C146	☐	12. RNP-10	☐	18. Other (see reverse):

Remove Appendix B and use Job Aids in ICAO Doc 9997 instead
Delete Appendix C

CIVIL AVIATION AUTHORITY
OF THE PHILIPPINES

ADVISORY CIRCULAR AC 08-007

APPLICATION & PROCESS: PERFORMANCE BASED NAVIGATION

SECTION 1 POLICY & GENERAL INFORMATION

1.1 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 CAAP 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.

1.2 STATUS OF THIS AC

This AC is an original issuance.

1.3 BACKGROUND

1.3.1 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.

1.3.2 NAVIGATION SPECIFICATIONS

Performance requirements are identified in <u>navigation specifications</u>, 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.

1.3.3 FLEXIBILITY

A. Under PBN, generic navigation requirements are defined based on the operational requirements.

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

- 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 a regulation contains the words “prescribed by the Authority,” the AC may be considered to “prescribe” a viable method of compliance, but status of that “prescription” is always “guidance” (never regulation).

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.

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

1.3.4 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.

1.3.5 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.

1.4 APPLICABILITY

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

1.5 RELATED REGULATIONS

- PCAR Part 7 includes requirements for instruments and equipment for performance based navigation
- PCAR Part 8 includes the requirements for performance based navigation.
- PCAR Part 9 includes the requirements for CAAP approval of AOC performance based navigation.

1.6 RELATED PUBLICATIONS

These ICAO publications are source documents for this advisory circular—

1) Civil Aviation Authority of the Philippines (CAAP)
    - AC 09-001, AOC Certification
    - AC 08-024, Application & Process: Baro-VNAV operations

Copies may be obtained from CAAP Flight Standards Inspectorate.

2) International Civil Aviation Organization (ICAO)

- Doc 9613-AN/937 – Performance Based Navigation Manual (PBN)
- 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.

1.7 DEFINITIONS & ACRONYMS

1.7.1 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

1.7.2 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) E**UROCONTROL** – 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) **PCAR –** Philippine Civil Aviation Regulation
19) **GNSS** – Global Navigation Satellite System
20) **GPS** – Global Positioning System

21) **INS** – Inertial Navigation System
22) **IRS** – Inertial Reference System
23) **IRU** – Inertial Reference Unit
24) **JAA** – Joint Aviation Authorities
25) **LNAV** – Lateral Navigation
26) **MEL** – Minimum Equipment List
27) **MNPS** – Minimum Navigation Performance Specification
28) **NSE** – Navigation System Error
29) **OEM** – Original Equipment Manufacturer
30) **PBN** – Performance Based Navigation
31) **RAIM** – Receiver Autonomous Integrity Monitoring
32) **RF** – Radius to Fix
33) **RNAV** – Area Navigation
34) **RNP** – Required Navigation Performance
35) **RTCA** – Radio Technical Commission on Aeronautics
36) **SBAS** – Satellite-based Augmentation System
37) **SID** – Standard Instrument Departure
38) **STAR** – Standard Terminal Arrival
39) **TLS** – Target Level of Safety
40) **TSE** – Total System Error VNAV Vertical Navigation
41) **VOR** – Very High Frequency Omni-directional Radio Range

SECTION 2 PERFORMANCE BASED NAVIGATION CONCEPTS

Performance based navigation is a relatively new concept that was 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 accomodate 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 functionalities. 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

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

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.

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 <u>do not</u> 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 *(Monitoring and Alerting)*	NSE only observed by pilot cross checks; No alerting on position error	Alerting on position accuracy and integrity	
FTE *(Monitoring)*	Managed by on-board system or crew procedure.	Managed by on-board system or crew procedure.	
PDE *(Monitoring)*	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).

> 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.

- 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.

> - 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 synonomously 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 CAAP before entry into airspace defined for the navigation performance requirements—

1) RNAV 10 (RNP 10)
2) RNAV 5
3) RNAV 2
4) RNAV 1
5) RNP 4
6) **RNP-2
7) Basic RNP 1
8) **Advanced RNP 1
9) RNP APCH
10) 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 CAAP.
- (**) indicates that a navigation specification has not yet been developed for these designation.

When preparing for RNP approach operations, the operators should also consult AC 08-018 for guidance for Baro-VNAV approvals.

2.3.2 SEPARATE APPROVAL FOR EACH NAVIGATION SPECIFICATION

A. The CAAP 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.

- These nav specifications differ regarding performance and functionality.

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

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) Basic RNP 1
5) RNP APCH

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

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

2.4 SEPARATE NAT-MNPS EVALUATION

A. The NAT-MNPS specification has been intentionally been 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 MNPS airspace are required to meet a Minimum Navigation Performance Specification (MNPS).

> Prior to NAT-MNPS operations, the operator must complete the certification process specified in AC 08-009.

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	ARR	APPROACH				DEP
				Initial	Interm.	Final	MISSED	
RNAV 10	10							
RNAV 5		5	5					
RNAV 2		2	2					2
RNAV 1		1	1	1	1		1^{b}	1
RNP 4	4							
Basic-RNP 1			$1^{a,c}$	1^{a}	1^{a}		1^{ab}	$1^{a,c}$
RNP APCH				1	1	0.3	1	
RNP AR APCH				1-0.1	1-0.1	0.3 – 0.1	1-0.1	

Notes:

The numbers given in the table refer to the 95% accuracy requirements (NM)
RNAV 5 is an en-route navigation specification which may be used for the initial part of the STAR outside 30NM and above MSA
RNP 2 and Advanced-RNP 1 are expected to be included in a future revision of the PBN Manual;
1a means that the navigation application is limited to use on STARs and SIDs only;
1b means that the area of application can only be used after the initial climb of a missed approach phase
1c means that beyond 30 NM from the airport reference point (ARP), the accuracy value for alerting becomes 2 NM

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.

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

- Basic 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.

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.

Presently, ICAO has provided navigation specifications for RNP APCH and RNP AR APCH.

C. Three general applications of RNP are characteristic of this phase of flight—

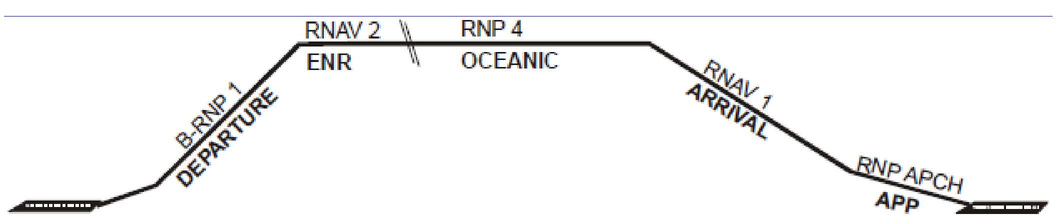
1) New procedures to runways never served by an instrument procedure;

2) Procedures either replacing or serving as backup to existing instrument procedures based on different technologies: and

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 navigations specifications that should be requested from the CAAP during cerification.

SECTION 3 OPERATIONAL APPROVAL PROCESS

3.1 GENERAL INTERNATIONAL REQUIREMENTS

3.1.1 COMPLETE CERTIFICATION REQUIREMENTS

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

1) Satisfactorily complete the process for granting of the proper authorizations;

2) Obtain CAAP-approval document for the specific aircraft or fleet.

3.1.2 CERTIFICATION EVALUATION REQUIRED

In making this certification evaluation, CAAP 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

CAAP 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;
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(s) consistently and safely

- 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.

3.2 GENERAL PHILIPPINE 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 blur in a simple certification.

B. Granting of PBN is a simple process. The applicant will provide the required formal application as prescribed by CAAP.

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 CAAP 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 CAAP 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—

(a) Master (formal) operations specifications; and

(b) 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;

See Appendix A: PBN Application Form
See Appendix B: 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);

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 nclude 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.

See Appendix C for copy of Aircraft PBN Conformity Checklist.

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

- CAAP 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 CAAP offices as a part of the application.

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).

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.

Unless otherwise accepted by the CAAP, 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.

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 CAAP, 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 CAAP 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;

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

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.

> 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.

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.

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—

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

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.

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 CAAP.

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, PCAR 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.

> - 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.

B. A listing of primary and secondary standards used to maintain test equipment which relate to PBN operations 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.

> 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.

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 CAAP-approved maintenance program to approve an aircraft for maintenance release.

> 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.

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

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 CAAP.

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.

> 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 CAAP 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).

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

B. Contract maintenance organizations should have appropriate records and instructions for coordination of records with the operator.

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.

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

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.

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.

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

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

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 CAAP.

SECTION 7 OPERATIONAL PROCEDURES

7.1 OPERATIONAL PROCEDURES

A. Appropriate operational procedures based on the approved operator program should be addressed.

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

B. Operational procedures should consider the—

1) Pilot qualification and training program;

2) Airplane flight manual;

3) Crew coordination procedures;

4) Monitoring.

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.

> 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.

D. Where operations are based on RNP, suitable flight manual provisions for RNP capability and uses should be provided.

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
Application for PBN Approval

Front Side of PBN Application Form

APPLICATION FOR PERFORMANCE BASED NAVIGATION APPROVAL

INSTRUCTIONS
Print or type. Do not write in shaded areas, these are for CAAP use only. Submit original only to the CAAP Flight Standards Inspectorate or a CAAP Authorized Person. If additional space is required, use an attachment

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: ☐ Initial Request ☐ Additional Request

ADD	NAVIGATION-RELATED APPROVALS	ADD	NAVIGATION-RELATED APPROVALS	ADD	SPECIAL AREA APPROVALS
☐	1. RNAV/RNP-10	☐	7. RNP-APRCH	☐	1. NAT / NAM
☐	2. RNAV-5	☐	8. RNP-AR-APRCH	☐	2. PAC / RAC
☐	3. RNAV-2	☐	9. Baro VNAV	☐	3. SAM / RAC
☐	4. RNAV-1	☐	10. Unlimited NAT-MNPS	☐	4. MID ASIA / RAC
☐	5. RNP-4	☐	11. Special NAT-MNPS	☐	5. NORPAC
☐	6. RNP-1	☐	12. Other:	☐	6. CEPAC

E. ADDITIONAL APPLICATION ATTACHMENTS:

☐ 1.PBN Conformance Checklist	☐ 5.MEL (with PBN adaptation)	☐ 9. Modification Approval Document
☐ 2.AFM (or AFM Supplement)	☐ 6.Relevant Maintenance Program	☐ 10. Database Supplier Approval
☐ 3.Relevant Operations Manuals	☐ 7.Related Maintenance Procedures	☐ 11. Aircraft PBN Conformity Cklist(s):
☐ 4.PBN Crew Training Programs	☐ 8.Database Integrity Procedures	☐ 12. Other (see reverse):

If more space is needed to list application contents, please enter on reverse.

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
☐	1. FAA AC 20-130A	☐	7. FAA TSO-C129a+	☐	13. JAA JTSO-2C115()
☐	2. FAA AC 25-15	☐	8. FAA TSO-C115()	☐	14. JAA JTSO-2C129a
☐	3. FAA AC 25-14	☐	9. FAA AC 90-94	☐	15. JAA GEN TGL 10
☐	4. FAA AC 90-45	☐	10. FAA Order 8400-12A	☐	16. JAA AMG 20X2
☐	5. FAA TSO-C145	☐	11. FAA Notice 8110-60	☐	17. ICAO DOC 7030/4
☐	6. FAA TSO-C146	☐	12. RNP-10	☐	18. Other (see reverse):

Reverse Side of PBN Application Form

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.

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	OPERATIONS DIRECTOR SIGNATURE:
	DATE#	TRAINING DIRECTOR SIGNATURE:
	DATE:	MAINTENANCE DIRECTOR SIGNATURE:

I. CAAP 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

CAAP Form 550A [0]2011 **Control Number:**

APPENDIX B

Conformance Checklist: PBN Certification

Page 1 of PBN Conformance Checklist

CONFORMANCE CHECKLIST FOR
PERFORMANCE BASED NAVIGATION APPROVAL

INSTRUCTIONS
Print or type. Do not write in shaded areas, these are for CAAP use only. Submit original only to the Flight Standards Inspectorate or a CAAP Authorized Person. If additional space is required, use an attachment

A. APPLICANT INFORMATION:	
1. NAME OF APPLICANT OR HOLDER	2. DATE OF APPLICATION

B	MAINTENANCE DOCUMENTS	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Relevant parts of the MEL have been revised to reflect system requirements (redundancy levels) appropriate to the intended RNAV operations?	☐	☐		
2	Proposed maintenance program includes all RNAV related maintenance requirements prescribed by the manufacturer or design organization?	☐	☐		

C	RNAV MAINTENANCE PROCEDURES	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Procedures for handling and storage of RNAV database files including uploads to the aircraft?	☐	☐		
2	Procedures for operating equipment for handling of the RNAV database (use of, handling and periodic testing?	☐	☐		
3	Procedures for downgrading a non-compliant aircraft?	☐	☐		
4	Procedures for monitoring and reporting of repetitive defects?	☐	☐		
5	Procedures for reporting to FOCA?	☐	☐		

D	DATABASE INTEGRITY ASSURANCE PROCEDURES	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Operator procedures for nav database supplier evaluation?	☐	☐		
2	Operator procedures for integrity checks and use of software tools?	☐	☐		
3	Operator procedures for reporting discrepancies to the database supplier?	☐	☐		
4	Operator procedures for notifying flight crews of irregularities with nav database?	☐	☐		
5	Operator process for updating the navigation database?	☐	☐		

E	RNAV FLIGHT PLANNING PROCEDURES	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Flight crew verification of aeroplane RNAV/RNP approval.	☐	☐		
2	Flight crew verification of applicable RNAV/RNP time limits.	☐	☐		
3	Flight crew verification of applicable requirements for GPS (RAIM, FDE).	☐	☐		
4	Flight crew reviews operating restrictions related to RNAV/RNP Approval.	☐	☐		

Page 2 of PBN Conformance Checklist

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

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

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?s?	☐	☐		
2	Flight crew notification of ATC of loss of navigation capability?	☐	☐		
3	Flight crew guidance for contingencies which might be encountered?	☐	☐		
4	Flight crew guidance to reversion to and use of other NAV aids in case of RNAV failure?	☐	☐		

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

Page 3 of PBN Conformance Checklist

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?	☐	☐		
2	Training program for ground staff requiring initial and recurrent training for tasks supporting RNAV operations?	☐	☐		
3	Training curriculums for ground staff which include RNAV training modules with subject elements and minimum events?	☐	☐		

K	RNAV TRAINING: MAINTENANCE PERSONNEL	Applicable?	Not Applicable	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Qualification requirements for maintenance personnel supporting RNAV operations?	☐	☐		
2	Training program requiring initial and recurrent training for maintenance personnel for tasks supporting RNAV operations?	☐	☐		
3	Training curriculums for maintenance personnel which include RNAV training modules with subject elements and minimum events?	☐	☐		

End of Appendix B

APPENDIX C

Conformity Checklist: Individual Aircraft

Front Side of PBN Individual Aircraft Conformity Checklist

INDIVIDUAL AIRCRAFT CONFORMITY FOR PERFORMANCE BASED NAVIGATION	**INSTRUCTIONS** Print or type. Do not write in shaded areas, these are for CAAP use only. Submit original only to the Flight Standards Inspectorate or a CAAP Authorized Person. If additional space is required, use an attachment

A. APPLICANT INFORMATION:	
1. NAME OF APPLICANT OR HOLDER	2. DATE OF APPLICATION

B. AIRCRAFT TO BE OPERATED:		
1. AIRCRAFT MMS:	2. AIRCRAFT REGISTRATION:	2. 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
☐	1. Type Design	☐	4. FAA STC	☐	6. Other CAA STC
☐	2. Service Bulletin	☐	5. JAA STC	☐	7. CAA Major Modification
☐	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?	☐	☐		
2	The CMP is established and provided for assessment?	☐	☐		

F	SYSTEMS INSTALLATION	YES	NO	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	Single navigation system installed?	☐	☐		
2	Dual navigation systems installed?	☐	☐		
3	Single long-range navigation system installed?	☐	☐		
4	Dual independent long-range navigation systems installed?	☐	☐		
5	Triple independent long-range navigation systems installed?	☐	☐		

G	NAV SYSTEM CAPABILITY	YES	NO	Manual Reference (Chapter, Section, Paragraph)	Acceptable?
1	The aeroplane position is automatically determined from VOR/DME sensors?	☐	☐		
2	The aeroplane position is automatically determined from INS/IRS systems with automatic updating from suitable radio based navigation equipment?	☐	☐		
3	The aeroplane position is automatically determined from INS/IRS systems without automatic updating from suitable radio based navigation equipment?	☐	☐		

Reverse Side of PBN Individual Aircraft Conformity Checklist

4	The aeroplane position is automatically determined from independent (stand-alone) GPS systems?	☐	☐		
5	The aeroplane position is automatically determined from FMS / Multisensor navigation systems integrating	☐	☐		

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?	☐	☐		
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?	☐	☐		
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?	☐	☐		
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?	☐	☐		
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?	☐	☐		
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?	☐	☐		
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?	☐	☐		

I. ADDITIONAL INFORMATION PERTINENT TO THIS APPLICATION:
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J. NAVIGATION APPROVALS REQUESTED FOR AIRCRAFT

YES	NAV SPECIFICATION	YES	NAV SPECIFICATION	YES	NAV SPECIFICATION
☐	1. RNAV/RNP-10	☐	4. RNAV-1	☐	7. RNP-APRCH
☐	2. RNAV-5	☐	5. RNP-4	☐	8. RNP-AR-APRCH
☐	3. RNAV-2	☐	6. RNP-1	☐	9. 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. ☐ APPROVED (Aircraft added to the operations specifications with PBN authority.

☐ Initial ☐ Renewal ☐ All Requests Granted ☐ Limitations

2. ☐ DISAPPROVED

3. Signature of Approving Official | 4. Title | 5. Date

CAAP Form 550C [0]2011 Control Number:

End of Advisory Circular

RAMON S. GUTIERREZ

Director General

Date of Issue **: 23 September 2011**

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APPENDIX G

Draft Flight Validation Policy Statement

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14.7 Validation of PBN (RNAV/RNP) Instrument Flight Procedures

14.7.1 Overview

1.1 The purpose of this document is to set out Civil Aviation Authority of the Philippines (CAAP) policy on the validation of RNAV/RNP instrument flight procedures (IFP) designed by CAAP and third-party IFP approved procedure designers (APD).

1.2 ICAO PANS-OPS Doc 8168 Volume II, Part I, Section 2, Chapter 4; ICAO Doc 8071 Volume 1 Chapter 8 and Volume II Chapter 5; ICAO Doc 9906 Volume 1, 5 and 6; and Civil Aviation Regulations for Air Navigation Services Part 14 form the requirement and basis for validation of instrument flight procedures together with any additional requirements as stated in this document.

1.3 The CAAP has the responsibility for ensuring the safe design of instrument flight procedures within the Philippine Flight Information Region as provided under Section 24 Paragraph j and Section 35 Paragraph g of the Civil Aviation Law R.A. 9497 and the CAAP is therefore required to establish an IFP regulatory framework to ensure compliance with its responsibility.

1.4 The process for producing instrument flight procedures encompasses the acquisition of data, and the design and promulgation of procedures. It starts with the compilation and verification of the many inputs and ends with ground and flight validation of the finished product and documentation for publication.

1.5 Consequently, ground and flight validation and, in the case of RNAV/RNP IFP, an additional navigation database validation become part of the package of IFP design activities that is needed. ~~the CAAP will require the procedure designer to complete.~~

14.7.2 Scope

2.1 This document addresses:

- The ground validation of instrument flight procedures;
- The flight validation of instrument flight procedures;
- The navigation database validation of RNAV/RNP instrument flight procedures;
- The flight validation crew and aircraft requirements; and
- The meteorological conditions required for conducting flight validations.

14.7.3 Glossary of Terms

3.1. **Approved Procedure Designer (APD)** - An APD is a flight procedure designer who has met the competency requirements laid down by the CAAP for the design of instrument flight procedures for aerodromes or heliports, which are under the jurisdiction of the CAAP.

3.2. APV/Baro-VNAV – An instrument approach procedure, which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations. (ICAO DOC 8168)

3.3. 'Flyability' of an IFP - An assessment that the IFP is flyable by the anticipated range of aircraft types in various weight, speed and centre of gravity configurations, and in various weather conditions (temperature, wind effects and visibility). It is also designed to assess that the required aircraft manoeuvring is consistent with safe operating practices, and that flight crew workload is acceptable.

3.4. Independent Approved Procedure Designer (IAPD) – An APD who has not been involved in the design of the IFP which is being validated, but can be part of the same organisation.

3.5. Instrument Approach Procedure (IAP) - A series of pre-determined manoeuvres by reference to flight instruments with specific protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. (ICAO DOC 8168)

3.6. Instrument Flight Procedure (IFP) – A standard instrument departure (SID), or a planned departure route (PDR), a standard instrument arrival (STAR), or an instrument approach procedure (IAP).

3.7. RNAV T- or Y- Bar Procedure – An RNAV non-precision approach or APV incorporating a T- or Y- bar arrangement. It is based on a runway aligned final segment preceded by an intermediate segment and up to three initial segments arranged either side of, and along, the final approach track to form a T or a Y. The lateral initial segments are based on course differences of 70° to 90° from the intermediate segment track. (ICAO DOC 8168)

3.8. Sponsor A person or an organization who proposed a new design, changes to, or withdrawal of an IFP. ~~An aerodrome licensee or representative from an aerodrome acting on the licensee's behalf, or an ANSP, who proposes a new design, changes to, or withdrawal of an IFP~~.

3.9. Flight Validation Pilot – A pilot authorized to conduct a flight validation in accordance with this regulation.

14.7.4 Validation

4.1 Validation is the final step in the procedure design process, prior to publication in the State AIP. The purpose of validation is to confirm the accuracy and completeness of all relevant obstacle and navigation data, and to assess the flyability of the IFP.

4.2 Validation comprises a ground validation element and may also comprise a flight validation element. ~~In the case of RNAV/RNP procedures, a navigation database validation is also required~~.

4.3 The APD will compile an instrument flight procedure validation package for use in the ground / flight validation process. Each validation package shall include the following:

• A plan view of the final approach obstacle evaluation template, drawn on an appropriate topographical map of scale 1:50,000 to safely accommodate use for navigation, elevated terrain analysis, obstacles and obstructions evaluation;

• Completed documents that identify associated terrain, obstacles and obstructions as applicable to the procedure. The controlling terrain/obstacle should be identified and highlighted on the appropriate chart;

• Minimum altitudes determined to be applicable from map studies and database information for each segment of the procedure;

• A narrative description of the instrument ~~approach~~ flight procedure as appropriate;

• Plan and profile pictorial views of the instrument ~~approach~~ flight procedure as appropriate;

• Documented data as applicable for each fix, intersection, and/or holding pattern; and

• Satisfactory coordination report with appropriate ATS units.

~~• The output from the navaid coverage analysis that was conducted by/for the APD together with any supporting data and design assumptions.~~

4.4 The sponsor is responsible for all elements of the validation and shall document their proposed validation activities in a plan and submit as early as possible for agreement with the CAAP FICG. ~~ATMD ATS~~.

4.5 The CAAP FICG will complete the validation or supervise the validation activities as proposed by the sponsor. Upon satisfactory completion of the validation activities, the CAAP FICG will issue a certificate.

4.6 Prior to publication of the IFP, CAAP AANSO is responsible to ensure proper validation for the IFP is conducted.

14.7.5 Ground Validation

5.1 The aim of ground validation is to reveal any errors in criteria application and documentation, and assess the flyability of the IFP.

5.2 Ground validation comprises the following elements:

• Aerodrome assessment - Verify that the infrastructure required for the provision of an instrument runway as required by CAAP Manual of Standards for Aerodromes is in place;

• Obstacle clearance review – A review conducted by an APD for each route segment;

• Charting review – A review of the chart conducted by an APD;

• Coding review – A review of the coding table of RNAV/RNP IFP conducted by an IAPD; and

• Flyability assessment – As necessary, with the use of software tools, e.g. PC-based to full flight simulator, which can be used to evaluate a range of aircraft types in various weight, speed and centre of gravity configurations, and in various weather conditions (temperature, wind effects and visibility), it should be possible to evaluate the flyability of most procedures.

5.3 Where a flyability assessment is conducted using a flight simulator the following elements shall be evaluated:

• All segments of the instrument flight procedure shall be assessed;

• In the case of SIDs and PDRs, all segments of the procedure from the departure end of the runway (DER) to joining the en-route structure or termination point shall be assessed; and

• In the case of IAPs all segments of the procedure from the Arrival/ Initial Fix through to the Missed Approach shall be assessed.

5.4 Where procedures share the same segment of flight (e.g. initial), the shared segment needs only to be validated once.

~~5.5 In the case of RNAV IFP a test database for the full flight simulator produced by an appropriate navigation data provider for use in the flight management system (FMS) shall be used. (See section 7 for navigation database validation).~~

5.5 ~~Where~~ Unless a ground validation can~~no~~t fully verify the accuracy and completeness of all obstacles and navigation data considered in the procedure design or the flyability of the IFP, the CAAP FICG ~~may decide that~~ will require that the flight validation is conducted ~~required~~. The CAAP FICG in determining whether a flight validation is required shall consider a number of factors. These include, but are not limited to the following:

- Deviation from PANS-OPS criteria;
- Speed restrictions applied in the design;
- Any segment length less than PANS-OPS optimum length;
- A descent gradient used in the design greater than 6.1% for a non-precision approach and 3.5° for a precision approach;
- Procedures designed for use in a challenging terrain area and/or dense obstacle environment;
- Sources and quality of obstacles, aerodrome and terrain data cannot be identified;
- Use of a Step Down Fix (SDF) in the final approach segment;
- A track change of greater than 90° at a waypoint has been used within an RNAV procedure;
- The introduction of new procedures at an aerodrome;
- A procedure type that is new to the Philippines; and
- Special crew procedures and/or operational techniques likely to be necessary to fly the procedures.

14.7.6 Flight Validation

~~6.1 Flight validation shall be carried out, in cases when ground validation determines that flight validation is necessary~~

6.1 The objectives of the flight validation of IFP are:

Obstacle Verification.

- Flight validation should aim to verify the obstacle that is identified as the controlling obstacle for each segment, and to check that no new obstacles have been erected since the design was undertaken, or that no existing obstacles have been charted with grossly incorrect heights along the designated track; and
- The final approach segment should be flown at an altitude 30m (100ft) below the proposed minimum altitude(s) on a LNAV approach and on LNAV/VNAV approach, the final approach segment should be flown 30m (100ft) below the VNAV path at the minimum authorized temperature.

Flyability Assessment.

- Flight validation ~~can provide a detailed~~ should include an assessment of crew workload and charting issues. However, due to the limitation of data received from one aircraft under flight validation conditions, relying on ground validation for a flyability assessment may provide a more comprehensive analysis.

6.2 Where a flight validation is conducted the following elements shall be evaluated:

- All segments of the instrument flight procedure shall be flown;
- In the case of SIDs and PDRs, all segments of the procedure from the departure end of the runway (DER) to joining the en-route structure or termination point shall be flown until the flight path is clear of all obstacles; and
- Segments where there is less than 1000ft obstacle clearance in the obstacle assessment area ~~In the case of IAPs all segments of the procedure from the Arrival/ Initial Fix through to the end of the Missed Approach~~ shall be flown.
- Flight validation of the Visual Manoeuvring area shall also be carried out if Visual Manoeuvring is authorized.

6.3 Where procedures share the same segment of flight (e.g. initial), the shared segment needs only to be validated once.

~~6.5 In the case of RNAV IFP a test database produced by an appropriate navigation data-coding provider for use in the RNAV system shall be used. (See section 7 for navigation database validation).~~

~~6.6 However, in the case of RNAV (GNSS) IAPs of a T- or Y- bar design, manual entry of the procedure into the RNAV system in use is acceptable. In this case the validating pilot will need to manually activate the Course Deviation Indicator (CDI) scaling changes during the different phases of the flight. (See section 7 for navigation database validation).~~

~~6.7 The use of trials can provide comprehensive flight validation in a number of aircraft types under controlled conditions. The data should be assessed to determine how best it applies to the instrument flight procedure under consideration.~~

6.3 Crew Requirements

6.3.1 The minimum crew of the validation aircraft shall be one Flight Validation Pilot, and the second crew member who is a ~~one~~ CNS Flight Inspector or a Flight Validation Pilot or ~~and~~ an ~~one~~ Instrument Flight Procedure Designer.~~ to collectively validate the IFP It is desirable that the CNS Flight Inspector has ICAO PANS-OPS Volume II knowledge.~~

Crew Qualification

6.3.2 A Flight validation pilot must meet ~~shall be accomplished by a pilot with all of the~~ following current qualifications:

- Commercial Pilot's Licence or Airline Transport Pilot's Licence (A) or (H) as applicable;
- Instrument Rating; ~~and~~
- Completed an approved training on conducting flight validation in accordance with the training requirement in ICAO Doc 9906 Vol 6; and ~~ICAO PANS OPS Training~~
- Knowledge of and skills in ground and flight validation procedures

If a CNS Flight Inspector is a member of the flight validation crew, he/she should have ICAO PANS-OPS Volume II and PBN knowledge.

~~6.9 Aircraft Requirements~~

~~6.9.1 The aircraft to be used for flight validation of an IFP shall have the performance capabilities appropriate to the categories for which the IFP has been designed.~~

6.4 Meteorological Conditions

6.4.1 All IFP validation flights shall be conducted during daylight hours in visual meteorological conditions (VMC), which allow the flight to be carried out with a flight visibility of not less than 8KM, and in sight of the surface throughout the flight validation of the procedure.

~~**14.7.7** Navigation Database Validation~~

~~7.1 Navigation database validation is only applicable to RNAV/RNP instrument flight procedures. Such procedures are coded using ARINC 424 path terminators to define specific nominal tracks, which are defined by waypoint location, waypoint type, and path terminator and, where appropriate, speed constraint, altitude constraint and course.~~
~~7.2 The key element of a navigation database validation is to ensure that the coding of the procedure in the RNAV/FMS system does not compromise the flyability of the procedure.~~

14.7.7 Reports

7.1 On completion of the validation, the flight validation pilot must complete the validation report.

~~Where a ground and/or flight and navigation database validation has been conducted, a report shall be completed by each of the following where applicable:~~

~~• Instrument flight procedure (APD);~~

~~• Validating pilot / CNS Flight Inspector (FICG)~~

~~• Relevant ATS unit.~~

7.2 The standard report format is shown in Appendices (A), (B), (C), and (D).

7.3 Completed validation reports shall be forwarded to ~~Air Traffic Services~~ the sponsor and CAAP-AANSO.

References

a. ICAO PANS-OPS Doc 8168 Volume II, Part I, Section 2, Chapter 4

b. ICAO Doc 8071 Volume 1 Chapter 8 and Volume II Chapter 5

c. ICAO Doc 9906 ~~Volume 1~~

d. R.A. 9497.

APPENDIX H

Manual of Special Operations Approvals

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MANUAL OF
SPECIAL OPERATIONS APPROVALS

CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

Committed to the highest standards of Ethics and Excellence

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Approval

This Manual of Special Operations Approvals is one in a set of manuals forming the technical guidance provided for the conduct of aviation safety oversight by the Civil Aviation Authority of the Philippines (CAAP). These manuals are produced to provide the information, policy and procedures necessary to perform tasks in support of the Philippine Civil Aviation Regulations (PCARs).

All personnel assigned by the CAAP to perform tasks that are addressed in this manual shall comply with these policies and procedures in the performance of their duties. All other relevant working documents relating to these specific tasks and responsibilities will also be considered. If there is any conflicting guidance, the employee should advise management in writing. It is a goal of the CAAP to provide guidance that empowers personnel to conduct their tasks in a standardized manner.

This manual is subject to regular review and improvement as approved by the Director. The CAAP has authority to amend the manual, as necessary, to conform to the Philippine Safety Oversight Program.

This manual will be treated as a dynamic document. As a result of amendments to the Philippine Civil Aviation legislation and the progress of aviation safety practices, there will be the need for amendments. Contribution of meaningful ideas for the improvement of the content of this manual is therefore encouraged and requested from all users.

Approved by:

Ramon S. Gutierrez
Director-General

Date of Issue : 23 September 2011

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Record of Revisions

- The overall revision status of this manual is identified in this Record of Revisions.
- Consult the List of Effective Pages to determine the current revision status of each page.

Rev. No.	Revision Date	Ini-tials	Supv Insp.	Rev. No.	Revision Date	Initials	Supv Insp.
01	30 Sept 2011			26			
02				27			
03				28			
04				29			
05				30			
06				31			
07				32			
08				33			
09				34			
10				35			
11				36			
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21				46			
22				47			
23				48			
24				49			
25				50			

Rev. No.	Revision Date	Ini-tials	Supv Insp.	Rev. No.	Revision Date	Initials	Supv Insp.
51				80			
52				81			
53				82			
54				83			
55				84			
56				85			
57				86			
58				87			
59				88			
60				89			
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67				96			
68				97			
69				98			
70				99			
71				100			
72				101			
73				102			
74				103			
75				104			
76				105			
77				106			
78				107			
79				108			

Comment Report

Please complete this form to transmit your comments, questions, or suggestions concerning this Manual (*See **Header***). Attach any reference pages, marking area where changes or questions apply.

Name: ____ Position: __________________

Dept.:__________________ Base:_______________ Box Number: _________________

Date Submitted: ____

E-mail Address: ____

Material Unclear

Chapter ______________________ Page _______________________

Suggestions for improvement ____

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Material Incorrect

Chapter ______________________ Page _______________________

Correction ____

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Suggestions for Additional Material

Chapter ___________________

Subject ____

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Additional Comments

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Director
Flight Standards Inspectorate
Civil Aviation Authority of the Philippines

Record of Bulletins

- Insert Bulletins in chronological order as directed by the Bulletin.
- The actual bulletin will appear separately as a file in the Inspector Toolkit sub-folder C-CAAP Technical Guidance.

Bulletin	Date Posted	Subject (Remarks)	Date Removed

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List of Effective Pages

End of LEP

Table of Contents

End of TOC

Index

A

C

E

G

H

I

L

M

N

P

R

S

T

W

End of Index

Chapter 1
Manual Administration

The purpose of this Chapter is to provide guidance for the—

- Availability of this manual.
- Compliance with this manual.
- Revision of this manual.
- Understanding of the manual formatting.
- Application of standard symbols or methods.

1.1 PRIMARY USER MANUAL FOR SPECIAL OPERATIONS APPROVALS

A. This manual is the primary user manual for all CAAP-FSIS inspector personnel involved in Special Operations Approvals.

> A primary user manual is defined as a manual that contains the compiled general policies and procedures for the conduct of a user's assigned duties for a specific task or job category.

B. The guidance in this manual has precedence over any other Special Operations Approvals Manual guidance issued by the CAAP.

- These policies shall be followed by the CAAP-FSIS personnel in the conduct of Special Operations Approvals.

1.2 AVAILABILITY OF THIS MANUAL

A. The official version of this Special Operations Approvals Manual is available to CAAP personnel on the CAAP Intranet.

B. All other copies of this manual, whether digital or hard copy, are considered "Uncontrolled.

> FSIS personnel are cautioned to always review the official copy of this manual before taking any official action, such as certification or enforcement.

- Use of an uncontrolled copy of this manual as a primary reference may result in non-adherence to current CAAP policy or procedure for the related action.

C. An uncontrolled printed copy will also be maintained in the Technical Library.

1.3 COMPLIANCE WITH THIS MANUAL

A. Each assigned user must comply with policies and procedures provided in this manual.

> Following the policies and procedures of this manual will ensure compliance with the CAAP requirements.

B. Should the user identify any policy or procedure that might not be consistent with CAAP requirements, that information should immediately be communicated to their assigned supervisor.

1.4 MAINTENANCE & OWNERSHIP OF MANUAL

A. FSIS personnel are not required to maintain a printed copy of this manual.

B. For personal, but “un-official” reference, FSIS personnel are authorized, for training and day-to-day reference, to—

1) Print an unofficial paper copy; and/or

2) Download the digital file from the server to their laptop.

C. FSIS personnel are expected to use the Special Operations Approvals Manual is maintained at the direction of the FSIS Director.

D. Any printed or digital copy must be relinquished to the appropriate FSIS supervisor in the event of the user’s retirement, termination, transfer or contract termination.

> The content of this manual is managed and updated by the FSIS and is the express property of the government.

1.5 INSERTING REVISIONS TO THIS MANUAL

1.5.1 TYPES OF REVISION

How this document will change in the future will be dependent on the type of revision. There are three primary methods of revising the text of this manual—

> An uncontrolled copy of a manual will be maintained in the office of the FSIS Director for reference purposes.

1.5.1.1 Time-Critical

A. Time-critical information will be made available on the servers as separate Bulletins at the bottom of the C-Technical Manuals folder in the Inspector’s Toolkit.

> Notifications of issuance of these bulletins will be sent in emails to the listed users of this manual.

B. They will also appear in the front of the official manual following the Record of Bulletins page.

- These Bulletins will not effect the manual page numbering and will not be included in the LEP.
- These bulletins will be canceled when the information has been incorporated into a formal revision to the manual or is no longer pertinent.

1.5.1.2 Formal Manual Revision

A. A new digital manual incorporating the latest revision will be issued with a revision number and highlights of the revision.

B. These revisions will include updating of the list of effective pages, table of contents and index and include the insertion of the revision will be recorded by the user in the Record of Revisions.

- Users of hard copy manuals should review the LEP and make the proper page revisions.

1.5.1.3 Supervisory Revision

A. “Supervisory” revisions may be issued by CAA management as necessary to make simple changes to policy and procedure.

B. Supervisory revisions, it should be accomplished by—

1) Inserting Adobe attachments within the Intranet Inspector Toolkit official copy of this manual; and

2) Distributing by mail attachments to all applicable employees.

1.5.2 NOTIFICATION OF REVISIONS

A. Notification of revisions to the official copy of this manual will be forwarded by email to all persons and organizations on the distribution list maintained by the FSIS Director for this manual.

B. Regardless of personal schedules, the user of this manual is required to respond to this email and confirm review of the receipt.

C. This confirmation will indicate that the user has reviewed and will adhere to any policy or procedure change.

- The notification will indicate any change of policy or procedure included in the revised document.
- This information will also appear on page 2 of the Record of Revisions of this manual.

1.5.3 EFFECTIVE PAGES [LEP]

A. An LEP (beginning at page 0-3) will be issued for the original and all revisions to this manual.

B. The LEP is the controlling reference for the page currency of the manual.

C. The LEP may be used to verify that all pages of the manual are current.

D. Only the most current LEP page(s) will be displayed in the official copy of the manual.

1.5.4 IDENTIFYING REVISIONS

1.5.4.1 Summary Page

A. Each revision contains a summary page that reflects important information concerning the revision on the page immediately following the Record of Revisions.

B. An 'action' page number and summary column contain pertinent information to follow when reviewing the revised pages.

1.5.4.2 Change Bars

A. Black vertical change bars in the outside margin are used to highlight the location of new or revised text on a newly published page. Deletion of text will be noted in the revision summary.

B. Change bars are used to highlight a change in the revision information at the bottom of the page.

- Change bars will also be used to highlight the revision information when a change elsewhere in the chapter has shifted the page text, but no text revision was made on the page.

C. Change bars will not be used on the LEP, index or table of contents pages normally generated automatically by the publishing software.

D. With the next revision of a page, previous change bars are deleted.

1.5.5 RECORDING REVISION

To indicate inclusion of a revision, effective date of the revision will appear after the appropriate revision number on the Record of Revisions page located in the front of the manual.

1.5.6 DISPOSAL OF SUPERCEDED UN-OFFICIAL COPIES OR PAGES

A. Any person that maintains an unofficial copy of the manual must, in the case of a—

1) Digital copy – replace that file with a copy of the updated file;

2) Hard copy – replace the copy in its entirety or insert the new pages (discarding the old pages).

The holder who just replaces pages should indicate accomplishment by initialing on the Record of Revisions page by the Revision Number.

B. Personnel maintaining an unofficial copy should advise, on receipt of a revision notification, that their unofficial copy has been updated.

1.6 PROPOSING REVISIONS TO THIS MANUAL

1.6.1 SUGGESTIONS FOR REVISION ARE WELCOME

The success of the CAAP policy and procedure implementation depends on employees and other users bringing professional insights. The CAAP-FSIS welcomes and encourages such communication to ensure that the company operates at peak performance.

1.6.2 SUGGESTING REVISION CONTENT

A. Any user of this manual may propose changes to the manual text. These proposals should be addressed to the CAAP-FSIS Director by—

1) Completing the “Comment Report” form that is included in the front of this manual immediately following the “Record of Revision and submitting it to the CAAP-FSIS Director’s Secretary; or

2) Sending an email outlining the suggested revision.

Consult the Comment Report form to standardize the email text of the submitted revision.

1.6.3 REVISION RESPONSIBILITIES

A. The CAAP-FSIS employee accomplishing any duties that are covered by the policy and procedure of this manual must accomplish them in accordance these policies and procedures/

Any employee that finds it necessary to depart from the policies/procedures of this manual in order to properly accomplish the task must report this occurrence to the CAAP-FSIS Director

B. The CAAP-FSIS Director is responsible for the content of the text of this manual and has the authority to revise the content as necessary to ensure proper guidance to the Inspectorate for their duties.

C. The CAAP-FSIS Director may delegate the authority to develop the content of a revision to another CAAP-FSIS employee, but does not delegate the approval authority.

1.7 EDITING CONVENTIONS

The following editing conventions will apply to the use of certain specific terminology within the text of all CAAP manuals–

1) **Gender** – In this manual, the male or female gender may be used in a generic sense to designate both sexes.

2) **Will, Shall and Must** – The words “will,” “shall,” and “must” are used in an imperative sense to state the requirement to accomplish the act prescribed. Compliance is mandatory.

3) **May** – The word “may” is used in a permissive sense to state authority or permission to do an act. Compliance is not mandatory.

4) **Includes** – The word “includes” means “includes, but is not limited to...”

5) **Refer to** – Where further discussion or reference is suggested, the notation “*Refer to....*” directs the reader to material located in another paragraph, chapter or manual. In these cases, the referenced location should be specific as to manual, chapter and paragraph.

6) **PCAR** or **PCARs** – Where used in this manual, this acronym will be an abbreviation for the Philippine Civil Aviation Regulations.

7) **Part or Parts** – Where used in this manual in association with the acronym "PCAR" or followed by a number or series of numbers, will be a reference to one or more of the Parts of the Philippine Civil Aviation Regulations which contain specific regulatory requirements.

1.8 USE OF NOTES, CAUTIONS AND WARNINGS

These additions to the text are used to highlight or emphasize important points when necessary. They call attention of the user about safety and precautionary or additional information to make the job safe, easier and efficient.

1.8.1 NOTES

A. Notes provide amplified information, instruction, or emphasis (see example).

A "NOTE" is identified and displayed in this type of box.

B. Notes call attention to methods that enable a user to perform a job easier or wiser.

C. If a Note applies to consecutive procedural steps, it is placed under the topic heading for those steps.

1.8.2 IMPERATIVE EMPHASIS NOTE

A. Imperative Emphasis Notes are used to emphasize the necessity to comply with the text provided (see example).

An "IMPERATIVE NOTE" is identified and displayed in this type of box.

B. This display is used when the text is important, but does not meet the criteria for a caution or warning.

1.8.3 CAUTIONS

A. Cautions are instructions about hazards that, if ignored, could result in damage to an aircraft component or system (see example).

A "CAUTION" is identified and displayed in this type of box.

B. Cautions specify methods and procedures that must be followed to avoid damage to equipment.

C. If the caution applies to consecutive subtasks/steps, it is placed before the first subtask/step.

D. If the caution applies to several, non-consecutive subtasks/steps, it is placed before the applicable subtask/step.

1.8.4 WARNINGS

Warnings are instructions about hazards that, if ignored, could result in injury, loss of aircraft control or loss of life (see example).

A "WARNING" is identified and displayed in this type of box.

1.9 INTENTIONALLY BLANK

A. "This page intentionally left blank" will be printed on any page that contains no text or graphics. This will usually be the even page at the end of a chapter.

B. "The remainder of the page intentionally left blank" will be printed on any page that has more than 15 lines of blank space at the bottom of the page.

C. The only exception to paragraph B is when "End of Chapter" or "End of Section" is printed immediately following the text.

End of Chapter - Appendix Follows

APPENDIX 1-A

Definitions & Acronyms for this Manual

1. Definitions

D. The following definitions are used in this advisory circular—

1) **Aeromedical Director.** A licensed physician within an air ambulance service or EMS operation who is ultimately responsible for patient care during transport missions. The aeromedical director is responsible for assuring that appropriate aircraft, medical personnel and equipment are provided for each patient.

2) **Air Ambulance Service and/or Emergency Medical Service (EMS).** The use of an aircraft in transportation, for carriage of ambulatory or other patients requiring special care, including BLS or ALS, during flight, and/or transport of body organs for medical reasons.

> An air ambulance or EMS aircraft may be used to transport patients deemed by medical personnel to require other special service not available on regular commercial air carrier or charter flights.
>
> - The service of providing transportation to medical personnel for the purpose of harvesting body parts is considered a passenger operation.
> - The service of providing transportation for body organs and no passengers can be considered a cargo operation..

3) **EMS/H:** A helicopter designated for the transportation of ambulatory patients or other patients requiring special care including, but not limited to, basic life support (BLS) or advanced life support (ALS).

   ♦ An air ambulance or EMS/H is equipped with the medical equipment (portable or installed) necessary to support these levels of care in flight with trained medical personnel.

4) **Helicopter Emergency Medical Evacuation Service (HEMES).** The operation of a helicopter, based at a hospital, to transport patients in an emergency medical evacuation service only.

5) **Medical Personnel**. A person trained in air medical environment and assigned to perform medical duties during flight including, but not limited to, doctors, nurses, paramedics, respiratory therapists or emergency medical technicians.

   ♦ Medical personnel may also be trained and assigned to perform other duties by the AOC holder.

6) **Basic Life Support.** This refers to the air-medical provider offering airborne patients transport staffed by a minimum of one medical person who is experienced and qualified by training, certification and current competency in BLS care.

   (a) This medical person practices through the orders of a physician-medical director and is supported by a medically configured aircraft capable of providing BLS systems (such as oxygen, suction, electrical supply, lighting, and climate control) to the patient.

   (b) As used in this circular, BLS consists of a medical person capable of recognizing respiratory and cardiac arrest, starting and maintaining the proper medical procedures until the victim recovers, or the medical person stops procedures, or until ALS is available. In air medical transports, BLS includes air-to-ground communications to ensure continuity of care.

7) **Advanced Life Support** This refers to the air-medical provider offering airborne patients transport staffed by a minimum of two medical personnel who are experienced and qualified by training, certification, and current competency in emergency critical care.

ALS includes—
- Air-to-ground communications to ensure continuity of care,; and
- The capability of constant monitoring and life support until the patient has been delivered to a continuing care facility.

(a) The medical personnel practice through the orders of a physician-medical director and are supported by a medically configured aircraft capable of providing life support systems (such as oxygen, suction, electrical supply, lighting, climate control, pressurization, etc.) to the patient.

(b) The following elements are recommended for ALS—

(i). BLS capability;

(ii). Using adjunctive equipment and special techniques, such as endotracheal intubation and closed chest cardiac compression.

(iii). Cardiac monitoring for dysrhythmia recognition and treatment.

(iv). Defibrillation.

(v). Establishing and maintaining an intravenous infusion lifeline.

(vi). Employing definitive therapy, including drug administration.

(vii). Stabilization of patient's condition

8) **Availability –** The probability that an operational communication transaction can be initiated when needed.

9) **Communication –** The accurate transfer of information between sender and receiver, the content of which can be readily understood by both.

10) **Communication Process Time –** The maximum time for the completion of the operational communication transaction after which the initiator should revert to an alternative procedure.

11) **Continuity –** The probability that an operational communication transaction can be completed within the communication transaction time.

12) **Integrity –** The probability that communication transactions are completed within the communication transaction time with undetected error.

13) **Required Communications Performance (RCP) –** A statement of the communication performance necessary for an aircraft to perform a given operation within a defined airspace or for a defined procedure or operation.

14) **Required Communications Performance Type (RCP type) –** Denotes communication service and aircraft capabilities; a label (e.g. RCP 240) that represents the values assigned to RCP parameters for communication transaction time, continuity, availability and integrity.

End of Appendix 1-A

APPENDIX 1-B
Acronyms & Abbreviations

15) **AOC –** Air Operator Certificate
16) **APV** – Approach Procedure with Vertical Guidance
17) **ALS** – Advanced Life Support
18) **BLS** – Basic Life Support
19) **AMT** – Aviation Maintenance Technician
20) **AMO** – Approved Maintenance Organization
21) **AOC** – Air Operator Certificate
22) **EASA** – European Aviation Safety Agency
23) **ECAC** – European Civil Aviation Conference
24) **EUROCAE** – European Organization for Civil Aviation Equipment
25) **CAAP** – Federal Aviation Administration
26) **FMS** – Flight Management System
27) **GNSS** – Global Navigation Satellite System
28) **GPS** – Global Positioning System
29) **GRAS** – Ground-based Regional Augmentation System
30) **IRU** – Inertial Reference Unit
31) **LNAV** – Lateral Navigation
32) **MEL** – Minimum Equipment List
33) **PBN** – Performance Based Navigation
34) **RCP –** Required Communications Performance
35) **RCP Type** – Required Communications Performance Type
36) **RNAV** – Area Navigation
37) **RNP** – Required Navigation Performance
38) **RTCA** – Radio Technical Commission on Aeronautics

End of Chapter

APPENDIX 1-CACRONYMS

The following acronyms and abbreviations are used in this advisory circular—

39) **EMI** – Electromagnetic Interference
40) **EMS** – Emergency Medical Services
41) **EMS/A** – Emergency Medical Services with Aeroplanes
42) **EMS/H** – Emergency Medical Services with Helicopters
43) **CAAP** – Civil Aviation Authority of the Philippines
44) **PCAR** – Philippine Civil Aviation Regulation
45) **HEMES** – Helicopter Emergency Medical Services
46) **MEL** – Minimum Equipment List
47) **MMEL** – Master Minimum Equipment List (approved by State of Design (or Manufacture.
48) **RFI** – Radio Frequency Interference
49) **TSO** – Technical Service Order
1)

End of Chapter

Chapter 2
Policies & Overview

This chapter is to provide guidance on the processing of special operational authorisations.

2.1 GENERAL

A. The issuance of an Air Operator's Certificate (AOC) or a Letter of Authorization (LOA) permits an air operator or an individual, respectively, to conduct a basic operation. There are additional approvals that may be granted demanding specialized training, equipment, procedures or other requirements that must be met prior to an operator conducting such operations.

B. This chapter provides the basic criteria for approval and, where necessary, the references wherein the detailed guidance associated with gaining special operations approvals can be found. It is necessary that operators note that any guidance provided represents an acceptable means, but not the sole means, for obtaining the respective approvals.

C. The information provided in this chapter is primarily for the Operations aspect of a request for special approvals.

There is always an Airworthiness component that must be addressed by the Airworthiness Inspectors before the approval can be issued.

2.1.1 ADHERE TO THE CERTIFICATION PROCESSING

A. Operator requests for operations approvals (includes authorizations, approvals and acceptance) are administered similarly to the initial certification process, including the following phases:

- Phase 1 – Preapplication
- Phase 2 – Initial Application Review
- Phase 3 – Document Conformance
- Phase 4 – Demonstration & Inspection
- Phase 5 – CAAP Administrative Actions

B. Following submission of CAAP Form 60, *Pre-Application Statement of Intent*, a date must be set for the Pre-Application meeting at which the company's proposal will be discussed and the CAAP's approval criteria identified. Detailed records of this and each subsequent meeting will be maintained.

C. In that meeting, the company will be advised that they must submit a formal application that contains at least the following before any CAAP resources will be committed to their proposal:

1) A realistic "Schedule of Events";

2) A "Conformance Checklist";

3) Any documentation in support of the requested approval;

4) The proposed changes to the Company Operations Manual; and

5) The proposed changes to their training program.

D. The CAAP will initially review the company's proposal to ensure that all of the required application documents have been included and generally follow the requirements for documentation.

- If not, the entire application package will be returned, pending inclusion of all required items.
- If yes, a Formal Application Meeting will be convened to review the events that must occur.

E. During the Document Compliance and Evaluation phase, the CAAP staff will review the items submitted for compliance with the regulations and relevant safety practises related to the particular special operation.

> As each document becomes acceptable, the CAAP will arrange to inspect the training, personnel, support programs, applicable records, facilities and capabilities and aircraft that will be included.

F. The company must then demonstrate the ability to exercise the policies and procedures applicable to special approval. This will be done through a demonstration or validation flight depending on the intial circumstances.

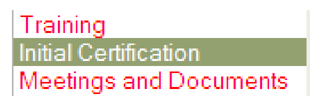
G. After a determination has been made that the operator has met all of the approval requirements, the CAAP staff will provide the documentation package to the CAAP Manager so that he may issue either the OpSpec or a Letter of Authorization (LOA), as appropriate.

2.1.2 ACTION RECORD ENTRIES

Making good CAA Action records of the inspector actions and decisions in the approval process is a key to having good overall all certification records. To record these certification processes coherently, the following are critical—

2.1.2.1 Start the Certification Process

This will be a formal certification so the assigned CPM will begin the process by—



1) From the CAA Action number drop-down menu, select **Initial Certification.**
2) From the list of possible certifications, select the appropriate CAA Action number.
   - ♦ Remember to select the radial button for **All** - if the CAA Action number that you are seeking does not appear.

> APPLICABLE CAA ACTION NUMBER
> - 1152 Series

3) Include a brief statement in the memo field regarding the certification.
4) Select the applicable Organization
5) Commit the record
6) Then select **View record just entered,** note the database assigned "control number" of this record is used as the project number.

2.1.2.2 Make New Project Number Available

7) The CPM must ensure that a new Project Number is included in the "Project Number" Menu.
8) Ensure that the Project Number field has the correct number (as selected from the drop-down menu).

2.1.3 ORG DATABASE ENTRIES

It is also very important when completing the process to revise the operations specifications that have been issued to the organization. This will require that the CPM insert the authorizations in the ORG database correctly. Some key elements to consider—

1) Do Not Over-Write Previous Records

- It is important to always make a new record when entering approvals and authorizations.

> The previous, out-dated record should just be deactived.

- With this historical "trail" of records, the CAAP will be able show when each approval became effective or was terminated.

2) Use Final CAA Action Record ID

- The final record of any certification effort should be the closing of the project.
- Do not make the data entry into the ORG subtables until that CAA Action record has been completed showing that the CPM has completed the close-out the certification. The Control Numbr of that project completion record inserted into the ORG database record of the approval.
- When that action has been taken the approving control number is identified. This number should immediately be used to record the approval in the ORG database. This control number will print out on the ops specs.

Control Number 063416

3) Effective Date

- The effective date of the issuance of the authorization by the CAA should be correct.

Effective Date * (dd/mm/yyyy) 09/08/2006

- Remember that most of the date fields in CASORT default to the current date. If the approval is effective before or after that date, it will be necessary to change the date to the correct one.

4) Revision Number

- Always insert a revision number for the authorization.

Revision Number 02

- Good information in this field will allow the CAAP to reconstruct the historical record of approvals for this particular special operations authorizations.
- To facilitate later sorting use at least a three-number format (e.g. 000, 001, 002, 003).

5) Limiting Factor

- Most of these special operations have a specified limiting factor.

Limiting Factor 600 RVR

- Enter that information in the **Limiting Factor** field.

2.1.4 OTHER INFORMATIONAL FIELDS

There are other fields which can provide very specific information regarding this particular approval. These are memo-style fields (see note). A brief text entry in the following fields would be appropriate—

> - Remember the rule regarding memo fields: Don't put anything negative in these fields.
> - If you believe a negative comment is necessary, put that comment as a Safety Issue in an CAA Action record so that it may be tracked to correction.

- **Equipment**. The navigational equipment installed on the aircraft that will be used for the particular special operation should be entered. For some certifications this field will be used to provide information to the operations specifications. Make the entry brief, but complete.

Equipment

- **Method.** For some operations, the specific method or procedures will be included in the operator's manual. The specific reference to that manual, chapter, and paragraphs should be included in this field

Method

- **Basis & Notes.** This field has been provided to allow a user to make brief notes regarding the approval and issuance of this specific authorization.

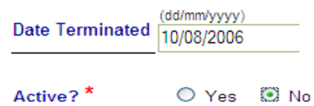
2.1.5 REVISION TO EXISTING SPECIAL APPROVAL

2.1.5.1 Make a new ORG Approval Record

- When the operator requests a revision to an authorization, a new ORG Approval should be entered in the database with a new revision number.

2.1.5.2 De-Activate the Previous Approval

- Through the **Home Page>View ORG Subtables**, select the previous record for editing.
- Make a date entry in the **Date Terminated** field.
- Select the Active radial button for **No**
- Select **Commit** (The record will no longer appear in the Ops Specs)



2.1.6 PRINT THE NEW OPERATIONS SPECIFICATION

A. The final action will be to print two copies of the section of the operations specifications that has been revised.

B. Both copies will be signed by a designated representative of the company and the CAAP.

C. The signed copy retained by the CAAP will be posted in the Working Files binder located with the CAAP copy of the company. manuals.

D. The superceded ops spec will be filed in the Historical Technical Files in the folder labeled “superceded operations specifications.

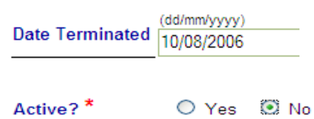
2.1.7 TERMINATION OF AN EXISTING SPECIAL APPROVAL

2.1.7.1 Access the current ORG Approval Record

A. When it becomes necessary to deactivate an existing Special Operations approval, the current ORG subtable containing the approval will be accessed from the CASORT ORG View page.

B. If at the request of the organization, the process is essentially—

1) Through the **Home Page>VORG bar View button,** select the previous record for editing.
2) Make a date entry in the **Date Terminated** field.
3) Select the Active radial button for **No**
4) Select **Commit** (The record will no longer appear in the Ops Specs)



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The superceded ops spec will be filed in the Historical Technical Files in the folder labeled “superceded operations specifications.

Chapter 3
Special Areas of Operations

This chapter provides direction and guidance for the evaluation and approval or denial of an operator's request to conduct operations in CAAP-designated special areas of operation.

3.1 BACKGROUND

A. Special areas of operation are geographic areas having unique characteristics that require the use of special equipment, procedures, and/or techniques to safely conduct flight operations.

B. These special areas also include operational situations when the application of standard criteria is not sufficient and other than standard criteria are more appropriate and can be safely used.

C. Special areas of operation include the following—

- Areas requiring high levels of performance due to a reduction in separation standards;
- Areas where navigation by magnetic reference is unreliable and/or inappropriate;
- Areas where metric altitudes/flight levels (FL) are used (altitudes in meters);
- Areas where communication difficulties are frequently encountered;
- Areas where air traffic control (ATC) difficulties are frequently encountered;
- Areas where operations by Philippine operators have political or international sensitivity;
- Areas where aircraft with unique performance characteristics require special criteria; and
- Areas where dual long -range navigation systems (LRNS) are not normally required.

3.1.1 AREAS REQUIRING HIGH LEVELS OF PERFORMANCE

A. In special areas of operation, the ATC system supports a reduction in separation standards. This reduction in separation standards requires improved levels of performance.

B. Significant increases in air traffic over certain busy routes, such as the North Pacific, European domestic airspace, United States domestic airspace, and the North Atlantic, can be accommodated efficiently if the ATC separation minimums are reduced to permit more aircraft to operate in the same airspace, at the same time.

C. However, this reduction in separation minimums can only be safely accomplished through significant improvements in ATC capabilities and the performance of all aircraft operating within that segment of airspace. The options currently available to permit reductions in ATC separation minimums include the use of the following—

- Independent surveillance (ATC radar),
- Automatic Depend ent Surveillance (ADS) (data link of the aircraft's present position to the ATC system),
- Improved traffic flows through the use of time-based metering,
- Reduced lateral separat ion minimums,
- Re duced vertical separation minimums,
- Reduced longitudinal separation minimums, and
- Communication

3.2 GENERAL POLICIES

3.2.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal certification process as outlined in CAAP guidance.

B. The formal certification process for special areas of operations may run concurrent with the process for performance based navigation certification of the operator.

> In these concurrent situations, a separate project number will be required to separately record the CAAP actions for MNPS.

3.2.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for special areas of operations .

B. It is the Airworthiness (Avionics) Inspector's responsibility to evaluate and approve the airworthiness requirements and associated support programs.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval for special areas of operations .

> APPLICABLE Action NUMBER
> - 1152G: Approve Special Area Operations
> - 1152G1: Approve MNPS Operations
> - 1152G2: Approve MNPS/NAT Operations
> - 1152G3: Approve NOPAC Operations
> - 1152G4: Approve PACOT Operations

3.2.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector to process the documentation and approval issuance who is not technical qualified in operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an avionics inspector;
2) With documented formal training in MNPS certification requirements; and
3) Has documented completion of OJT by a qualified instructor forfor special areas of operations Program and Conformance

C. An assigned flight operations inspector will be considered qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Is qualified in large turbojet aircraft;
2) With documented formal training in certification requirements for special areas of operations;
3) Has documented completion of OJT by a qualified instructor for for special areas of operations ; and
4) Has documented aircraft qualification of completion of LOFT simulator session for the application for special areas of operations -related procedures, including contingency procedures.

3.2.4 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for special areas of operations ;
- PCAR Part 8, in that, the operator must have CAAP approval and flight crews must be qualified for operations in for special areas of operations ;
- PCAR Part 14, in that the AOC flight crews must receive formal training and qualification for operations in for special areas of operations and maintain continuing qualfication for such operations;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for operations in special areas of operations ;

3.2.5 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to MNPS—

- CAAP: AC 08-009, *Application & Process: Operations in MNPS Airspace*;
- Aircraft manufacturer's procedures, limitations and relevant safety practices;
- EUROCONTROL DOCs; and
- ICAO: DOC 7030/4, *Operations in NAT-MNPS Airspace;*
- United States Federal Aviation Administration: AC 120-33, *Operational Approval of Airborne Long-Range Navigation Systems for Flight within the North Atlantic Minimum Navigation Performance Specifications Airspace*.

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered with mutual agreement of the operator and CAAP.

3.3 BACKGROUND

3.3.1 SPECIAL AREAS (NAVIGATION PEFORMANCE)

A. In an effort to maximize the use of airspace, ICAO and individual States have established areas wherein reduced aircraft separation criteria apply based on the operator's ability to navigate with greater degrees of accuracy than was previously possible.

- These areas have been termed special areas of operations .

B. The navigation accuracy standard used by most States and ICAO is that developed for the North for special areas of operations.

C. ICAO requires operators to obtain approval from their CAAP before conducting any operations within such airspace (Annex 6 requires approval by the State of Registry of the aircraft).

> When aircraft are leased to operators in another State, the State of the operator is normally considered the State to issue the approval.

D. Some special area of navigation have routes are separated by 15-60 nm. If a Gross Navigation Error (GNE) occurs, the aircraft may have blundered into the airspace of an adjacent route.

> - GNEs are extremely serious.
> - The potential for a collision is high because the resulting flight path can overlap the flight path assigned to another aircraft (possibly coming from the opposite direction).

3.3.2 REQUIRED NAVIGATION PERFOMANCE

A. The special area of navigation requires navigational performance (necessary to reduce the risk of collision) on a internationally established level. For example, the MNPS establishes the following demanding criteria—

1) The average lateral deviation (for any cause) cannot be greater than 6.3 nautical miles (nm) from the centerline of the assigned route over any portion of the route.

2) Ninety-five percent of all of the lateral displacements (for any cause) from the centerline of the assigned route cannot be greater than 12.6 nm for all flights over any portion of that route.

3) Each operator cannot have more than 1 lateral deviation (for any cause) of 30 nm or more in 1,887 flights in the NAT/MNPS airspace. When errors of these magnitudes occur, the aircraft has failed to navigate to the degree of accuracy required for the control of air traffic.

4) Each operator cannot have more than 1 lateral deviation (for any cause) which is within ±10 nm of a multiple of the separation minimums applied in 7,693 flights in the NAT/MNPS airspace.

CAAP Advisory Circulars 91-70 and 120-33 should be used for reference information.

3.4 CAAP APPROVAL

3.4.1 GENERAL REQUIREMENTS

A. This chapter is to give guidance in the evaluation and authorization of North Atlantic Minimum Navigation performance Specifications airspace (NAT/MNPS).

Applicable Action Number
- 4363: Evaluate MNPS Conformance and Program
- 4663: Inspect MNPS Program Conformance

B. Airspace where MNPS is applied should be considered special qualification airspace. The specific aircraft type or types that the operator intends to use will need to be approved by the CAAP before the operator conducts flight in MNPS airspace.

C. In addition, where operations in specified airspace require approval in accordance with an ICAO Regional Navigation Agreement, an operational approval will be needed.

D. Each aircraft type that an operator intends to use in MNPS airspace should have received MNPS airworthiness approval from the aircraft certificating authority prior to approval being granted for MNPS operations, including the approval of continued airworthiness programmes.

E. The NAT/MNPS, as implemented in the North Atlantic Region, is a demanding standard. Safety of flight in this airspace is critically dependent on each operator achieving and continuously maintaining a high level of navigation accuracy.

F. The operator must obtain this approval for each airplane and navigation/system combination used for operations in this airspace. To obtain MNPS approval, the operator must show compliance with the following conditions—

- Each aircraft is suitably equipped and capable of meeting the MNPS standards
- The operator has established operating procedures that ensure MNPS standards are met
- The flight crews are trained and capable of operating to MNPS requirements

3.4.2 INITIAL NAT/MNPS APPROVALS

A. Each operator, and each aircraft and navigation system combination must be approved before operating in NAT/MNPS airspace.

B. Each operator must demonstrate (validate) that it can meet MNPS standards before receiving approval.

1) Validation flights must be conducted through NAT/MNPS airspace.

2) Inspectors must ensure that requirements of the applicable Advisory Circular(s) and/or other official documentation for Global Positioning System (GPS), or Multi-Sensors (or equivalent) are fully met by the operator before approving any operation in this airspace.

> All NAT/MNPS approvals are granted by issuing OpSpecs and by adding that area of en route operation to those OpSpecs.

3.4.3 APPROVAL FOR OPERATIONS USING GPS

The assigned inspectors will provide guidance on process and procedures for confirming the operator's capability to meet the requirements.

- The operator is not required to collect navigation performance data in NAT/MNPS airspace to apply to Pass/Fail graphs.

3.4.4 VALIDATION FLIGHT

After the AOC holder has accomplished its training, at least one validation flight must be conducted.

- The test(s) will evaluate the AOC holder's procedures and knowledge of operations within MNPS airspace.
- A Flight Operations Inspector shall conduct an enroute inspection with special emphasis on the AOC holder's MNPS training subject areas.
- The crew should be a randomly picked line crew and shall be tested on general knowledge and the various contingencies that can occur in the airspace.

3.4.5 AOC CASORT ORG ENTRY

Following the successful conclusion of the demonstration flight for an AOC holder, a new record will be entered in the ***AOC Approvals (OPS Fleet)*** subtable of the ORG database for that organisation to include the MNPS authorisation.

3.4.6 OPERATIONAL AUTHORISATION

A. When the criteria for approval has been met and all open discrepancies have been closed, the—

- AOC holder must can be issued a revision to OpSpecs Section H to include the MNPS authorisation.
- General Aviation Operator must be issued a Letter of Authorisation (General Aviation).

B. Either of these document must contain—

1) The navigation specification;

2) Define the airspace boundaries; and

3) List the aircraft that have been approved, by type (make, model, series); and

4) Their navigation equipment.

> If aircraft of the same type are equipped with different navigation system configurations, they should be listed by the aircraft registration or serial number.

3.5 AIRWORTHINESS CONSIDERATIONS

This chapter is to give guidance in the evaluation and authorization of North Atlantic Minimum Navigation performance Specifications airspace (NAT/MNPS).

Applicable Action Number

- 4363: Evaluate MNPS Conformance and Program
- 4663: Inspect MNPS Program Conformance

3.5.1 NAVIGATION EQUIPMENT

A. An assessment will be made to determine if the equipment is appropriate for the route to be flown and the operator's manuals, procedures and training program are adequate.

B. Navigation equipment must be approved and installed in accordance with the aircraft's type certificate (TC), a supplemental type certificate (STC) or an acceptable method approved by another ICAO State.

C. In any case, co-ordination should be accomplished with an Airworthiness Inspector to ensure it is operational and installed correctly and that maintenance program and training are adequate.

3.5.2 MAINTENANCE PROGRAM

Each operator requesting MNPS operational approval must establish maintenance and inspection practices acceptable to the CAAP that include any required maintenance specified in the data package.

- Operators of aircraft subject to a continuous airworthiness maintenance program must incorporate these practices in their program.

3.6 FLIGHT OPERATIONS CONSIDERATIONS

3.6.1 OPERATIONS MANUAL

A. An AOC holder's Operations Manual must provide specific pre-flight, in-flight and post-flight procedures as well as crewmember procedures for the verification of waypoint entry information and other procedures to preclude navigation errors.

B. The Training Manual must include requirements for training and checking crewmembers on its operational use.

3.6.2 TRAINING

3.6.2.1 Ground Training

AOC holder's requesting to operate within MNPS airspace shall provide its flight crew members with the following information and ground training—

1) The MNPS "Specification" and what it means, including the historical concept of MNPS airspace and the horizontal separation standard;

2) The geographical boundaries of MNPS airspace and route structures/systems within and around it;

3.6.2.2 Flight/Simulator Training

Flight/simulator training requirements shall be completed prior to approval for flight operations within MNPS airspace being granted.

3.7 INVESTIGATION & CORRECTION OF GROSS NAVIGATION ERRORS

> Each gross navigational error has a significant impact on flight safety in this airspace and must be fully investigated in a timely manner.

A. In addition to initially meeting MNPS criteria, each operator must continuously maintain the required level of navigational performance.

1) The cause of each error must be identified and effective action must be taken to prevent reoccurrence of similar errors.

2) Gross navigational errors (GNE) are detected by ATC and reported to one of the regional monitoring agencies of the world.

3) The regional monitoring agency then provides the notification of the GNE to not only the operator that made the GNE but also to the CAAP.

4) The CAAP inspectors in turn review the GNE.

5) During that investigation, the an inspector learns of a GNE by one of his/her operators, the inspector must immediately contact the operator and advise that the GNE will be investigated

6) The inspector must ensure that the operator takes timely corrective action.

B. After this notification, inspectors must determine the effectiveness of the operator's actions as follows—

1) If it is determined that an operator's actions will prevent the occurrence of similar errors, the operator should be permitted to continue NAT/MNPS operations with close surveillance of the operator's navigational performance.

   ♦ If similar errors occur (in subsequent operations) more frequently than permitted by the standard, stronger action must be taken.

2) If an operator fails to take action to improve navigation performance, action must be initiated to suspend the NAT/MNPS authorization, by rescinding the operations specification.

3) If it is determined that an operator's actions to improve navigational performance are inadequate or otherwise unsatisfactory, the operator must be notified that the corrective action is unacceptable.

   ♦ When an operator does not implement a satisfactory solution in a timely manner, the action must be initiated to suspend NAT/MNPS authorization and could include enforcement action.

3.8 MINIMUM NAVIGATION PERFORMANCE SPECIFICATIONS AIRSPACE (NAT/MNPS)

3.8.1 GENERAL

A. The NAT/MNPS, as implemented in the North Atlantic Region, is a demanding standard. Safety of flight in this airspace is critically dependent on each operator achieving and continuously maintaining a high level of navigation accuracy.

B. Each Philippine operator is to acquired to have CAAP approval before conducting any operation in minimum navigation performance specification (MNPS) airspace.

C. The operator must obtain this approval for each airplane and navigation/system combination used for operations in this airspace.

D. To obtain MNPS approval, the operator must show compliance with the following conditions—

- Each aircraft is suitably equipped and capable of meeting the MNPS standards.
- The operator has established operating procedures that ensure MNPS standards are met.
- The flightcrews are trained and capable of operating to MNPS requirements

> - Operational history in NAT/MNPS airspace clearly shows that most serious navigational errors are directly related to operator/pilot error.
> - Equipment malfunction and equipment accuracy are usually not the primary cause for these errors.
> - Most of these serious errors are caused by the flightcrew navigating very precisely to the wrong place while believing that the aircraft is complying with the "currently effective" ATC clearance.

3.8.2 NAVIGATIONAL PERFORMANCE

A. The NAT/MNPS represents navigational performance (necessary to reduce the risk of collision) on an internationally established level.

- While the NAT/MNPS airspace currently does not have a published Required Navigation Performance (RNP) value, it is anticipated that in the future an RNP requirement will be implemented.
- The NAT/MNPS predates the implementation of RNP, but is consistent with RNP principles.

B. The MNPS establishes the following demanding criteria—

1) The average lateral deviation (for any cause) cannot be greater than 6.3 nautical miles (NM) from the centerline of the assigned route over any portion of the route.

2) Ninety-five percent of all of the lateral displacements (for any cause) from the centerline of the assigned route cannot be greater than 12.6 NM for all flights over any portion of that route.

3) Each operator cannot have more than one lateral deviation (for any cause) of 30 NM or more in 1,887 flights in the NAT/MNPS airspace.

> When errors of these magnitudes occur, the aircraft has failed to navigate to the degree of accuracy required for the control of air traffic.

4) Each operator cannot have more than one lateral deviation (for any cause) which is within ±10 NM of a multiple of the separation minimums applied in 7,693 flights in the NAT/MNPS airspace. NAT/MNPS airspace routes are separated by 60 NM.

5) If an error of 50-70 NM occurs, the aircraft has blundered into the airspace of an adjacent route. Errors of these magnitudes are extremely serious. The potential for a collision is high because the resulting flight path can overlap the flight path assigned to another aircraft (possibly coming from the opposite direction).

3.9 CEP & NOPAC ROUTE SYSTEM

3.9.1 GENERAL

A. The CEP system is the organized route system between Hawaii and the west coast of the United States.

- Several ATS routes and associated transition waypoints are within the CEP.

> - Non-approved aircraft can expect to fly above or below the exclusionary airspace.
> - Refer to US-FAA AC 91-70 and the Alaskan AIP as well as the Pacific Supplement for further information.

B. The NOPAC system is the organized route system in the North Pacific between Japan and the United States.

C. RVSM and Required Navigation Performance 10 (RNP-10) is required for aircraft operating on the CEP routes.

3.9.2 APPLICABLE ATC PROCEDURES

Applicable ATC procedures can be found in—

- ICAO Document 7030 PAC/RAC, Annex 2, Appendix 3; and
- ICAO Document 9574 (RVSM Guidance).

3.9.3 BACKGROUND

A. RVSM programs enable 1,000-foot vertical separation to be applied between aircraft above FL 290.

1) Approval of operators and aircraft for RNP-10 enables a 50 NM lateral separation to be applied between aircraft operating in oceanic/remote areas.

2) FLs or routes because Air Traffic Service Providers (ATSP) notify operators of requirements for filing, flight and aircraft navigation equipage requirements on oceanic/remote area routes in aeronautical publications.

- Tokyo Oceanic Center publishes such information in AIPs and NOTAMs.
- Oakland and Anchorage Oceanic Centers publish such information in Notices to Airmen (NOTAM) and the Pacific and Alaska Chart Supplements.

3.9.4 POLICY

A. All operators conducting operations on the CEP and/or NOPAC route systems must be issued the operations specifications approving such operations from CAAP.

B. Inspectors will also need to review the guidance for RVSM authorization and RNP-10 (or RNP-4) authorization.

General aviation operators conducting flights on the NOPAC and CEP Route Systems at FLs where RVSM and/or RNP-10 approval is required must be issued a letter of authorization (LOA) approving such operations.

3.10 AMUS

Two large areas of en route operation have unique features which significantly complicate air navigation. These two areas are centered around the earth's magnetic poles.

3.10.1 CONCEPT

A. Conventional magnetic compasses sense magnetic direction by detecting the horizontal component of the earth's magnetic field.

B. Since this horizontal component vanishes near the magnetic poles, magnetic compasses are highly unreliable and unusable in an area approximately 1,000 NM from each magnetic pole.

C. Within these areas, air navigation tasks are further complicated by very rapid changes in magnetic variation over small distances. F

- or example, when flying between the magnetic North Pole and the true North Pole, a heading of true North results in a magnetic heading of South (a magnetic variation of 180 degrees).

3.10.2 CONVERGENCE OF THE MERIDIANS

A. Since these two major AMUs also occur near the earth's geographic poles, the convergence of the meridians also presents additional directional complications.

B. When flying "great circle" courses at latitudes greater than 67 degrees, convergence of the meridians can create rapid changes in true headings and true courses with small changes in aircraft position. When even small errors occur, very large navigation errors can develop over extremely short distances.

> Relatively small errors in determining the aircraft's actual position can produce very large errors in determining the proper heading to fly and maintain the assigned flight path.

- An extreme example of this phenomenon occurs at the earth's geographic North Pole. Flight in any direction from the exact pole is initially due South (that is, the direction to Russia or the United States is South).

3.10.3 SPECIAL EQUIPMENT, TECHNIQUES, AND/OR PROCEDURES

A. Special navigation equipment, techniques, and/or procedures are critical to operate safely in polar areas, including the two AMUs.

B. Operations based solely on magnetic references within AMUs are unsafe, unacceptable, and shall not be approved.

> Operations within these areas can only be conducted safely if the primary heading reference is derived from sources other than magnetic.

C. All INS/IRS/IRU are capable of calculating true North independently from other aircraft systems. INS/IRS/ IRU can be approved and safely used for operations in AMUs and polar areas provided the following conditions are met—

1) The INS is certified as airworthy for the highest latitude authorized for these operations.

2) Ground alignment of the INS/IRS/IRU is restricted to those airports where satisfactory alignment has been demonstrated or otherwise approved.

3) The operator's training programs and crew procedures provide acceptable techniques and methods for the following—

- ♦ Approaches and departures using appropriate heading references other than magnetic
- ♦ The use of ground -based NAVAIDs, which are oriented to appropriate directional references other than magnetic

> Inspectors must not approve operations in polar areas and/or AMUs without the participation and concurrence of an inspector with special training regarding navigation methods for these areas.

D. There is a wide variety of other methods, systems, techniques, and procedures that can be used for navigation in AMUs and polar areas.

- However, due to the variety of means and the complexity of air navigation in these areas, specific direction and guidance for these other means of navigation are not provided in this manual.

> Iinspectors must obtain assistance froman inspector with special navigation qualification when evaluating and approving or denying an operator's request to use systems, techniques, or procedures that are not discussed in this chapter.

3.10.4 BOUNDARIES OF THE AMU

A. For the northern hemisphere, the Canadian AIP establishes the basic boundaries for the AMU. Canadian Air Navigation Order, current edition, states that no person may operate an aircraft in instrument flight rules (IFR) flight within Canadian northern domestic airspace unless it is equipped with a means of establishing direction that is not dependent on a magnetic source.

B. The special equipment, training, and procedures discussed in this paragraph are required for all operations into the area of northern domestic airspace.

> Relatively small errors in determining the aircraft's actual position can produce very large errors in determining the proper heading to fly and maintain the assigned flight path.

C. This area is also outlined on Canadian en route charts.

- For the purposes of this paragraph, northern domestic airspace is considered to extend from ground level to infinity.

3.11 AREAS OF SIGNIFICANT COMMUNICATIONS & ATC DIFFICULTIES

The levels of sophistication in communication, navigation, and ATC capabilities in certain areas of operation outside North America and Europe vary widely. The following paragraphs provide evaluation criteria that must be considered when approving operations in these areas.

3.11.1 NAVAIDS

A. The ground-based facilities that are implemented to support air navigation in some of these areas are based on antiquated technology and frequently experience reliability problems.

B. The NAS and the navigational performance requirements in many countries are based almost exclusively on non-directional radio beacons (NDB).

C. Also, many of the NAVAIDs do not operate continuously.

- For example, NAVAIDs are shut down from dusk to dawn in certain countries.

3.11.2 COMMUNICATIONS

A. The primary means of en route communication with ATC in many areas of operation is almost exclusively HF radio.

B. Atmospheric noise created by extensive thunderstorm activity in tropical areas and aurora activity in polar areas significantly increases the difficulty of using HF as a prime means of communication with ATC.

3.11.3 ATC

A. The level of ATS varies from radar based services to a total absence of any ATC.

B. Flight information regions (FIR) have been established in most areas of the world. Specific ICAO member states have been assigned the responsibility of providing ATS in these FIRs.

> There are wide variations in the ATC services available.

C. En route ATC radar is not available in all countries and ATS may rely heavily on position reports and airborne navigation performance capabilities for the separation of aircraft. Various levels of ATS provided in these areas are as follows—

> It is critical that flightcrews understand that subtle terminology differences and language barriers may exist in foreign countries where they operate.

3.11.3.1 Air Traffic Service

A. Within controlled airspace, ATC provides ATC service to prevent collisions between aircraft and to expedite and maintain an orderly flow of air traffic. This also includes air traffic advisory services and those alerting services related to weather and search and rescue.

B. Within advisory airspace, air traffic advisory service is available to provide separation, to the extent possible, between aircraft operating on IFR flight plans.

It is important to understand that this is an advisory service , not a control service (prevention of collision).

C. In advisory airspace, flightcrews are provided information concerning the location of other aircraft.

- Prevention of collision is the responsibility of the PIC.
- Terrain clearance is also the responsibility of the PIC.

D. The ATS available also include those alerting services related to search and rescue.

3.11.3.2 Broadcast In the Blind

A. In certain areas, special reporting procedures called "broadcasts in the blind" have been established to assist pilots in avoiding other aircraft.

B. At designated intervals, each pilot broadcasts the aircraft's position, route, and FL over a specified very high frequency (VHF).

- Awareness of the proximity of other aircraft is obtained by maintaining a continuous listening watch on the specified frequency.
- This procedure is an "expected" practice in large portions of Northwestern Africa (including the Dakar FIR) and South America (including most Brazilian airspace).
- In many of these areas, the "broadcast in the blind" procedure is used to augment the separation of IFR aircraft.

3.11.3.3 No FIR Established

A. Flight information regions have not been established for a few areas in the world.

B. These are commonly called uncontrolled information regions or no man's land. The largest of these areas is in the South Atlantic Ocean, annotated as "No FIR."

- Within no man's land, aircraft separation (prevention of collision) is entirely the responsibility of the PIC.
- Advice and information for the safe and efficient conduct of flights is not provided from an ATS unit.
- An ATS unit does not provide alerting services related to search and rescue..

C. Flight information services also do not exist in the high altitude structure in other large areas (above the top of controlled airspace).

3.11.4 METRIC FLIGHT LEVELS

A. The NAS in many Eastern European countries (former Eastern Bloc countries), and some mainland Asian countries are based on the use of metric flight altitudes/levels.

B. Operations within these areas require special procedures for conversion charts between metric FLs and FLs based on feet.

- For example, a FL of 10,000 meters represents FL 328 or a flight altitude of 1,000 meters represents an altitude of 3,280 feet.

3.12 EVALUATION CRITERIA: AREAS WITH COMMUNICATIONS & ATC DIFFICULTIES

POIs must evaluate, on a case-by-case basis, all proposals to conduct operations in the sovereign airspace of countries that are not equivalent or similar to the Philippine airspace.

3.12.1 GENERAL CRITERIA

A. The operator must show (considering factors unique to the proposed area of operation) that safe operations can be conducted within the area of operation and that the facilities and services necessary to conduct the operation are available and serviceable during the period when their use is required.

B. The operator must also show that the proposed operation is in full compliance with the e OpSpecs that are applicable to that operation.

3.12.2 OPERATIONS IN ADVISORY AIRSPACE

A. The operator must show that its training programs and operating procedures permit safe operations in advisory airspace and ensure compliance with the “expected” operating practices.

B. The operator must also show that the operation is in compliance with the requirements for IFR En Route Operations in Class G Airspace.

3.12.3 OPERATIONS IN UNCONTROLLED INFORMATION REGIONS (NO MAN’S LAND)

A. Since ATC, air traffic advisory, flight information, and alerting services are not available from ATS units when operating within these areas, the operator must show that acceptable, alternative means are available to ensure the following—

1) The appropriate organization can be notified in a timely manner when search and rescue aid is needed.
2) Changes in significant weather information can be provided to the flightcrew in a timely manner.
3) Changes in the serviceability of the required navigation aids are available to the flightcrew and the operator’s operational control system.
4) Reliable information concerning other IFR aircraft operating within this area is available in -flight (e.g., Traffic Alert and Collision Avoidance System (ACAS), Automatic Dependent Surveillance-Broadcast (ADS-B)). This includes “broadcast in the blind” procedures and other “expected” practices.
5) The required navigation facilities necessary to safely conduct the operation are available and serviceable.

3.13 OPERATIONS IN RESTRICTED INTERNATIONAL AREAS

A. Operations by Philippine operators within the sovereign airspace of certain countries have restrictions levied by the Philippine government or international relationships. The following are examples—

- Commercial trade restrictions,
- No-fly zones,
- Restriction of certain transactions related to aircraft services,
- Suspension of cargo air operation, and
- Suspension of passenger-carrying operations to the Philippines because the airport authorities do not maintain and carry out effective security measures.

These restrictions frequently specify certain air-ports, selected routes, and special procedures that must be used.

3.13.1 INFORMATION ON RESTRICTED AREAS

A. The current list of restrictions and information about the processes and agencies to contact in regard to those restrictions is maintained by the FSIS.

B. The AOC holder should review the current list of restrictions with the POI to confirm what restrictions apply in order for the AOC holder to obtain the applicable license and/or exemption for flight operations in that restricted area.

3.13.2 AOC HOLDER ACTIONS REQUIRED

A. It is important that the AOC holder be advised to take simultaneous actions with all of the agencies that are necessary for the licenses and/or exemptions for the restricted country or countries in which or over which they are requesting to operate.

> It is critical that overflight permits be coordinated in a timely manner and under no circumstances should the operator conduct an overflight of a restricted airspace unless the issuing authority has given approval.

- The POI should advise the AOC holder that the CAAP does not have control over the process by which other agencies grant licenses.
- Therefore, the POI should recommend that AOC holders make the requests as far in advance as possible of the intended date of flight.

B. The AOC holder is responsible for obtaining the appropriate licenses and/or exemptions from the government agency or agencies that impose the restrictions for that country or area.

C. If there is a CAAP Directive that imposes a flight prohibition, and if other government agencies have imposed restrictions for flights into or over a restricted country or area, before flight operations can be authorized, the AOC holder or operator must provide its POI with either—

1) All applicable written government authorizations granting authorization to operate in or over the restricted international area.

2) Applicable written guidance with written CAAP approval from the FSIS Director

3.13.3 APPROVAL OF OPERATIONS IN RESTRICTED AREAS

A. If an AOC holder requests authorization to conduct operations into or over restricted international areas for which an flight prohibition is not in effect and shows that it meets the requirements for such operations.

B. The AOC holder should provide the POI with a copy of any government authorization to operate into or over a restricted international area is required, including the date of issuance and its expiration date.

End of Chapter

Chapter 4
Reduced Vertical Separation Minima (RVSM)

This chapter provides guidance for approval of an aircraft operator for RVSM operations

APPLICABLE ACTION NUMBERS
- 1152D: Approvel: RVSM Operations

4.1 GENERAL POLICIES

4.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal certification process as outlined in CAAP guidance.

B. The RVSM formal certification process may run concurrent with the process for initial certification of the operator.

In these concurrent situations, a separate project number will be required to separately record the CAAP actions for RVSM.

4.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for RVSM.

B. It is the Airworthiness (Avionics) Inspector's responsibility to evaluate and approve the airworthiness requirements and associated support programs.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of RVSM operations.

4.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector to process the documentation and approval issuance who is not technical qualified in RVSM operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered RVSM-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an avionics inspector;

2) With documented formal training in RVSM certification requirements; and

3) Has documented completion of OJT by a qualified instructor for RVSM Program and Conformance

C. An assigned flight operations inspector will be considered RVSM-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Is qualified in large turbojet aircraft;

2) With documented formal training in RVSM certification requirements;

3) Has documented completion of OJT by a qualified instructor for RVSM Program and Conformance; and

4) Has documented aircraft qualification of completion of LOFT simulator session for the application of RVSM-related procedures.

4.1.4 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 3, in that, the aircraft must have a type certificate (or supplemental type certificate) which includes RVSM.
- PCAR Part 4, in that the general aviation operator must have an approved aircraft inspection programthat includes RVSM specifics;
- PCAR Part 6, in that, the aircraft must meet the minimum instrument and equipment requirements for RVSM;
- PCAR Part 10, in that, the operator must have CAAP approval and flight crews must be qualified for operations in RVSM airspece;
- PCAR Part 12, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for operations in RVSM airspace;
- PCAR Part 14, in that the AOC flight crews must receive formal training and qualification for operations in RVSM airspace and maintain continuing qualfication for such operations;

4.1.5 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to RVSM—

- CAAP AC 08-004, Application & Process: Reduced Vertical Separation Minima;
- Aircraft manufacturer's procedures, limitations and relevant safety practices;
- EUROCONTROL DOCs; and
- ICAO's *Manual on Implementation of a 300 m (1000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive* (Doc 9574-AN/934).

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered with mutual agreement of the operator and CAAP.

4.2 BACKGROUND INFORMATION

A. RVSM airspace is being implemented worldwide and international convention requires Philippine operators to obtain approval from the CAAP-FSIS before conducting any operations within this airspace.

B. Both the individual operator and the specific aircraft type or types which the AOC holder intends to use must be approved by the CAAP-FSIS before the operator conducts flight in RVSM airspace.

C. In addition to CAAP-FSIS approval, the aircraft must undergo height monitoring by a height monitoring unit (HMU) or GPS monitoring unit (GMU) to confirm the aircraft meets RVSM performance criteria before operational approval is given.

D. Finally, the CAAP-FSIS must record the relevant information in a RVSM database for each aircraft approved and provide this database to the organisation responsible for the RVSM airspace in question.

> Once an initial approval has been given to an aircraft or group of aircraft, that approval is valid for all RVSM airspace.

4.3 CAAP APPROVAL PROCESS

4.3.1 PRE-APPLICATION

A. This is the period of time before the formal application is submitted, when the applicant is developing the documentation and discussing the minimum requirements with the CAAP-FSIS inspector personnel.

B. The applicant should complete a Pre-Application Statement of Intent (PASI) to officially start this phase of certification.

> Refer to AC 12-001 for more specific guidance for the completion of a PASI.

C. A pre-application meeting should be scheduled between the AOC holder and the CAAP-FSIS to inform the operator of CAAP-FSIS expectations regarding the approval process to operate in a RVSM environment.

D. The content of the operator RVSM application, CAAP-FSIS review and evaluation of the application, validation flight and conditions for removal of RVSM authority should be basic items of discussion.

4.3.2 SPECIFIC APPLICATION CONTENTS

A. The CAAP-FSIS will, during an formal Pre-Application meeting, outline the requirements for RVSM certification.

B. The applicant will be required to submit, with the formal application package, a completed Formal Application Checklist (FAC) including a listing of each aircraft type.

> Refer to AC 12-001 for more specific guidance for the completion of the FAC.

C. The formal application package will also include all manuals and documents necessary to ensure adequate maintenance and safe operations of aircraft in RVSM airspace.

> Refer to Section 3 of AC 10-004 for more specific guidance for the contents of the RVSM formal application.

D. When applying, the AOC holder must list the aircraft by type and series. If aircraft of the same type/series are equipped with different altimetry system configurations, they should be listed by the aircraft registration or serial number.

E. If an operator has aircraft that are capable of flying within RVSM airspace but does not intend to operate there, those aircraft will not be issued an authorisation.

4.3.3 INITIAL APPLICATION REVIEW

A. This is the period of time immediately following the applicant's submission of the complete formal application.

> The applicant shall submit the formal application for RVSM operations at least 60 days prior to intended date to start operations.

B. The CAAP-FSIS personnel review the total application package during an internal meeting and determine if the application package is complete enough to accept for evaluation.

> The entire application package may be rejected following this internal meeting if it is found to be deficient in one or more critical areas.

C. Shortly after that meeting (generally within 15 days after submission of the application package), a formal meeting will be held with the applicant to discuss the—

> All individual documents that are re-submitted to the CAAP-FSIS are subject to an "initial application review" to ensure that they are acceptable for processing.

1) Basis for rejection; or

2) Formal acceptance.

4.3.4 DOCUMENT CONFORMANCE

A. This is the period of time after the formal acceptance of the certification package when each document is separately evaluated for conformance to the minimum acceptable standards,

B. During this phase, the individual documents may be returned to the applicant for correction. It is in the applicant's interest to track these documents to ensure that they are re-submitted in a timely manner to the CAAP-FSIS for continuation of the conformance evaluation.

C. This phase 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.

> APPLICABLE ACTION NUMBERS
> - See Appendix 3B for applicable RVSM Evaluation Action Numbers.

4.3.5 INSPECTION & DEMONSTRATION

A. This is the period of time that the CAAP-FSIS conducts a series of inspections to determine that applicant's organization and personnel are qualified to conduct RVSM operations.

> APPLICABLE ACTION NUMBERS
> - See Appendix 3B for applicable RVSM Inspection Action Numbers.

B. The applicant's aircraft, support organizations and training will receive close scrutiny as they meet the requirements that will qualify them for the RVSM operations.

C. Each aircraft type that an AOC holder intends to use in RVSM airspace should have received airworthiness approval in accordance with the criteria provided in Doc 9574 and the CAAP-FSIS *Airworthiness Inspector Manual*.

D. Individuals or AOC holders seeking approval for its aircraft should contact the manufacturer of the specific aircraft type and apply to the CAAP-FSIS to determine/co-ordinate the process.

E. At some point, during this phase, the applicant will be issued an LOA to conduct RVSM operations under the close supervision of the CAAP-FSIS inspector personnel.

> AOC holders shall be required to conduct a minimum of 2 satisfactory validation flights before completing this phase.

4.3.6 VALIDATION FLIGHTS

A. When all other airworthiness and operational requirements of the application are met, the CAAP-FSIS will authorize validation flight(s).

> These flights may be conducted in conjunction with the verification/monitoring program.

B. In some cases, the review of the RVSM application and programme may suffice for validation purposes. However, the final step of the approval process may be the completion of a validation flight(s).

C. The CAAP-FSIS may accompany the operator on a flight through RVSM airspace to verify that operations and maintenance procedures and practices are applied effectively. If the performance is adequate, operational approval for RVSM airspace will be granted.

D. The AOC applicant must be found to have adopted RVSM operating policies and procedures for pilots and, if applicable, flight dispatchers.

E. The inspector must verify that each pilot has adequate knowledge of RVSM requirements, policies, and procedures.

4.3.7 FINAL CERTIFICATION ACTIONS

A. This is the period of time that the CAAP-FSIS completes the necessary documentation to formalize the approval of the applicant to conduct RVSM operations in specific aircraft type(s).

B. That approval will be in the form of—

1) For general aviation operators; an LOA valid for a period of 24 months; and

2) For AOC holders, a revision to the—

(a) Master (formal) ops specs (Section H); and

(b) Aircraft Display Ops Specs (for each type of aircraft).

4.3.8 AOC CASORT ORG ENTRY

Following the successful conclusion of the validation flight for an AOC holder, a new record will be entered in the ***AOC Approvals (OPS Fleet)*** subtable of the ORG database for that organisation to include the RVSM authorisation.

4.4 GENERAL CAAP CONSIDERATIONS

4.4.1 GENERAL

The CAAP-FSIS should ensure that each AOC holder can maintain high levels of height-keeping performance. It should be satisfied that operational programme are adequate for each AOC holder. Operations and training manuals as well as flight crew training should be evaluated.

4.4.2 REMOVAL OF RVSM AUTHORITY

A. The incident of height-keeping errors that can be tolerated in an RVSM environment is very small. It is incumbent upon each operator to take immediate action to rectify the conditions that caused the error.

1) The operator should also report the event to the CAAP-FSIS within 72 hours with initial analysis of causal factors and measures to prevent further events.

2) The requirement for follow-up reports should be determined by the CAAP-FSIS.

> Errors that should be reported and investigated are:
> - TVE equal to or greater than ±300 ft (±90 m),
> - ASE equal to or greater than ±245 ft (±75 m), and
> - AAD equal to or greater than ±300 ft (±90 m).

B. Height-keeping errors fall into two broad categories: errors caused by malfunction of aircraft equipment and operational errors.

- An operator who consistently commits errors of either variety may be required to forfeit authority for RVSM operations.
- If a problem is identified that is related to one specific aircraft type, then RVSM authority may be removed from the operator for that specific type.

C. The operator should make an effective, timely response to each height-keeping error. The CAAP-FSIS may consider removing RVSM operational approval if the operator's response to a height-keeping error is not effective or timely.

1) The CAAP-FSIS will also consider the operator's past performance in determining the action to be taken.

2) If an operator shows a history of operational and/or airworthiness errors, then approval may be removed until the root causes of these errors are shown to be eliminated and RVSM programme and procedures are shown to be effective.

3) The CAAP-FSIS will review each situation on a case-by-case basis.

4.5 MAINTENANCECONSIDERATIONS: RVSM

The purpose of this section is to provide guidance to CAAP-FSIS personnel in the evaluation and approval of Reduced Vertical Separation Minimums (RVSM).

4.5.1 POLICY

A. Airspace where RVSM is applied should be considered special qualification airspace. The specific aircraft type or types that the operator intends to use will need to be approved by the CAAP-FSIS before the operator conducts flight in RVSM airspace. In addition, where operations in specified airspace require approval in accordance with an ICAO Regional Navigation Agreement, an operational approval will be needed.

Applicable Action Number
- 4365: Evaluate RVSM Conformance and Program
- 4665: Eval RVSM Program Conformance

- This document provides guidance for the approval of specific aircraft type or types, and for operational approval.

B. Each aircraft type that an operator intends to use in RVSM airspace should have received RVSM airworthiness approval from the aircraft certificating authority prior to approval being granted for RVSM operations, including the approval of continued airworthiness programmes.

C. It is accepted that aircraft that have been approved in compliance with JAA Information Leaflet No. 23 or CAAP Interim Guidelines 91-RVSM satisfy the airworthiness criteria.

Operators should be advised to check existing approvals and the Aircraft Flight Manual for redundant regional constraints.

D. The integrity of the design features necessary to ensure that altimetry systems continue to meet RVSM approval criteria should be verified by scheduled tests and inspections in conjunction with an approved maintenance programme. The operator should review its maintenance procedures and address all aspects of continued airworthiness that may be relevant.

E. Adequate maintenance facilities are required to enable compliance with the RVSM maintenance procedures.

F. Each operator requesting RVSM operational approval must establish RVSM maintenance and inspection practices acceptable to the CAAP-FSIS that include any required maintenance specified in the data package. Operators of aircraft subject to a continuous airworthiness maintenance programme must incorporate these practices in their programme.

4.5.2 PROCEDURE

A. The following material should be made available to the CAAP-FSIS, in sufficient time to permit evaluation, before the intended start of RVSM operations.

1) *Airworthiness Documents* Documentation that shows that the aircraft has RVSM airworthiness approval.

2) *Description of Aircraft Equipment* A description of the aircraft equipment appropriate to operations in an RVSM environment.

3) *Training Programmes and Operating Practices and Procedures* Holders of Air Operators Certificates (AOC) may need to submit training syllabi for initial, and where appropriate, recurrent training programmes together with other appropriate material to the CAAP-FSIS.

4) *Past Performance* Relevant operating history, where available, should be included in the application. The applicant should show that changes needed in training, operating or maintenance practices to improve poor height keeping performance have been made.

5) *Minimum Equipment List* Where applicable, a minimum equipment list (MEL), adapted from the master minimum equipment list (MMEL) and relevant operational regulations, should include items pertinent to operating in RVSM airspace.

6) *Maintenance* When application is made for operational approval, the operator should present a maintenance programme acceptable to the CAAP-FSIS.

7) *Plan for Participation in Verification/Monitoring Programmes* The operator should establish a plan acceptable to the CAAP-FSIS, for participation in any applicable verification/-monitoring programme. This plan will need to include, as a minimum, a check on a sample of the operator's fleet by an independent height monitoring system, and an analysis of reliability data.

B. The following items should be reviewed, as appropriate:

1) Maintenance Manuals.

2) Structural Repair Manuals.

3) Standard Practices Manuals.

4) Illustrated Parts Catalogues.

5) Maintenance Schedule.

6) MMEL/MEL.

C. If the operator is subject to an approved maintenance programme, that programme should include, for each aircraft type, the maintenance practices stated in the applicable aircraft and component manufacturers' maintenance manuals. In addition, for all aircraft, including those not subject to an approved maintenance programme, attention should be given to the following items:

1) All RVSM equipment should be maintained in accordance with the component manufacturers' maintenance instructions and the performance criteria of the RVSM approval data package.

2) Any modification or design change that in any way affects the initial RVSM approval should be subject to a design review acceptable to the responsible authority.

3) Any repairs, not covered by approved maintenance documents, that may affect the integrity of the continuing RVSM approval, e.g. those affecting the alignment of pitot/static probes, repairs to dents or deformation around static plates, should be subject to a design review acceptable to the responsible authority.

4) Built-in Test Equipment (BITE) testing should not be used for system calibration unless it is shown to be acceptable by the aircraft manufacturer or an approved design organization, and with the agreement of the responsible authority.

5) An appropriate system leak check (or visual inspection where permitted) should be accomplished following reconnection of a quick-disconnect static line.

6) Airframe and static systems should be maintained in accordance with the aircraft manufacturer's inspection standards and procedures.

7) To ensure the proper maintenance of airframe geometry for proper surface contours and the mitigation of altimetry system error, surface measurements or skin waviness checks will need to be made, as specified by the aircraft manufacturer, to ensure adherence to RVSM tolerances. These checks should be performed following repairs, or alterations having an effect on airframe surface and airflow.

8) The maintenance and inspection programme for the autopilot will need to ensure continued accuracy and integrity of the automatic altitude control system to meet the height keeping standards for RVSM operations. This requirement will typically be satisfied with equipment inspections and serviceability checks.

9) Whenever the performance of installed equipment has been demonstrated to be satisfactory for RVSM approval, the associated maintenance practices should be verified to be consistent with continued RVSM approval. Examples of equipment to be considered are:

(a) Altitude alerting.

(b) Automatic altitude control system.

(c) Secondary surveillance radar altitude reporting equipment.

(d) Altimetry systems.

D. The maintenance procedures should provide that aircraft identified as exhibiting height keeping performance errors that require investigation should not be operated in RVSM airspace until the following actions have been taken:

1) The failure or malfunction is confirmed and isolated; and,

2) Corrective action is taken as necessary and verified to support RVSM approval.

E. Evaluate maintenance training as additional instruction may be necessary to support RVSM approval. Areas that may need to be highlighted for initial and recurrent training of relevant personnel are:

1) Aircraft geometric inspection techniques.

2) Test equipment calibration and use of that equipment.

3) Any special instructions or procedures introduced for RVSM approval.

F. Evaluate the proposed test equipment for the following:

1) The test equipment should have the capability to demonstrate continuing compliance with all the parameters established in the data package for RVSM approval or as approved by the responsible authority.

2) Test equipment should be calibrated at periodic intervals using reference standards whose calibration is certified as being traceable to national standards acceptable to the CAAP-FSIS.

G. The approved maintenance programme should include an effective quality control programme with attention to the following:

1) Definition of required test equipment accuracy.

2) Regular calibrations of test equipment traceable to a master standard. Determination of the calibration interval should be a function of the stability of the test equipment. The calibration interval should be established using historical data so that degradation is small in relation to the required accuracy.

3) Regular audits of calibration facilities both in-house and outside.

4) Adherence to approved maintenance practices.

5) Procedures for controlling operator errors and unusual environmental conditions that may affect calibration accuracy.

H. Approval to operate in designated RVSM for AOC holders will be accomplished thru operations specifications in accordance with Part 12. Each aircraft group for which the operator is granted approval will be listed in the Operations Specification.

4.6 OPERATIONS CONSIDERATIONS

4.6.1 GENERAL

The following has been written for use by a wide variety of operator types and therefore, certain items have been included for purposes of readability and completeness.

4.6.2 OPERATIONS MANUALS & CHECKLISTS

A. The appropriate manuals and checklists should be revised to include information/guidance on standard operating procedures. The SOPs are to include ACAS considerations when in level flight, climbing or descending in RVSM airspace.

B. Appropriate manuals should also include a statement of the airspeeds, altitudes and weights considered in RVSM aircraft approval to include identification of any operating restrictions established for that aircraft group.

C. For example, when an aircraft is restricted from conducting RVSM operations in areas of the full RVSM envelope where the value of mean ASE exceeds 120 ft (37 m) and/or the absolute value of mean ASE plus three standard deviations of ASE exceed 245 ft (75 m). When such a restriction is established, it should be identified in the data package and documented in appropriate aircraft operating manuals; however, visual or aural warning/indication systems should not be required to be installed on the aircraft.

4.6.3 OPERATIONS TRAINING PROGRAMME & OPERATING PRACTICES & PROCEDURES

A. AOC holders shall submit training syllabi and other appropriate material to the CAAP-FSIS to show that the operating practices, procedures and training items related to RVSM operations are incorporated in initial and, where warranted, recurrent training programme.

B. Training for dispatchers shall also be included where appropriate.

- Certain items may already be adequately standardized in existing operator training programme and operating practices.
- New technologies may also eliminate the need for certain crew actions.
- If this is found to be the case, then the intent of this guidance can be considered to be met.

C. General Aviation operators shall demonstrate to the CAAP-FSIS through oral or written tests that their knowledge of RVSM operating practices and procedures is equivalent to AOC holders and is sufficient to warrant granting of approval to conduct RVSM operations.

D. Practices and procedures in flight planning, aircraft pre-flight procedures for each flight, procedures prior to RVSM airspace entry, in-flight procedures and flight crew training procedures should be standardized using the guidelines in the advisory circular.

4.6.4 FLIGHT PLANNING

During flight planning the flight crew should pay particular attention to conditions which may affect operation in RVSM airspace. These include, but may not be limited to—

- Verifying that the aircraft is approved for RVSM operations;
- Reported and forecast weather conditions on the route of flight;

- Minimum equipment requirements pertaining to height-keeping systems; and
- If required for the specific aircraft group, accounting for any aircraft operating restriction related to RVSM airworthiness approval.

4.6.5 AIRCRAFT PRE-FLIGHT PROCEDURES FOR EACH FLIGHT

The following actions should be accomplished during pre-flight—

1) Review maintenance logs and forms to ascertain the condition of equipment required for flight in RVSM airspace. Ensure that maintenance action has been taken to correct defects to required equipment;
2) During the external inspection of aircraft, particular attention should be paid to the condition of static sources and the condition of the fuselage skin in the vicinity of each static source and any other component that affects altimetry system accuracy (this check may be accomplished by a qualified and authorised person other than the pilot; e.g., a flight engineer or maintenance personnel);
3) Before takeoff, the aircraft altimeters should be set to the local altimeter (QNH) setting and should display a known elevation (e.g. field elevation) within the limits specified in aircraft operating manuals. The two primary altimeters should also agree within the limits specified by the aircraft operating manual. An alternative procedure using QFE may also be used;

> The maximum value for these checks cited in operating manuals should not exceed 75 ft.

4) Before take-off, the equipment required for flight in RVSM airspace should be operational and indications of malfunction should be resolved.

4.6.6 PROCEDURES PRIOR TO RVSM AIRSPACE ENTRY

The following equipment should be operating normally at entry into RVSM airspace—

> Dual equipment requirements for altitude-control systems may be established by regional agreement after an evaluation of criteria such as mean time between failures, length of flight segments and availability of direct pilot-controller communications and radar surveillance.

1) Two primary altitude measurement systems;
2) One automatic altitude-control system;
3) One altitude-alerting device; and
4) Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot should request a new clearance so as to avoid flight in this airspace.
5) Operating Transponder. The operator should ascertain the requirement for an operational transponder in each RVSM area and transition areas adjacent to RVSM airspace where operations are intended.

> An operating transponder may not be required for entry into all designated RVSM airspace.

4.6.7 IN-FLIGHT PROCEDURES

The following policies should be incorporated into flight crew training and procedures—

1) Flight crews should comply with aircraft operating restrictions (if required for the specific aircraft group) related to RVSM airworthiness approval;
2) Emphasis should be placed on promptly setting the sub-scale on all primary and standby altimeters to 29.92 in Hg/1013.2 mb (Hp) when passing the transition altitude and rechecking for proper altimeter setting when reaching the initial cruising flight level (CFL);

3) In level cruise it is essential that the aircraft maintains the CFL. This requires that particular care is taken to ensure that ATC clearances are fully understood and followed. Except in contingency or emergency situations, the aircraft should not intentionally depart from CFL without a positive clearance from ATC;

4) During cleared transition between levels, the aircraft should not be allowed to overshoot or undershoot the cleared flight level by more than 150 ft (45 m);

> It is recommended that the climb or descent be accomplished using a vertical speed of 500 fpm or less and that level off be accomplished using the altitude capture feature of the automatic altitude-control system.

5) An automatic altitude-control system shall be operative and engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement. In any event, adherence to cruise altitude should be done by reference to one of the two primary altimeters;

6) The altitude-alerting system shall be operational;

7) At intervals of approximately one hour, cross-checks between the primary altimeters should be made. A minimum of two should agree within 200ft (60m). (Failure to meet this condition will require that the altimetry system be reported as defective and ATC notified) Cross-check procedures include—

   (a) The normal pilot scan of cockpit instruments should suffice for altimeter cross-checking on most flights.

   (b) At least the initial altimeter cross-check in the vicinity of the point of maximum range of ICAO standard navaids (VOR/NDB) should be recorded (e.g. on coast out). The readings of the primary and standby altimeters should be recorded and available for use in contingency situations.

> Future systems may make use of automatic altimeter comparators in lieu of cross-checks by the crew.

8) Normally, the altimetry system being used to control the aircraft should be selected to provide the input to the altitude-reporting transponder transmitting information to ATC;

9) If the pilot is advised in real time that the aircraft has been identified by a height-monitoring system as exhibiting a Total Vertical Error (TVE) greater than 300 ft (90 m) and/or Altimetry System Error (ASE) greater than 245 ft (75 m) then the pilot should follow established regional procedures to protect the safe operations of the aircraft. (This assumes that the monitoring system will identify TVE or ASE within agreed levels of accuracy and confidence); if the pilot is notified by ATC of an Assigned Altitude Deviation (AAD) error that exceeds 300 ft (90 m) then the pilot should take action to return to the CFL as quickly as possible;

4.6.8 CONTINGENCY PROCEDURES

If, after entering RVSM airspace, the required minima cannot be maintained, the following actions will apply—

1) The pilot should notify ATC of contingencies (equipment failures, weather conditions) which affect the ability to maintain the CFL and co-ordinate a plan of action. ICAO Doc 7030, *Regional Supplementary Procedures*, is the primary reference document for contingency procedures.

2) Examples of equipment failures that ATC should be notified of are—

   (a) Failure of all automatic altitude-control systems; aboard the aircraft;

   (b) Loss of redundancy of altimetry systems;

(c) Loss of thrust on an engine necessitating descent; or

(d) Any other equipment failure affecting the ability to maintain CFL;

3) The pilot should notify ATC when encountering greater than moderate turbulence; and

4) If unable to notify ATC and obtain an ATC clearance prior to deviating from the assigned CFL, the pilot should follow established contingency procedures and obtain ATC clearance as soon as possible.

4.6.8.1 Post Flight

A. In making maintenance log book entries against malfunctions in height-keeping systems, the pilot should provide sufficient detail to enable maintenance to effectively troubleshoot and repair the system.

B. The pilot should detail the actual defect and the crew action taken to try to isolate and rectify the fault.

C. The following information should be noted when appropriate—

1) Primary and standby altimeter readings;

2) Altitude selector setting;

3) Subscale setting on altimeter;

4) Autopilot used to control the aeroplane and any differences when the alternate system was selected;

5) Differences in altimeter readings if alternate static ports selected;

6) Use of air data computer selector for fault diagnosis procedure; and

7) Transponder selected to provide altitude information to ATC and any difference if alternate transponder or altitude source was manually selected.

4.7 SPECIAL EMPHASIS ITEMS: FLIGHT CREW TRAINING

The following items should also be included in flight crew training programme—

1) Knowledge and understanding of standard ATC phraseology used in each area of operations;

2) The importance of crewmembers cross-checking each other to ensure that ATC clearances are promptly and correctly complied with;

3) Use and limitations in terms of accuracy of standby altimeters in contingencies. Where applicable, the pilot should review the application of SSEC/PEC through the use of correction cards;

4) Problems of visual perception of other aircraft at 1,000 ft (300 m) planned separation during night conditions, when encountering local phenomena such as northern lights, for opposite and same direction traffic and during turns;

5) Characteristics of aircraft altitude capture systems that may lead to the occurrence of overshoots;

6) TCAS considerations, particularly during climbs/descents in RVSM airspace;

7) Relationship between the altimetry, automatic altitude control and transponder systems in normal and abnormal situations;

8) Aircraft operating restrictions (if required for the specific aircraft group) related to RVSM airworthiness approval; and

9) Contingency procedures in the event of equipment failures, including reporting procedures in the event of altitude errors exceeding requirements.

4.8 OTHER APPLICATION REQUIREMENTS

4.8.1 PAST PERFORMANCE

A. An operating history of the aircraft to be used should be included in the application.

B. The applicant should show any events or incidents related to poor height-keeping performance that may indicate weaknesses in training, procedures, maintenance or the aircraft group intended to be used.

4.8.2 MINIMUM EQUIPMENT LIST

A minimum equipment list (MEL), adopted from the master minimum equipment list (MMEL), should include items pertinent to operating in RVSM airspace.

4.8.3 MAINTENANCE

The operator should submit a maintenance programme at the time the operator applies for operational approval.

4.8.4 PLAN FOR PARTICIPATION IN VERIFICATION/MONITORING PROGRAMME

A. The operator shall provide a plan for participation in the verification/monitoring programme.

B. This programme will normally entail a check of at least a portion of the operator's aircraft by an independent height-monitoring system.

4.8.4.1 Verification/Monitoring Programme

A. A programme to monitor or verify aircraft height-keeping performance is considered a necessary element of RVSM implementation for at least the initial area where RVSM is implemented.

B. The verification/monitoring programme have the primary objective of observing and evaluating aircraft height-keeping performance to validate crew procedures, aircraft performance and maintenance procedures.

C. Each aircraft or group of aircraft is required to receive HMU approval.

D. Arrangements for GMU monitoring may be done by contacting ARINC Inc., Annapolis, Maryland, USA (telephone 410-266-4931 or fax 410-573-3007). The ARINC website is http://www.arinc.com for additional information.

> A height-monitoring system based on Global Positioning Satellites (GMU) or an earth-based system (HMU) may fulfill this function.

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APPENDIX 4-A

Job Aid AW-077: RVSM Evaluation

Date		**Control #**	
Action #		**Record ID#**	
Inspector		**Org Identifier**	
Location		**Project#**	
Destination		**Aircraft MMS**	
Action Taken		**Aircraft Reg#**	
Maint Rep		**PIC #**	
Mgmt Rep		**Other PEL#**	

- For completion instructions, refer to Chapter 2 of the Operations or Airworthiness Inspector Manual .

AIRCRAFT CONFIGURATION	
Aircraft Make & Model?	
Engine Make & Model & Serial Number?	
Engine Make & Model & Serial Number?	
Engine Make & Model & Serial Number?	
Engine Make & Model & Serial Number?	

YES	No	NS	NA	1	RVSM Maintenance Procedures
				1.1	Is the proposed aircraft certified for RVSM? TD or AFM
				1.2	Are components considered to be RVSM critical identified and listed?
				1.3	Are structural areas noted as RVSM critical areas identified and listed?
				1.4	Is the name or title of the person who will ensure that the aircraft is maintained in accordance with the approved programme included?
				1.5	Does the method the operator will use to ensure that all personnel performing maintenance on the RVSM system are properly trained, qualified, and knowledgeable of that specific system?
				1.6	Does the MEL identify systems and equipment that are required for RVSM?
				1.7	Is the method the operator will use to notify the crew if the aircraft has been restricted from RVSM but is airworthy for an intended flight identified?
				1.8	Is the method the operator will use to ensure conformance to the RVSM maintenance standards, including the use of calibrated and appropriate test equipment described?
				1.9	Is there a quality assurance programme for ensuring continuing accuracy and reliability of test equipment, especially when out-sourced?

				1.10	Is the method the operator will use to verify that components and parts are eligible for installation in the RVSM system identified?
				1.11	Are there procedures to prevent ineligible parts from being installed?
				1.12	Is the method the operator will use to return an aircraft to service after maintenance has been performed on an RVSM component/system or after the aircraft was determined to be non-compliant defined?
YES	**No**	**NS**	**NA**	**2**	**Continued Airworthiness Issues**
				2.1	Are there provisions for Periodic inspections, functional flight tests, and maintenance and inspection procedures for ensuring continued compliance with the RVSM aircraft requirements?
				2.2	Are the maintenance requirements listed in Instructions for Continued Airworthiness (ICA) associated with any RVSM associated component or modification identified?
				2.3	Does the Operator plan to participate in a monitoring programme?
				2.4	Does the Monitoring Programme include method of scheduling?
				2.5	Does the programme have provisions for monitoring the results?
				2.6	Is there an “altitude error” reporting system in place?
				2.7	Are other maintenance items the operator incorporated to ensure continued compliance with RVSM requirements identified and appropriate?
YES	**No**	**NS**	**NA**	**3**	**Use of Part 6 AMO**
				3.1	Operators using the services of PCAR Part 6 Approved Maintenance Organizations must include provisions to ensure that the requirements of their RVSM programmes are being met.

INSPECTOR SIGNATURE		**ORG REP SIGNATURE**	

End of Appendix 4-A

APPENDIX 4-B

Job Aid OP-41: RVSM Certification

Date		Control #	
Action #		Record ID#	
Inspector		Org Identifier	
Location		Project#	
Destination		Aircraft MMS	
Action Taken		Aircraft Reg#	
Maint Rep		PIC #	
Mgmt Rep		Other PEL#	

YES	N	NS	NA	Q#	DOCUMENTS & DOCUMENTATION
				1	Operator Letter Requesting RVSM Authority
				2	Letter of Authorization (LOA)
				3	Aircraft RVSM-compliance (RVSM Airworthiness) Documents: 1. <u>For in-service aircraft:</u> • Service Bulletin (SB), Supplemental Type Certificate (STC); Aircraft Service Change (ASC); or Service Letter (SL) 2. <u>For aircraft manufactured RVSM-compliant:</u> AFM and/or Type Certificate Data Sheet (TCDS)
				4	RVSM Operational Policy & Procedures detailed in Operations Manuals, Checklists and other on-board documents.
				5	Published guidance on Flight Planning Into RVSM Airspace.
				6	Published guidance on Severe Turbulence and Mountain Wave Activity.
				7	Published guidance on Wake Turbulence.
				8	Published guidance on Pilot/Controller Phraseology.
				9	Published guidance on Contingency Actions: Weather Encounters and Aircraft Systems. (Pilot & Controller Actions).
				10	Published guidance on Flight Level Orientation Scheme.

				11	MEL (for operators operating under an MEL): MEL or MMEL that complies with GC 059 – (MEL pages applicable to RVSM required systems) Note: Many MMELs have been revised to incorporate Global Change (GC) 059.
				12	**RVSM Monitoring:** method and plan to show participation in an RVSM height monitoring/verification program. **Note 1:** monitoring is **not** required to be completed prior to the LOA being issued. **Note 2:** monitoring results can be accessed on the U.S. RVSM Approvals Database at: http://www.tc.faa.gov/act-500/niaab/rvsm/approvals.asp **Note 3: Information Source for European Monitoring.** European monitoring procedures, requirements and results are discussed under the "Aircraft Operators" section of the Eurocontrol RVSM website. The Eurocontrol RVSM Website is linked to the first page of the FAA RVSM Homepage and FAA RVSM Documentation Webpage. There is also a link in the "Monitoring Requirements and Procedures" European section. The FAA RVSM Homepage is at www.faa.gov/ats/ato/rvsm1.htm . RVSM Documentation is linked to the RVSM Homepage.
				13	Validation Flight(s) conducted.
				14	CASORT ORG Entry: after successful completion of validation, Enter the RVSM authorization in ACO Approvals (Ops Fleet).
				15	Revise AOC-Holders Operations Specifications, Section J to include the RVSM authority.
				16	Issue Letter of Authorization to General Aviation Operator.
YES	NO	NS	NA	Q#	EQUIPMENT
				17	Configuration List: Identification of components considered to be RVSM critical.
				18	Tech Data Sheet for each aircraft to be approved for RVSM, listing by Make, Model and Series.
				19	An operating history of the aircraft to be used submitted with the application.
YES	NO	NS	NA	Q#	TRAINING
				20	Method of Pilot Training/Knowledge (e.g., ATO, course of instruction, operator in-house training, record or certificates of completion).

				21	**Pilot Training Syllabi** for Initial and Recurrent Training contains at least the following subjects: The knowledge and understanding of any ATC phraseology applicable to each area of RVSM operation; The knowledge and understanding of any published contingency procedures applicable to each area of RVSM operation; (c) The minimum equipment requirements for safe RVSM flight; The reinforcement of cockpit drills to ensure that ATC clearances are fully understood, correctly complied with and queried should the need arise; (e) Information on the use and limitations of standby altimeters; (f) Visual perception differences at altitudes where previously a 2000 ft separation was applied; (g) Characteristics of the aeroplane(s) altitude capture systems; (h) Any additional aeroplane operating restrictions applicable to an RVSM environment; (i) Aeroplane and/or autopilot handling considerations if turbulence is experienced and the requirement to alert ATC if such an encounter prevents compliance with RVSM operation/clearance; TCAS/ACAS operating characteristics and the need to ensure that currently acceptable rates of climb or descent may need to be modified whilst changing flight level, particularly when entering or flying within RVSM airspace; The requirement for any aeroplane/operator combination to have been granted State approval for RVSM operations and that this approval may have to be in addition to any other approvals required for operation in given airspace.
				22	Dispatcher Training Syllabi for Initial and Recurrent Training contain the minimum elements listed in item 21 (a) thru (k).
				23	General Aviation applicants demonstrate comparable levels of knowledge and competence to AOC holders in the Operating Practices and Procedures required for RVSM operations. and Procedures .
YES	NO	NS	NA	Q#	PREFLIGHT
				24	Verify aircraft is approved for RVSM operations.
				25	Reported and forecast weather conditions on the route of flight.

				27	Sources of observed and forecast information that can help the pilot ascertain the possibility of MWA or severe turbulence have been checked: Forecast Winds and Temperatures Aloft, Area Forecast, SIGMETS and PIREPS.
				27	Annotating the flight plan to be filed with the ATS Provider to show that the aircraft and operator are approved for RVSM operations.
				28	Review maintenance logs and forms. Ensure maintenance action has been taken to correct defects of required equipment. Proper documentation of any RVSM required aircraft operating restrictions.
				29	During the external inspection of the aircraft, particular attention should be paid to the condition of the static sources, condition of the fuselage skin, and any other component that affects altimetry system accuracy.
				30	Before takeoff, the aircraft altimeters should be set to the local altimeter (QNH) setting and should display a known field elevation within the limits specified in the aircraft operating manuals.
				31	Before takeoff, confirm that equipment required for flight into RVSM airspace is operational and malfunctions resolved.
YES	NO	NS	NA	Q#	PRIOR TO RVSM AIRSPACE ENTRY
				32	Confirm RVSM equipment that must be operational prior to RVSM airspace entry is properly functioning: at a minimum, two primary altitude measurement systems, one altitude-control system, and one altitude alerting device.
				33	Operating Transponder. Ascertain the requirement for an operating transponder in the airspace where operating; insure proper operation.
				34	In the case of failure of any of the above equipment prior to entry into RVSM airspace, the pilot requests new clearance to avoid RVSM airspace.
YES	NO	NS	NA	Q#	INFLIGHT
				35	Flight Crew complies with aircraft operating restrictions related to RVSM airworthiness approval.
				36	Flight Crew promptly sets the sub-scale on all primary and standby altimeters to 29.92 in. Hg/1013.2 hPa when passing through the Transition Altitude and rechecking the proper altimeter setting when reaching the initial Cleared Flight Level (CFL).
				37	In level cruise, aircraft is flown at the CFL.
				38	Clearances fully understood and followed.

				39		During cleared transition between Flight Levels, the aircraft does not overshoot or undershoot the CFL by more than 150 ft. (45m).
				40		Unless circumstances dictate otherwise, an automatic altitude control system should be operative and engaged during cruise, etc.
				41		Altitude alerting system operational.
				42		At intervals of approximately one hour, cross-checks between the primary altimeters and the standby altimeter are made. A minimum of two primary altimeters agree within 200 ft. or a lesser value if specified in the aircraft operating manual.
				43		The difference between the primary and standby altimeters is noted for use in contingency situations. At least the initial altimeter cross-check should be recorded in aircraft forms.
				44		The altimeter system being used to control the aircraft is selected to provide the input to the altitude reporting transponder that is transmitting the information to ATC.
				45		If the pilot is notified by ATC of an assigned altitude deviation error which exceeds 300 ft., then the pilot takes action to return to the CFL as quickly as possible.
				46		Contingency Procedures after entering RVSM airspace. The pilot notifies ATC of contingencies which affect the ability to maintain the CFL and coordinates a plan of action.
YES	NO	NS	NA	Q#		In-flight Procedures, Special Emphasis Items
				47		Area of Operations Specific Operational Policy & Procedures, including Standard ATC Phraseology.
				48		Use and limitations of standby altimeters in contingencies.
				49		Problems of visual perception of other aircraft at 1,000 ft. vertical separation.
				50		TCAS operating characteristics in RVSM airspace.
				51		Operational knowledge of contingencies and proper response to specific contingencies.
YES	NO	NS	NA	Q#		POSTFLIGHT
				52		When making maintenance log book entries that document malfunctions in height keeping systems, the pilot provides sufficient detail to enable maintenance to effectively troubleshoot and repair the system.
YES	**N**	**NS**	**NA**	**Q#**		MAINTENANCE PROGRAM ELEMENTS

					53	General: 1. Operators without an approved aircraft maintenance program are required to develop and obtain approval of an RVSM maintenance program. 2. Operators who maintain their aircraft under a continuous airworthiness maintenance program may choose to incorporate the RVSM maintenance requirements into the program.
					54	FSI Job Aid 26-A from Airworthiness Inspector's Handbook (AIH) complete.
					55	Identification of components considered to be RVSM critical, and identification of structural areas noted as RVSM critical areas.
					56	The name or title of the person who will ensure that the aircraft is maintained in accordance with the approved program.
					57	The method the operator will use to ensure that all personnel performing maintenance on the RVSM system are properly trained, qualified, and knowledgeable of that specific system.
					58	The method the operator will use to notify the crew if the aircraft has been restricted from RVSM but is airworthy for an intended flight.
					59	The method the operator will use to ensure conformance to the RVSM maintenance standards, including the use of calibrated and appropriate test equipment and a quality assurance program for ensuring continuing accuracy and reliability of test equipment, especially when outsourced.
					60	The method the operator will use to verify that components and parts are eligible for installation in the RVSM system, as well as to prevent ineligible parts from being installed.
					61	The method the operator will use to return an aircraft to service after maintenance has been performed on an RVSM component/system or after the aircraft was determined to be non-compliant.
					62	Periodic inspections, functional flight tests, and maintenance and inspection procedures with acceptable maintenance practices for ensuring continued compliance with the RVSM aircraft requirements.
					63	Any other maintenance requirement that needs to be incorporated to ensure continued compliance with RVSM requirements.
					64	Use of AMO: Operators using the services of an AMO must include provisions to ensure that the requirements of their RVSM programs are being met.

End of Appendix 4-B

APPENDIX 4-C
RVSM Action Numbers

1. RVSM Certification Action Number

1152D: Adding RVSM Authority

2. Airworthiness (Avionics) RVSM Action Numbers

4365: Eval RVSM Conformance & Program
4365A: Eval RVSM Type Design Status
4365B: Eval RVSM Aircraft Modification Status
4365C: Eval RVSM Critical Component List
4365D: Eval RVSM Critical Structural Areas
4365E: Eval RVSM Specific Maintenance Instructions
4365F: Eval RVSM Maintenance Standards
4365G: Eval RVSM Quality Assurance Provisions
4365H: Eval RVSM Maintenance Release Procedures
4365J: Eval RVSM Monitoring Program
4365K: Eval RVSM MEL Provisions
4365L: Eval RVSM Crew Notification Procedures
4365M: Eval RVSM-Specific Systems Training Curriculum
4665: Inspect RVSM Program Conformance

3. Operations RVSM Action Numbers

2386: Eval RVSM Program & Conformance
2386A: Eval RVSM Operational Procedures
2386B: Eval RVSM Operations Manual Provisions
2386C: Eval RVSM MEL Provisions
2386D: Eval RVSM Contingency Procedures
2386E: Eval RVSM Personnel Training Provisions
2386E1: Eval RVSM Flight Crew Training Provisions
2386E2: Eval RVSM Dispatcher Training Provisions
2386F: Eval RVSM Flight Crew Qualification Provisions
2386G: Eval RVSM Crew Notification Procedures
2386H: Eval RVSM Weather Considerations
2386I: Eval RVSM Flight Planning Provisions
2386J: Eval RVSM Dispatch Procedures
2601E: Inspect RVSM Procedures In-Flight
2620: Inspect OPS RVSM Program Conformance

End of Chapter

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Chapter 5
Performance Based Navigation Operations

This chapter provides guidance for approval of an aircraft operator for PBN operations in accordance with the applicable ICAO navigation specifications.

APPLICABLE ACTION NUMBERS
1152C+Add PBN-RNP Authorization
2385+ Evaluate PBN-RNP Program
4366+ Evaluate PBN-RNP Program

5.1 GENERAL POLICIES

5.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal certification process as outlined in CAAP guidance.

B. The formal certification process for approval of PBN operations MAY be administered concurrent with the process for initial certification of the operator.

5.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for PBN operations.

B. It is the Airworthiness (Avionics) Inspector's responsibility to evaluate and approve any additional airworthiness requirements and associated programs in support of Performance Based Navigation.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of PBN operations.

5.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector or aviation technical assistant to process the documents and events who is not technical qualified in PBN operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered PBN Operations-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is a qualified avionics inspector;

2) After completion of formal training regarding the specific PBN system installation and maintenance; and

3) With documented OJT qualification in PBN Operations certification requirements.

C. At least one assigned operations inspector will be considered PBN Operations-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an qualified operations inspector;

2) Has documented completion of OJT by a qualified instructor for PBN Operations.

D. An assigned flight operations inspector will be considered PBN Operations-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Holds a category, class and type rating for the aircraft to be used;

2) Has completed formal ground and flight training for use of an PBN system;

3) Has documented completion of OJT by a qualified instructor for evaluation and inspection of PBN operations; and

5.2 RELATED TECHNICAL PUBLICATIONS

5.2.1 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for PBN operations;
- PCAR Part 8, in that, the operator must have CAAP approval and flight crews must be qualified for operations in PBN operations;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for PBN operations;

5.2.2 TECHNICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to approval of PBN Operations—

- CAAP AC 08-007, Application & Process: Performance Based Navigation.
- The applicable aircraft and component manufacturer's procedures, limitations and relevant operational safety and maintenance practices;

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered without mutual agreement of the operator.

5.2.3 ICAO NAVIGATION SPECIFICATIONS

5.2.3.1 List of Navigation Specifications

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

1) RNAV 10 (RNP 10)
2) RNAV 5
3) RNAV 2
4) RNAV 1
5) RNP 4
6) **RNP-2
7) Basic RNP 1
8) **Advanced RNP 1
9) RNP APCH
10) 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 CAAP.
> - (**) indicates that a navigation specification has not yet been developed for these designation.

> When preparing for RNP approach operations, the operators should also consult AC 08-023 for guidance for Baro-VNAV approvals.

5.2.3.2 Separate Approval for Each Navigation Specification

A. The CAAP 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.

- These nav specifications differ regarding performance and functionality.

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

5.3 OPERATIONAL APPROVAL PROCESS

5.3.1 GENERAL INTERNATIONAL REQUIREMENTS

5.3.1.1 Complete Certification Requirements

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

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

5.3.1.2 Certification Evaluation Required

In making this certification evaluation, CAAP 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

5.3.1.3 Criteria for Granting the Approval Document

CAAP 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

> - 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.

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;

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(s) consistently and safely

5.3.2 GENERAL PHILIPPINE PBN REQUIREMENTS

5.3.2.1 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 blur in a simple certification.

> Applicable Action Number
> - 4363: Evaluate MNPS Conformance and Program
> - 4663: Inspect MNPS Program Conformance

B. Granting of PBN is a simple process. The applicant will provide the required formal application as prescribed by CAAP.

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.

5.3.2.2 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 CAAP 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).

5.3.2.3 Final Certification Actions

A. This is the period of time that CAAP 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—

(a) Master (formal) operations specifications; and

(b) Aircraft Display operations specification (for each type of aircraft).

5.4 CONTENTS OF FORMAL APPLICATION PACKAGE

5.4.1 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);

See Appendix A: PBN Application Form
See Appendix B: PBN Conformance Checklist

5.4.2 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 nclude 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);

5.4.3 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.

See Appendix C for copy of Aircraft PBN Conformity Checklist.

5.4.4 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.

5.4.5 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;
2) Standard practices manuals; and
3) Illustrated parts catalogues.

- CAAP 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 CAAP offices as a part of the application.

5.5 AIRWORTHINESS CONSIDERATIONS

5.5.1 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).

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.

Unless otherwise accepted by the CAAP, 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.

5.5.2 CONTINUING AIRWORTHINESS/MAINTENANCE

5.5.2.1 Maintenance Program

A. Unless otherwise approved by CAAP, 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 CAAP 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.

5.5.2.2 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.

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

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.

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

- A recording procedure for both satisfactory and unsatisfactory results should be included.

> 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.

- Fleet sampling is not generally acceptable in lieu of specific aircraft assessment.
- At least one satisfactory performance based navigation 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.

5.5.3 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.

5.5.4 CONTINUING TRAINING

A. Continuing training should be accomplished—

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

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.

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 CAAP.

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 install, evaluate, control, and test system and component software changes, updates, or periodic updates
8) Procedures related to the MEL remarks section use which identify PBN related systems and components, specifying limitations, upgrading and downgrading
9) Procedures for identifying PBN related components and systems as "RII" items, to provide quality assurance whether performed in-house or by contract vendors.

5.5.5 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.

5.5.6 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.

> 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.

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 CAAP-approved maintenance program to approve an aircraft for maintenance release.

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

5.5.7 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 navigation system to the RNP level required is to periodically use the system and note satisfactory performance.

B. Periodic navigation system checks should be conducted in accordance with—

- Procedures recommended by the airframe or avionics manufacturer; or
- An alternate procedure approved by the CAAP.

> 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.

5.5.8 CONFIGURATION CONTROL/SYSTEM MODIFICATIONS

A. The operator should ensure that any modification to systems and components approved for performance based navigation capability 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 CAAP accepted criteria or processes

5.5.9 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).

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

B. Contract maintenance organizations should have appropriate records and instructions for coordination of records with the operator.

5.5.10 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).

5.5.11 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.

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

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.

5.5.12 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.

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

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

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

5.6 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.

5.6.1 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

5.6.2 FLIGHT CREW TRAINING

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

5.6.3 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 CAAP.

5.7 OPERATIONAL PROCEDURES

5.7.1 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.

5.7.2 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.

5.7.3 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.

> 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.

D. Where operations are based on RNP, suitable flight manual provisions for RNP capability and uses should be provided.

5.7.4 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.

5.7.5 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

5.8 PERFORMANCE BASED NAVIGATION IN RNP-10 (OR RNP-4) AIRSPACE

The implementation of PBN is part of a worldwide ICAO effort for the implementation of the Future Air Navigation System (FANS), Communication, Navigation, and Surveillance (CNS), and air traffic management (ATM) concepts.

5.8.1 GENERAL

A. Aircraft/operators that operate on routes where RNP separation standards are applied must be approved by the State of the operator or registry, as appropriate, as capable of navigating to prescribed PBN standards.

- For example: RNP-10 for the entire route on which RNP-10 is required.

B. Other separation standards are projected to require different RNP types.

- 30 NM lateral separation is projected to require Required Navigation Performance 4 (RNP-4)).

C. The implementation of more stringent RNP and other CNS capabilities is part of an ICAO coordinated effort to introduce separation standards that will enable more efficient ATM while maintaining acceptable levels of safety.

> The benefits to users of PBN include increased availability of fuel/time efficient altitudes, routes and enhanced airspace capacity, and controller flexibility.

5.8.2 OPERATIONAL APPROVAL IN OCEANIC AIRSPACE WHERE RNP-10 IS REQUIRED

5.8.2.1 Background

A. States and operators are implementing PBN as part of a worldwide ICAO effort to implement the FANS, CNS, and ATM concepts.

B. The Pacific oceanic planning groups have implemented 50 NM and 30 NM lateral separation in Pacific oceanic airspace. In addition, 50 NM longitudinal separation has also been introduced for aircraft that are equipped with the required nav equipment.

- In accordance with ICAO Document 7030, aircraft/operators that operate on routes where these separation standards are applied must be approved by the State of operator or registry, as appropriate, as capable of navigating to RNP-10 for the entire route on which RNP-10 is required.

C. Other separation standards require different RNP types (e.g., 30 NM lateral separation requires RNP-4).

- The implementation of more stringent RNP and other CNS capabilities is part of an ICAO coordinated effort to introduce separation standards that will enable more efficient air traffic management while maintaining acceptable levels of safety. Policy.

5.8.2.2 Compliance with RNP-10 or RNP-4 Navigation Specification

A. AC 08-007, PBN Certification, provides one method of aircraft and operator approval in any airspace where RNP-10 or RNP-4 navigation criteria is required.

> Operator applications for RNP-10 or RNP-4 must conform to the Navigation Specification for the PBN navigation capability required for the area of operations.

B. General aviation operators will be approved through the issuance of an—

- LOA authorizing Operations in RNP Airspace;
- For short-term operations, LOA authorizing Flight in Special Areas of Operation For Short-Term Operations.

> - LOAs should be issued using the guidance in this manual.
> - Standard formats for the LOA are provided in the Inspector's Toolkit in the Standard Letters folder.

C. The principal inspectors should inform their AOC holders that this advisory circular outlines the approval process for RNP-10 (or RNP-4 authorization.

D. The steps in this process should be followed when—

1) Aan operator seeks authority to operate an airplane type/LRNS combination in areas where RNP-10 is applied; and

2) The operator has not previously received RNP-10 approval for that specific airplane type/LRNS combination.

> Normally, if an operator has received initial Class II navigation/RNP-10 approval for a specific airplane type/LRNS combination, that operator should not be required to re-apply for approval to conduct RNP-10 operations on additional routes or areas.

5.9 RNP 10 (OR RNP-4) APPLICATION GUIDANCE

AC 08-007 provides guidance on the content of an operator's RNP-10 application. The application should contain the items listed below—

1) Airworthiness documents that establish the proposed aircraft/navigation system group, its RNP-10 approval status, and a list of airframes in that group.
2) Approved or requested RN -10 time limit for aircraft for which INS or IRU are the only source of long-range navigation (LRN).
3) Documentation establishing the RNP-10 area of operations or routes for which the specific aircraft/navigation system is eligible.
4) Documentation that the operator has adopted operating practices and procedures related to RNP-10 operations.
5) Documentation showing that the pilot and, if applicable, dispatcher knowledge of RNP -10 operating practices and procedures will be adequate.
6) Documentation that appropriate maintenance practices and procedures have been adopted.
7) MEL updates, if applicable.
8) Operating history that identifies past problems and incidents, if any, and actions taken to correct the situation.
9) Awareness of the necessity to follow up action after navigation error reports, and the potential for removal of RNP-10 operating authority.

5.10 AIRCRAFT ELIGIBILITY (RNP-10)

A. The operator must show the aircraft/navigation system groups that will be presented for approval of RNP-10 operations and provide a list of airframes that are determined to be in the specific aircraft/navigation system groups to be evaluated.

1) Determining aircraft eligibility requires that for aircraft navigation systems which have been approved by an aircraft certification authority to RNP-10 or better, the operator must provide appropriate sections of the Aircraft Flight Manual (AFM) that address RNP, including any associated time limits for INS and IRU navigation systems.
2) Aircraft equipped with global positioning systems (GPS) that are approved to primary means of navigation standards, are required to show that. for aircraft equipped with GPS, where such GPS units are the only systems for LRN, the operator must show that it is approved in accordance with the applicable navigation specification. .

   > An RNP-10 time limit is not applicable to this installation.

3) Where aircraft have multisensor systems integrating GPS (with GPS integrity provided by receiver autonomous integrity monitoring (RAIM)), the operator must show that systems are approved and operated in accordance with applicable navigation specification..

   > An RNP-10 time limit is not applicable to this installation.

4) Where the aircraft has the GPS equipped in combination with another approved LRNS (e.g., INS or IRU); the operator must show that aircraft equipped with GPS and one or

   > An RNP-10 time limit is not applicable to this installation.

more approved LRNS are installed and operated in accordance with the applicable navigation specification. .

5) The operator to show that INS or IRU installation is approved in accordance with applicable navigation specification, unless the operator takes action to extend the approved navigation system time limit and/ or plans to update the system en route, a baseline RNP-10 time limit of 6.2 hours, starting at the time the system was placed in navigation mode, is applicable.

- An RNP-10 time limit is applicable to this installation.
- Refer to the RNP-10 navigation specification when processing an extention to the nav system time limit.

6) Aircraft Eligibility Through Data Collection, (Eligibility Group 3) is an alternative when the aircraft is equipped with navigation systems not approved under existing criteria, the operator may demonstrate RNP-10 eligibility through data collection.

7) Where the aircraft is equipped with only INSs or IRUs, the operator is required to show the routes or areas where it is eligible to operate if restrictions (e.g., INS RNP-10 time limit) apply to navigation systems.

The operator may conduct a one-time evaluation of eligibility to fly in an RNP-10 area of operations or on specific RNP-10 routes or may elect to evaluate on a per-flight basis.

5.11 ONE-TIME EVALUATION OF SPECIFIC RNP-10 AREA

A. For one-time evaluation of a specific RNP-10 area or track system, aviation safety inspectors (ASI) should expect the operator to accomplish the following—

1) Calculate the longest distance from either departure airports or en route update points (if applicable) to the point at which the aircraft will begin to navigate by reference to VHF omni-directional range station (VOR), distance measuring equipment (DME), NDB, or comes under ATC radar surveillance.

2) Using 75 percent probability wind component, convert this distance to en route time.

3) If navigation systems are to be updated en route, adjust the base line RNP-10 time limit approved for the specific operator navigation system to account for update accuracy.

- Subtract 0.3 hour from the baseline for DME/DME.
- Subtract 0.5 hour from the baseline for VOR/DME.
- Subtract 1 hour from the baseline for manual update.

4) Compare calculated en route time to the navigation system RNP-10 time limit (adjusted for en route update, if applicable) to determine if the airplane is eligible for the operation.

5) If the aircraft navigation system is found eligible for operation on the specific routes evaluated, then the RNP-10 area of operations or routes on which RNP-10 operations can be conducted are established.

6) If the aircraft navigation system is not found eligible for operation on all routes evaluated, then the operator will need to designate routes for which it is eligible or take action to gain approval for an extended RNP-10 time limit.

5.11.1 CALCULATION OF TIME LIMIT FOR EACH SPECIFIC FLIGHT

A. For a per-flight evaluation of eligibility to fly a specific RNP-10 route, follow the steps above using flight plan winds to determine en route time.

- If the RNP-10 time limit is exceeded, the flight must be re-routed or delayed.

5.11.2 OBTAINING APPROVAL FOR AN EXTENDED TIME LIMIT (INS/IRU)

A. The operator can show eligibility for an extended time limit by—

1) Obtaining approval from an appropriate State of Design, or

2) Conducting operational data collection using the established processes established.

B. Continuing Airworthiness (Maintenance Requirements), specifies that the AOC holder must provide documentation that appropriate maintenance practices and procedures have been adopted.

C. The operator is required to revise the MEL to address any new operating requirements.

5.12 OPERATIONS PROGRAMS & MANUALS

A. The AOC holder must provide revisions to manuals and checklists to show the adoption of the RNP-10 operating practices and procedures .

- If applicable, general aviation operators should show appropriate sections of the AFM relating to RNP-10 aircraft/navigation system eligibility.

B. AOC holders should show that training programs have been updated to include the practices specified in the applicable navigation specification.

- General aviation operators must show during the application process that pilot knowledge of PBN navigation requirements.

5.13 DEVIATION FROM RNP-10 REQUIREMENTS (SPECIFIC FLIGHT)

A. An AOC holder may be authorized to deviate from the RNP-10 requirements for a specific flight in designated RNP-10 airspace if the ATS provider determines that the airplane may be provided appropriate separation and the flight will not interfere with, or impose a burden on other operators. For operations under such authority, the AOC holder shall not take off for flight in designated RNP-10 airspace, unless the following requirements are met:—

1) If fuel planning is predicated on en route climb to FLs where RNP-10 is normally required, an appropriate request must be coordinated with the ATS provider in advance of the flight.

2) The appropriate information blocks on the ICAO flight plan filed with the

3) ATS provider show that the airplane and/or AOC holder is not approved for RNP-10 as specified in the AOC holder OpSpecs.

B. For these flights either of the following conditions must be met:—

1) At least one of the navigation system configurations listed below must be installed and operational:—

(a) At least two independent INS.

(b) At least two flight management system/navigation sensor combinations (or equivalent).

(c) At least two independent approved GPS navigation systems acceptable for primary means of Class II navigation in oceanic and remote areas.

(d) At least two approved independent LRNS from the list below:

(i). INS.

(ii). Flight management system/navigation sensor combination (or equivalent).

(iii). GPS navigation system approved for Class II navigation in oceanic and remote areas.

5.14 VALIDATION TESTS & VALIDATION FLIGHTS

A. The following is intended to provide broad guidance for establishing requirements for validation tests and/or validation flights. The POI should consider each application on its own merit and consult with inspectors with specialized navigation qualification, as necessary.

B. Validation testing requires that ASIs evaluate operator programs and documents in accordance with the guidance in this chapter.

5.14.1 VALIDATION FLIGHTS REQUIRED?

A. The following is provided as guidance for ASIs to consider in determining whether or not validation flights are required.

1) For operators with LRNS navigation experience with the same navigation equipment as that being proposed for RNP-10 approval, evaluation of the applicant's programs and documents should normally suffice. A validation flight should not normally be required.

2) For operators with previous LRNS navigation experience navigating with an LRNS other than that being proposed for RNP-10 approval, evaluation of the applicant's programs and documents is required. A validation flight should normally be required.

- If conducted in RNAV 5 airspace, the validation flight may be conducted in revenue service.
- If conducted in RNP-10 airspace, it must be non-revenue with the exception that cargo may be carried.

3) For operators with no previous LRNS navigation experience proposing to operate where RNP-10 is required, evaluation of the operator's programs and documents is required. A validation flight should be required and should be conducted in Oceanic airspace. It should be a non-revenue flight with the exception that cargo may be carried.

5.14.2 CONDITIONS FOR VALIDATION FLIGHTS

A. At least one flight should be observed by an CAAP ASI.

B. A demonstration of any required dispatch procedures must be conducted for routes or areas where RNP-10 is required.

C. The flight(s) should be of adequate duration for the pilots to demonstrate knowledge of dispatch requirements, capability to navigate with the system, and to perform the normal and non-normal procedures.

5.14.3 NAVIGATION ERROR REPORTS

A. The operator should indicate awareness of the requirement for operator follow-up action on reported navigation errors and of the potential to remove RNP-10 operating authority.

APPLICABLE ACTION NUMBER
1011L: Investigate PBN-RNP Navigation Error

End of Chapter

Chapter 6
Required Communications Performance (RCP)

This chapter provides guidance for approval of an aircraft operator for RCP-related operations

CERTIFICATION ACTION NUMBER
- 1152N: Approve RCP Areas for Operation

6.1 GENERAL POLICIES

6.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal certification process as outlined in CAAP guidance.

B. The formal certification process for approval of RCP operations MAY be administered concurrent with the process for initial certification of the operator.

6.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for RCP operations.

B. It is the Airworthiness (Avionics) Inspector's responsibility to evaluate and approve any additional airworthiness requirements and associated programs .

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of RCP operations.

6.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector or aviation technical assistant to process the documents and events who is not technical qualified in RCP operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered RCP Operations-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is a qualified avionics inspector;

2) After completion of formal training regarding the specific RCP system installation and maintenance; and

3) With documented OJT qualification in RCP Operations certification requirements.

C. At least one assigned operations inspector will be considered RCP Operations-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an qualified operations inspector;

2) Has documented completion of OJT by a qualified instructor for RCP Operations.

D. An assigned flight operations inspector will be considered RCP Operations-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Holds a category, class and type rating for the aircraft to be used;

2) Has completed formal ground and flight training for use of an RCP system;

3) Has documented completion of OJT by a qualified instructor for evaluation and inspection of RCP operations; and

6.2 RELATED TECHNICAL PUBLICATIONS

6.2.1 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for RCP operations;
- PCAR Part 8, in that, the operator must have CAAP approval for operations in specified RCP areas;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for RCP operations;

6.2.2 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to approval of RCP Operations—

- CAAP AC 08-008, Application & Process: Required Communications Performance.
- The applicable aircraft and component manufacturer's procedures, limitations and relevant operational safety and maintenance practices;

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered without mutual agreement of the operator.

6.3 RCP CONCEPT

6.4 COMMUNICATION-CONFIRMATION-ACTION

A. Determination of RCP type is based on the time required to safely complete a "communications transaction." That time varies depending on the type of equipment used.

- For example, voice is faster than data link to complete a transaction.

B. The RCP for a given area will depend on the type of equipment used to make the communications transaction.

C. At the present time, those RCP types are expressed as the transaction time in seconds.

- For example, RCP-20 = transaction time of 20 seconds.

D. According to the transaction time probabilities contained in the following analysis, the equipment and the operator, must be consistently capable of meeting these transaction times in order to receive approval for the specific RCP.

RCP type	Transaction time (sec)	Continuity (probability/ flight hour)	Availability (probability/ flight hour)	Integrity (acceptable rate/ flight hour)
RCP 10	10	0.995	0.99998	10^{-5}
RCP 60	60	0.99	0.9995	10^{-5}
RCP 120	120	0.99	0.9995	10^{-5}
RCP 240	240	0.99	0.9995	10^{-5}
RCP 400	400	0.99	0.999	10^{-5}

E. If an operator requests to be approved for operations in airspace defined as RCP-60, that operator's personnel must be able to demonstrate transaction times of 60 seconds consistently using the required equipment.

> No additional transaction time can be tolerated for factors such as language proficiency or competency with the equipment.

F. In some areas, there will be two RCP types defined, a primary and an alternative. The operator's communications equipment and personnel must be capable of consistent transaction times for the primary RCP type.

SECTION 7 OPERATIONAL APPROVAL PROCESS

7.1 GENERAL INTERNATIONAL REQUIREMENTS

7.1.1 COMPLETE CERTIFICATION REQUIREMENTS

Prior to operating a civil aircraft of Philippine registry in airspace defined for an RCP type must first—

1) Satisfactorily complete the process for granting of the authorization;
2) Obtain an approval document for the specific aircraft or fleet from CAAP.

7.1.2 CERTIFICATION EVALUATION REQUIRED

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

1) Defined airspace or route to be flown;
2) RCP type required in that airspace;
3) Suitability of the aircraft communications equipment; and
4) Capability of the crew to consistently meet the specified transaction times.

7.1.3 CRITERIA FOR GRANTING THE APPROVAL DOCUMENT

CAAP shall be satisfied that the—

1) Communications equipment on the aircraft does not restrict the operator from meeting the required communications performance for the primary and, if applicable, the alternative RCP type;
2) Operator has instituted appropriate procedures in respect to continued airworthiness (maintenance and repair) practices and programmes of the communications equipment;

3) Operator has instituted appropriate flight crew communication procedures in the operations manual for operations in defined RCP airspace; and

4) Operator has ensured that all flight crew personnel used in the defined airspace are capable of consistently meeting the transaction times.

7.2 GENERAL PHILIPPINE REQUIREMENTS

7.2.1 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 blur in a simple certification.

B. Granting of RCP authorizations is a simple process. The applicant will provide the required formal application as prescribed by CAAP.

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.

7.2.2 INSPECTION & DEMONSTRATION

A. The specific aircraft to be used will be inspected for communications 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 transaction times, the applicant will be issued an LOA to conduct RCP operations under the close supervision of CAAP inspector personnel.

> Past performance of the operator's personnel with the communications equipment required to meet the primary RCP type will be a key factor in the type of demonstration required.

C. The demonstrated transaction times will be considered before granting the RCP type(s).

7.2.3 FINAL CERTIFICATION ACTIONS

A. This is the period of time that CAAP completes the necessary documentation to formalize the approval of the applicant for RCP types in specific aircraft type(s) and, if necessary, in specific areas or on certain routes.

B. That approval will be in the form of—

1) For general aviation operators; an LOA valid for a period of 24 months; and

2) For AOC holders, a revision to the—

(a) Master (formal) ops specs; and

(b) Aircraft Display Ops Specs (for each type of aircraft).

SECTION 8 CONTENTS OF FORMAL APPLICATION PACKAGE

8.1 GENERAL REQUIREMENTS

The following documents will be considered individually—

1) Letter of request for RCP approval
2) Summary of relevant past operating history (where available);

8.2 FOR AIRCRAFT TYPE

The following documents must be submitted for each aircraft type—

1) Description of aircraft communications equipment that will be used to meet RCP;
2) Operations manuals (or proposed revisions to existing manuals) providing specific procedures or procedure steps to include RCP;
3) For AOC holders, training programs that include initial and recurrent training that provides pilots with adequate knowledge of RCP requirements;
4) Proposed Minimum Equipment List (MEL) revisions for RCP, if applicable;
5) Current Master Minimum Equipment List (MMEL)

8.3 AVAILABLE FOR CONSULTATION

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

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

- CAAP 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 CAAP offices as a part of the application.

End of Chapter

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Chapter 7
Extended Range Twin Engine Operations (ETOPs)

This chapter provides guidance for authorization of aircraft operators for ETOPS operations.

APPLICABLE ACTION NUMBER
1152F: Add ETOPS Authorization
1153D: Upgrade/Downgrade ETOPS Approved Diversion Time

7.1 GENERAL POLICIES

7.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal ETOPS certification process as outlined in CAAP guidance.

B. The ETOPS formal certification process may NOT run concurrent with the process for initial certification of the operator.

Because of the citical nature of this certification, it must be accomplished separately.

7.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for ETOPS.

B. It is the Airworthiness (Maintenance) Inspector's responsibility to evaluate and approve the airworthiness requirements and associated support programs.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of ETOPS operations.

7.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector to process the documentation and approval issuance who is not technical qualified in ETOPS operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered ETOPS-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an maintenance inspector;
2) With documented formal training in ETOPS certification requirements; and
3) Has documented completion of OJT by a qualified instructor for ETOPS Program and Conformance

C. An assigned operations inspector will be considered ETOPS-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an qualified operations inspector;
2) With documented formal training in ETOPS certification requirements; and
3) Has documented completion of OJT by a qualified instructor for ETOPS Program and Conformance

D. An assigned flight operations inspector will be considered ETOPS-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Is qualified in large turbojet aircraft;

2) With documented formal training in ETOPS certification requirements;

3) Has documented completion of OJT by a qualified instructor for ETOPS Program and Conformance; and

4) Has documented aircraft qualification of completion of LOFT simulator session for the application of ETOPS-related procedures.

7.1.4 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 5, in that, the aircraft must have a type certificate (or supplemental type certificate) which includes ETOPS.
- PCAR Part 5, in that the general aviation operator must have an approved aircraft inspection programthat includes ETOPS specifics;
- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for ETOPS operations;
- PCAR Part 8, in that, the operator must have CAAP approval and flight crews must be qualified for operations in ETOPS operations;
- PCAR Part 8, in that the AOC flight crews must receive formal training and qualification for ETOPS operations and maintain continuing qualfication for such operations;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for ETOPS operations;

7.1.5 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to ETOPS—

- CAAP AC 08-005, *Application & Process: ETOPS Certification*;
- Aircraft manufacturer's procedures, limitations and relevant safety practices;

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered without mutual agreement of the operator.

7.2 GENERAL

A. This section contains some of the criteria to be used by the CAAP before authorizing ETOPS operations for air operators in commercial air transport.

> Applicable Action Number
> - 3361: Evaluate ETOPS Conformance and Program
> - 3630: Inspect ETOPS Program Conformance
> - 4361: Evaluate ETOPS Conformance and Program

B. However, the basic criteria used to obtain approval may be found in CAAP Advisory Circular 08-005, "ETOPS Certification."

1) ICAO Annex 6 requires approval by the state of registry of the aircraft; however, when aircraft are leased to operators in another state, the state of the operator is normally considered the state to issue the approval.

2) When the criteria for approval are met, Section H of the operations specifications will be re-issued authorizing the ETOPS operations of the specific MMS aircraft citing the company documentation that must be followed by the company.

C. The operator must list the aircraft type, registration and/or serial number, which are ETOPS-approved in accordance with the appropriate maintenance requirements, including—

- Aircraft/propulsion system combination,
- Specific systems and components,
- MEL and
- Communication and navigation systems.

> If aircraft of the same type are equipped with different navigation system configurations, they should be listed by the aircraft registration or serial number.

7.3 EXTENDED RANGE TWIN ENGINE (ETOPS) APPROVALS

A. In considering an application from an operator to conduct ETOPS, the CAAP will make an assessment of the operator's over-all safety record, past performance, training and maintenance programs.

> Applicable Action Number
> - 3361: Evaluate ETOPS Conformance and Program
> - 3630: Inspect ETOPS Program Conformance
> - 4361: Evaluate ETOPS Conformance and Program

- The data provided with the application should substantiate the operator's ability and competence to safely conduct and support these operations and should include the means used to satisfy the airworthiness considerations outlined.
- Any reliability assessment obtained, either through analysis or service experience, should be included in the evaluation

B. The CAAP should evaluate the operator's ability to achieve and maintain the level of propulsion system reliability achieved by the world fleet.

- The evaluation should include trend comparisons of the operator's data with other operators as well as the world fleet average values and the application of a qualitative judgment that considers all of the relevant factors.
- The operator's past record of engine reliability with related types of powerplants should also be reviewed, as well as the record of achieved systems reliability with the airframe-engine combination for which authorization is sought to conduct ETOPS.

C. Although these considerations are normally part of the operator's continuing airworthiness program, the maintenance and reliability program may need to be supplemented in consideration of the special requirements of ETOPS.

D. The following items, as part of the operator's program, should be reviewed to ensure that they are adequate for ETOPS.

1) *Engineering modifications*. The operator should provide the titles and numbers of all modifications, additions and changes which were made in order to substantiate the incorporation of the configuration, maintenance and procedures (CAMP) standard for the aircraft used in ETOPS.

2) *Maintenance procedures*. Following approval of the changes in the maintenance and training procedures, substantial changes to maintenance and training procedures, practices or limitations established to qualify for ETOPS should be submitted before such changes may be adopted.

3) *Reliability reporting.* The reporting requirement of the reliability program as supplemented and approved, should be

> Reliability trends and corrective actions should be provided regularly to the CAAP and to the concerned airframe and engine manufacturers.

implemented prior to and continued after approval of ETOPS. Data from this process should result in a suitable summary of problem events.

4) *Modifications and inspections implementation*. Approved modifications and inspections that would maintain the reliability objective for the propulsion system and airframe systems as a consequence of AD actions and revised CAMP standards should be promptly implemented.

- Other recommendations made by the engine and airframe manufacturers should also be considered for prompt implementation.
- This would apply to both installed and spare parts.

5) *Aircraft dispatch procedures*. Procedures and centralized control processes should be established which would preclude an aeroplane's being dispatched for ETOPS after propulsion system shut-down or primary airframe system failure on a previous flight, or significant adverse trends in system performance, without appropriate corrective action having been taken.

Confirmation of such action as being appropriate may, in some cases, require successful completion of one or more non-revenue or non-ETOPS revenue flights (as appropriate) prior to dispatch on an ETOPS.

6) *Maintenance program*. The operator's maintenance program should ensure that the airframe and powerplant systems will continue to be maintained at the level of performance and reliability necessary for ETOPS, including engine condition monitoring and engine oil consumption monitoring programs.

E. The nature of ETOPS necessitates a re-examination of the dispatch systems to ensure that they are adequate for ETOPS. Systems redundancy levels appropriate to ETOPS should be reflected in the Master Minimum Equipment List (MMEL).

An operator's minimum equipment list (MEL) may be more restrictive than the MMEL considering the kind of ETOPS proposed and equipment and service problems unique to the operator.

F. Systems considered to have a fundamental influence on flight safety may include, but are not limited to—

- electrical, including battery;
- hydraulic,
- pneumatic,
- flight instrumentation;
- fuel;
- flight control;
- ice protection;
- engine start and ignition;
- propulsion system instruments;
- navigation and communications;
- auxiliary power-units;
- air conditioning and pressurization-,
- cargo fire suppression;
- engine fire protection;
- emergency equipment-, and any other equipment required for ETOPS.

7.3.1 PROCEDURES

A. The CAAP Airworthiness inspector must consider the following in conducting evaluation and approval of submitted programs for ETOPS.

1) Does the aircraft model have an ETOPS Type Design Approval from the country of manufacture?
2) The world fleet in-service experience for the particular airframe/engine combination.
3) If the applicant's system of maintenance is designed to achieve the required reliability.
4) An ETOPS MEL submitted, describing the systems/equipment that must be serviceable for departure on an ETOPS route.
5) Reliability and ETOP suitability relate to all principle systems on the aircraft, and not just the engines. One limiting factor could be cargo-hold fire suppressant capability.

B. The major components of the ETOPS airworthiness program are to be evaluated as independent programs integrated into a final reliability consideration. The CAAP inspector will evaluate each as outlined in the followings paragraphs.

C. Evaluate the Engine Condition Monitoring program. It should reflect the manufacturers instructions and industry practices—

> The program should provide for engine limit margins to preclude any prolonged single engine diversion exceeding approved engine limits at all power levels and environmental conditions.

1) Describing parameters to be monitored;
2) The method of data collection; and
3) The corrective action process.

D. Evaluate the procedures for corrective action following any engine shut-down, primary system failure, adverse trend or any other prescribed event that may require a verification flight or other follow-up action to ensure accomplishment.

E. If the operator currently has an approved reliability program it must be re-evaluated to ensure that all required revisions or supplements has been included to provide for ETOPS considerations.

F. If the operator does not currently utilize a reliability program, one must be developed for ETOPS.

- The program should be designed to provide for early identification and prevention of ETOPS related problems.
- The program should be event oriented and incorporate reporting procedures for significant events.
- There must be a method of reporting events and reliability information to the CAAP in a timely manner.

G. Ensure that the items identified to be reported to the CAAP include—

1) Engine in-flight shut-downs
2) Diversions or turn-backs
3) Un-commanded power changes or surges
4) Inability to control the engine or obtain desired power
5) Problems with systems critical to ETOPS
6) Any other event detrimental to ETOP.

H. Review the reporting format intended for use by the operator. It should include in addition to the information required above the following data—

1) The aircraft identification (make, model, serial number)
2) The engine identification (make, model, serial number)
3) Total time, cycles and time since last shop visit

4) If systems, identification and time since last overhaul or last inspection of the defective component

5) Phase of flight

6) Corrective action

I. Review the training program to ensure ETOPS training in addition to the general training for the personnel that will be involved in the ETOPS program.

The ETOPS program should identify the personnel that have completed the training and have satisfactorily accomplished ETOPS task under supervision as" authorized personnel."

J. Evaluate the parts control program to ensure that the proper parts and configuration are available and maintained to the standards for ETOPS.

The parts control should program provide for notification to all involved personnel if parts identified and maintained for ETOPS are not installed in the aircraft.

K. Extended range operations are formally approved by operations specification. The approval documents must specify—

1) The aircraft make, model and maximum diversion time

2) The Identification of the reliability program including date

3) The identification of the CMP including date and amendment number

7.4 OPERATIONS CONSIDERATIONS

7.4.1 OPERATIONS MANUAL REQUIREMENTS

A. The operator's Operations Manual must provide specific pre-flight requirements and procedures, including ETOPS in MNPS airspace and in-flight normal and abnormal procedures.

B. Communication and navigation procedures shall be included covering ETOPS flight planning and position plotting requirements.

C. A section specific to dispatch requirements shall be included covering MEL issues, fuel and oil supply, alternate aerodromes, aircraft performance data, weather, weather minima, flight planning and navigation, NOTAMs and flight watch procedures, including communication.

7.4.2 TRAINING MANUAL REQUIREMENTS

The operator's Training Manual shall include requirements for training and checking of dispatch personnel and flight crew members on ETOPS operations.

7.4.2.1 Ground Training

Operators requesting ETOPS operational approval shall provide its dispatch and flight crew members with at least the following information and ground training—

1) The concepts and requirements of ETOPS, including the company procedures with respect to these requirements;

2) A full glossary of ETOPS-specific terms and their definitions;

3) ETOPS dispatch and MEL requirements, including considerations following previous equipment failures;

4) Flight planning and navigation documentation and procedures specific to ETOPS;

5) Weather and minima requirements with specific emphasis on enroute alternates;

6) Enroute alternate aerodrome selection criteria;

7) Fuel requirements, including minimum requirement, contingency fuel reserve and critical fuel scenarios;

8) MMNPS procedures and requirements;

9) Abnormal and emergency (contingency) procedures and diversion procedures, including procedures for single and multiple equipment failures in flight and the operational restrictions with these failures;

10) The use of performance data on one-engine inoperative; and

11) Communication procedures.

7.4.2.2 Simulator/Flight Training

A. The operator's simulator training program shall include a dedicated ETOPS critical scenario covering an engine failure and/or emergency depressurization and associated decision making criteria.

B. MNPS procedures for in-flight contingencies and navigation cross-check procedures shall be reviewed in either the simulator training or during flight training.

C. Flight training under supervision shall consist of four sectors over an ETOPS route the last of which can be a check flight.

D. It is recommended that dispatchers be given a minimum of two flight sectors as observers for the purpose of familiarization.

7.5 PROCESS AN AOC HOLDER'S APPLICATION FOR ETOPS

7.5.1 TYPES OF AUTHORIZATION

A. The CAAP approves ETOPS in accordance with the requirements and limitations

1) The CAAP may authorize ETOPS with two-engine airplanes over a route that contains a point farther than 60 minutes flying time from an adequate airport at an approved one-engine-inoperative cruise speed under standard conditions in still air.

2) For passenger carrying aircraft with more than two engines, the CAAP may grant authorization to conduct ETOPS operations over a route that contains a point greater than 180 minutes flying time from an adequate airport at an approved one-engine-inoperative cruise speed under standard conditions in still air.

7.5.2 APPLICATION PROCESS

7.5.2.1 Initial Contact

A. The application process usually begins with a visit, phone call or e-mail from the prospective AOC holder (applicant) to the CAAP.

B. At that time, the inspector should ask the following questions and annotate the responses for future reference—

> Inform the AOC holder of the applicable regulations and guidance materials they should review.

1) Is the familiar with ETOPS requirements?

2) When do you want to start the operation?

3) What kind of operation do you want? Cargo? Passenger? Both?

4) What routes do you want to fly?

5) How many minutes of ETOPS authority are you seeking?

6) What aircraft-engine combination are you going to use?

7) What are your current capabilities?

8) Do you have an operating certificate?

9) If it is a new entrant, do you want to gain non-ETOPS authorization first *or* do you want to do both together?

10) What is a good day and time for you to meet with us?

7.5.2.2 Preparation for the Initial Meeting

A. In preparation for the meeting, the inspector complete the following tasks:

1) Inform CAAP management that an AOC holder is interested in applying for ETOPS.

2) If applicable, discuss the AOC holder's existing programs for any deficiencies that could affect ETOPS authorization with CAAP management.

B. The CAAP management will coordinate the coordinates team leaders and members for the meeting. The three required members include—

- Principal operations inspector (POI) (Operations).
- Principal maintenance inspector (PMI) (Airworthiness).
- Principal avionics inspector (PAI) (Airworthiness).

C. Other resources may include the—

- Assistant principal inspectors (API).
- Cabin safety inspector (CSI) (Operations).
- Aviation safety inspector/aircraft dispatch (ASI-AD) (also known as flight control safety inspector (FCSI) (Operations)).
- Maintenance Inspecto (Airworthiness).
- Flight operations inspector (Operations).

D. If the CAAP does not have ETOPS expertise, make arrangements to get the required assistance by asking for help from the region in preparation for the initial meeting.

7.6 CONDUCT THE INITIAL MEETING

7.6.1 INITIAL MEETING

A. At the initial meeting, the AOC holder should officially request ETOPS authorization and present the CAAP with the official letter of intent (LOI) and the application package outlined in subparagraph E of this section.

7.6.2 NOTES

Review any notes from the AOC holder's initial contact (phone call, face-to-face, or e-mail).

These meetings are *confidential* and participants may only share information derived from them on a *need to know* basis.

7.6.3 DISCUSSION

. During the initial meeting, discuss the following items with the AOC holder—

7.6.3.1 POCs

Identify all of the POCs for the AOC holder and CAAP. For example, the CAAP manager should appoint the POI, PMI, or PAI, or an assistant, as the certification project manager (CPC). The AOC holder should also appoint a CPC as a POC.

7.6.4 PROGRAM DEFICIENCIES

A. If applicable, identify any existing program deficiencies the AOC holder (applicant) may have.

B. If the applicant has existing ETOPS authority, present any existing ETOPS program deficiencies to the applicant.

C. The applicant/AOC holder must address these deficiencies prior to applying for ETOPS authorization.

- For example, if the AOC holder has a marginal Continuing Analysis and Surveillance System (CASS), the AOC holder must correct it before the CAAP grants ETOPS authority.

7.6.5 IDENTIFY APPROPRIATE REGULATIONS & GUIDANCE MATERIALS

Identify all of the regulations and guidance materials that will be used for this certification process.

7.6.6 METHODS

A. There are two methods to gain ETOPS authorization: accelerated and In-service.

B. Inform the AOC holder of the 6 month minimum notification requirement prior to the anticipated start date for the Accelerated Method, and the 60-day minimum notification requirement for the In-service Method. The applicant must understand that these times are not negotiable.

C. In accordance with the current edition of AC 08-005, AOC applicants may choose to use either method. Depending on the circumstances, discuss the applicable method(s) and be prepared to discuss the pros and cons of each method. Although either method is available, applicants rarely use the In-service Method.

D. Smaller operators must use the In-service method. An AOC holder can enhance safety when, before conducting ETOPS, the operator gains operational experience in the type of airplane capable of ETOPS, and with the operational environment typically encountered on longer range flights in areas where there are limited airports available for an en route diversion. Typically, this involves prior operational experience on overwater flights to international areas of operation.

7.6.7 ETOPS FLIGHT OPERATIONS REQUIREMENTS

7.6.7.1 ETOPS Requirements

A. AOC holders applying for ETOPS authority must present to the CAAP documentation to show that they have policies, procedures, and training programs for pilots, dispatchers, and flight followers (as applicable) to conduct ETOPS.

B. The AOC holder must provide manuals and a training program curriculum to the CAAP for approval. Refer to the current edition of AC 08-005 for specific requirements.

C. The application must also include the policies and processes the AOC holder will use to collect, monitor, evaluate and maintain records for their ETOPS operations.

D. The engine-out speed that applicants will submit for approval will be the basis for ETOPS calculations. In addition the applicant should provide a graphical display in the form of range circles for the proposed area of operation.

7.6.8 ETOPS MAINTENANCE REQUIREMENTS

Ask the AOC holder various questions concerning the ETOPS maintenance requirements to gather additional information. These may include—

1) What airplane-engine combination are they going to use?

2) If they are an AOC holder, do they currently have an approved maintenance program?

3) Do they understand the supplemental maintenance programs required for two-engine ETOPS operations per AC 08-005?

> Although the initial contact conversation may have conveyed this information, re-affirm it during this meeting.

7.6.9 FORMAL DECLARATION OF INTENT

A. Inform the applicant that ETOPS authorization requires a formal PASI or letter of intent. The applicant may submit this separately, or it may be part of the application package (discussed later). The formal letter of intent should include the following information at a minimum—

1) Proposed ETOPS operating start date.

2) Airplane-engine combination.

3) Intended areas of operation.

4) Type of ETOPS authorization requested.

5) Existing operating certificate information, if applicable.

B. Inform the applicant that after the CAAP CAAP reviews the formal letter of intent; the CAAP will provide a written response.

> This response should acknowledge receipt of the letter and should specify acceptance of the letter of intent, or specify what required information is missing.

C. After the initial meeting with the AOC holder when they have officially requested ETOPS authorization, the CAAP will ensure that the appropriate CASORT Action entries are made for the evaluation of an ETOPS program

D. The 6-month notification period for the Accelerated Method and the 60-day notification period for the In-service Method begin upon CAAP's acceptance of the formal letter of intent. When the applicant uses the In-service Method, the applicant must understand that all training, processes and procedures required for ETOPS must already be in place prior to CAAP acceptance of their formal letter of intent.

7.6.10 OPTIONAL ETOPS BRIEFINGS

A. The CAAP will, upon request, provide the AOC holder with an ETOPS briefing. This briefing will—

1) Outline relationships, roles, and responsibilities. This meeting helps clarify the lines of communication and authority in regards to the application and subsequent approval process.

2) Discuss the entire ETOPS application process and the roles of HQ, the region and the CAAP during the ETOPS application and validation process.

B. The point is to make the following perfectly clear: "The CAAP will make the final decision of whether or not the AOC holder has the qualifications to receive ETOPS authorization."

7.7 APPLICATION PACKAGE

A. The applicant must submit an application. The applicant may submit the package at the same time as the letter of intent; however, the applicant may also submit it later. The application package is the heart of the ETOPS authorization process. It must contain detailed information on the following—

1) As stated earlier, the application package may contain the formal declaration of intent.

2) Defined processes, procedures, and related resources being allocated to initiate and sustain ETOPS operations.

B. These processes, procedures, and related resources are typically referred to as the AOC holder's ETOPS program. The AOC holder must demonstrate a commitment by management and all personnel involved in ETOPS Flight Operations and Maintenance.

C. The applicant must describe in detail how they will address the applicable flight operations requirements as defined in the applicable regulations and advisory circulars.

D. The applicant must describe in detail how they will address each of the maintenance elements as defined in the applicable regulations and advisory circulars.

1) ETOPS authorization requested (e.g., 120 or 180 minutes).

2) Proposed routes.

3) Dispatch policies and procedures.

4) Requested method of approval (In-service or Accelerated).

> The method the applicant chooses requires the identification of a formal timeline.

5) Documented plan for compliance with requirements of Accelerated ETOPS (if applicable).

6) An approved airplane-engine combination, including engine-out speed, those ETOPS calculations will be based on.

7) Detailed review gates or equivalent. You can find further information about review gates later in this section.

8) Validation process. The validation process requires the applicant to identify a formal timeline.

7.8 CAAP REVIEW PROCESS

A. The CAAP validates whether the applicant included *all* of the required elements in their application package. A review gate process, normally captured in the form of a matrix, may identify all of these elements and can facilitate tracking them throughout the validation process.

B. If the applicant included all of the elements in the application package then the CAAP will continue with the evaluation process and proceed to evaluate the application package including all of the elements.

C. If there are missing or incomplete elements, the CAAP sends written notification to the AOC holder describing the short falls.

7.8.1 REVIEW GATES

A. The review gate process will help ensure that the applicant's processes comply with the provisions of the applicable regulations and AC 08-005 and are capable of continued ETOPS operations.

> The review gate process as defined in the current edition of AC 08-005 is not detailed or required for the In-service Method; however, it is a proven process that is useful in both application methods.

- Normally, the review gate process will start 6 months, at a minimum, before the proposed start of ETOPS and should continue until at least 6 months after the start of ETOPS.

B. Review gates, or an equivalent method, are helpful to track every aspect of an ETOPS approval and to be able to see the status of the project at a glance. Review gates or milestones should be in a matrix form. The method used should—

1) Include dates of pertinent meetings, data submittals, and CAAP reviews and/or approvals.

2) Identify each applicable maintenance and flight operations milestone.

3) Include a "Process Validation Plan."

C. Table 4-22, Extended Operations Authorization Review Gate Matrix Example, found in Volume 4, Chapter 6, Section 3 includes what experience has shown to be a "best-practices" example of a Review Gate Matrix. While we cannot mandate that the applicant complete their information in this format, or in any particular format, a matrix is a proven tool that you can share and you should encourage its use.

7.8.2 PROCESS VALIDATION PLAN

A. The Process Validation Plan must include how the applicant intends to validate each of the process elements required to attain ETOPS authorization. This plan will spell out in sufficient detail how the applicant intends to ensure that each required process works. Note that this is a living document and it can change many times.

B. The Process Validation Plan must ensure that each ETOPS process is—

1) Defined,

2) Demonstrated,

3) Analyzed,

4) Amended (if required),

5) Revalidated, and

6) Proven (prior to ETOPS authorization).

C. The Process Validation Plan may include validation through simulation; however, the regulations require final validations be conducted in the aircraft/engine combination that the prospective AOC holder proposes be used in their ETOPS operation.

D. After the CAAP accepts the completed application package and the defined ETOPS processes it contains, inform the AOC holder to begin the execution of their Process Validation Plan. The AOC holder will complete the Process Validation Plan under CAAP observation.

E. The final step in the Process Validation Plan is the validation flights. The applicant cannot institute the validation flight portion of the validation until the CAAP develops scenarios.

- The validation sequence will typically require two non-revenue legs to complete the ETOPS validation process, followed by six revenue setctors to complete the validation process.

F. Prior to initiation of ETOPS Validation Flights, the AOC holder (applicant) must have all aspects of their ETOPS program successfully validated with one exception; that is the physical inspection of all the AOC holder's proposed ETOPS stations and facilities.

G. Airworthiness ASIs from the CAAP may conduct ETOPS station and facility inspections in conjunction with the ETOPS validation flights.

H. is understood that it may not be possible for CAAP ASIs to visit all of the operator's ETOPS station/facilities during the validation flight process.

- Ideally, a CAAP ASI should accomplish an ETOPS station/facility inspection prior to an operator conducting revenue ETOPS operations at all of its stations.
- In the event that this course of action is not practical, principal ASIs must ensure that all of the operator's ETOPS stations/facilities are evaluated within 90 days after the commencement of revenue ETOPS service.

- The principal Airworthiness ASI must ensure the accomplishment of these evaluations to make certain that every ETOPS station/facility contains all of the elements required to sustain successful ETOPS operations.
- In addition, CAAP ASIs must re-evaluate existing ETOPS stations/facilities at a minimum of every 3 years to ensure the operator continues to maintain all of the elements required to sustain successful ETOPS operations.

I. If the validation flight process is successful, then the AOC holder may be granted ETOPS authority.

7.9 ETOPS VALIDATION FLIGHTS

A. The CAAP, after receiving the AOC holder's application, will validate the submitted processes and procedures. The validation process will conclude with validation flights.

B. This ensures the AOC holder's policies, procedures, and training will enable the AOC holder to safely conduct ETOPS operations.

C. For initial ETOPS approval, an AOC holder may be required to fly two non-revenue flight sectors.

D. If the AOC holder has existing ETOPS approval and is adding a new aircraft/engine combination; a change to their existing authorization (120 minutes to 180 minutes); or a new geographic Area of Operation to its ETOPS approval, the AOC holder may be required to fly two flight legs (revenue service may be appropriate).

E. Prior to the initiation of validation flights, the CAAP will issue appropriate operations specifications (OpSpecs) that are restricted to validation flights only .

7.10 VALIDATION FLIGHT EMPHASIS AREAS

A. The following areas should be given special focus by the PIs during the approval process.

B. A Flight Control Safety Inspector or FCSI, participate in the ETOPS approval process.

7.10.1 AIRPLANE & FLIGHT PLANNING DATA

A. The CAAP should ensure that the AOC holder is utilizing the appropriate airplane manufacturer's performance for the calculation of the ETOPS performance data.

APPLICABLE ACTION NUMBER
2387O: Eval ETOPS Minimum Fuel & Oil Provisions
2387O1: Eval ETOPS Critical Fuel Reserves
2387O1: Eval ETOPS Critical Fuel Supply Scenarios

B. This information must be available for use by flight crews members, dispatchers, flight followers, and flight locators and must include the following—

1) One-engine-inoperative level off (gross) fuel planning.
2) One-engine-inoperative level off fuel planning at 10,000 feet.
3) All-engine operating fuel planning to comply with oxygen requirements.

C. The AOC holder must show it can obtain the appropriate winds aloft data for the area of operation in which they are planning to conduct operations.

- The wind forecasts model utilized in the flight planning system must be World Area Forecast System (WAFS) Gridded In Binary (GRIB) data wind forecasts.

The 5 percent increase cannot be added to the tail wind component to improve the fuel burn calculation.

- The GRIB forecast must have a minimum of 140 kilometers (km) horizontal resolution (1.25 degrees).

If the AOC holder's flight planning system does not utilize 140km horizontal resolution GRIB data, a special variance may be considered.

- This data must then be biased (increased) by 5 percent of the wind speed to correct for possible variations in the actual winds aloft could result in an increase in headwind of a decrease in tailwind.

D. The flight planning system utilized by the AOC holder must base all ETOPS fuel calculations on aircraft specific performance data in accordance with their approved program for each aircraft type.

If the AOC holder does not have an approved program to monitor the in-flight performance of each aircraft it operates and adjust fuel calculations accordingly, then each ETOPS fuel calculation utilized by the AOC holder must include a 5 percent fuel penalty to account for engine degradation and airframe drag..

E. The in-flight aircraft performance data and ETOPS fuel calculations must consider the additional fuel burn required to account for the use of engine and wing anti-ice for the entire time icing is forecast or, ice accretion plus wing and engine anti-ice for 10 percent of the time icing is forecast, which ever is the greater.

F. The ETOPS fuel calculations must also include fuel for auxiliary power unit (APU) use, if the APU is a required power source during the flight and fuel to account for holding, approach and landing.

7.10.2 ETOPS AREA OF OPERATION

A. The AOC holder must show before validation testing that the altitudes and airspeeds used in establishing the ETOPS Area of Operations for each airplane-engine combination comply with the terrain and obstruction clearance, as well as the critical fuel scenario associated with the applicable ETOPS equal-time point, and the time limited system requirements are not exceeded.

7.10.3 EN ROUTE AIRPORT INFORMATION

A. Tthe AOC holder must assemble a list of airports for the proposed ETOPS Area of Operation.

APPLICABLE ACTION NUMBER
2387N1: Eval ETOPS Enroute Airport Current Status

- This list should be reviewed by the CAAP to determine that the AOC holder is able to access and maintain current information on the operational capabilities of the airports.

B. The AOC holder's program should provide flight crews members, dispatchers, flight followers, and flight locators with current and forecasted weather, field conditions, Notices to Airmen (NOTAM), rescue and fire fighting services (RFFS), and any other information that may affect the safe operation of the aircraft into the airport with one-engine-inoperative.

See Figure 4-84, Foreign Airport Assessment Aid.

7.10.4 ADEQUATE AIRPORTS

A. An AOC holder to list an adequate airport, with CAAP approval. An adequate airport must meet the requirements of specified in AC 08-005 or be an active and operational military airport.

B. In order to be considered adequate for a specific ETOPS operation (flight), the airport must be open and the AOC holder should be able to show that they can land at the airport in accordance with the applicable aircraft performance requirements.

C. Unless operating in North Atlantic Oceanic Airspace in accordance, the weather at an adequate airport does not have to meet the landing minimums specified in the AOC holder's OpSpecs.

7.11 ETOPS ALTERNATE AIRPORTS

A. Thh AOC holder to list ETOPS Alternate Airports in their OpSpecs.

B. The AOC holder may list these airports as being strictly for use as ETOPS Alternate Airports or they may also use any regular, provisional or refueling airport that is listed in their OpSpec as an ETOPS alternate.

> APPLICABLE ACTION NUMBER
> 2387H: Eval ETOPS Alternate Aerodrome Provisions

7.11.1 ALTERNATE REQUIREMENTS

A. ETOPS Alternate Airports must meet the alternate requirements contained in the AOC holder's OpSpecs prior to takeoff.

B. Once the flight is en route, the weather minimums at an ETOPS Alternate Airport may fall below the alternate minimums requried for flight planning, but they must remain at or above the landing minimums prescribed for destination airports.

- Any time the weather at the designated ETOPS alternate drops below alternate minimums, the POI must ensure that the AOC holder has procedures in place that indicate they shall make every effort to change the alternate to another approved airport within the maximum diversion time of the aircraft.

7.11.2 OPERATIONS BEYOND 180 MINUTES OR IN THE NORTH OR SOUTH POLAR AREA

A. For operations conducted in the North or South Polar Area, the AOC holder must provide a specific passenger recovery plan for the designated ETOPS Alternate Airports (diversion airports).

7.11.3 ONE-ENGINE-INOPERATIVE SPEED SELECTION

A. The one-engine-inoperative cruise speed is a speed that is within the certified operating limits of the airplane that the AOC holder specifies and the CAAP approves.

- The speed selected is used to determine the still air (no wind), 60-minute range (distance) centered on the adequate airports identified in subparagraph 3 of this paragraph (above).

B. If the route of flight takes the aircraft out of this area, the operation must be conducted in accordance with the approved ETOPS program.

C. The AOC holder makes the calculation for the ETOPS maximum diversion times, (e.g., 120 or 180, minutes); utilizing the CAAP-approved one-engine-inoperative speed.

- The ETOPS operation must remain within the maximum no-wind distance (based on the maximum diversion time) of the selected ETOPS Alternate Airports.

D. Normally, the AOC holder will produce a planning chart (paper or electronic) that shows the normal one-engine-inoperative cruise range in the form of circles.

> - ETOPS fuel calculations must take into account and comply with terrain clearance and oxygen requirements.
> - If these reqquirements, then the flight is considered to be "ETOPS Fuel Critical."

7.11.4 RECALCULATION OF FLIGHT PLAN WHILE EN ROUTE

A. The AOC holder should have the capability to recalculate the flight plan after departure (in-flight reanalysis). Depending on the route of flight, the ETOPS Entry Point (EEP) can be many hours after departure.

B. The AOC holder is required to re-evaluate the weather at each ETOPS Alternate Airport prior to entry into the ETOPS airspace.

- An analysis of the current status of the aircraft systems should also be conducted to ensure all ETOPS significant systems are functioning normally.

- If the weather at any ETOPS alternate airport falls below landing minimums or any ETOPS significant system becomes inoperative prior to reaching the EEP, the AOC holder must evaluate the impact and take appropriate actions, which may require an in-flight re-evaluation of the route of flight, fuel calculations or any other elements of the flight plan.

C. In addition, the AOC holder should have the capability to re-calculate the flight plan in the event of an en route deviation or reroute to ensure that the aircraft remains within the maximum diversion time of the ETOPS alternate airports or an appropriate adequate airport if the new route of flight takes the aircraft out of the maximum diversion range of the listed ETOPS alternate airports.

7.11.5 COMPUTER FLIGHT PLANNING (CFP) SYSTEM

A. The AOC holder should substantiate the CFP and dispatch/flight release system is capable of providing the following information to the pilot and dispatcher—

1) Flight planning based on latitude/longitude as well as Air Traffic System routings in the event of an in-flight diversion.
2) Dynamic graphic display of ETOPS circles, based on speed selected during preplanning.
3) Depending on the aircraft type, the aircraft must be able to carry additional fuel for stronger-than-planned winds and additional fuel for icing.
4) A database with a list of suitable en route (ETOPS) alternates where the dispatcher would select from the list based on type of operation and aircraft; e.g., 120 or 180 minutes with a two- or four-engine aircraft.
5) Accuracy of internal computer calculations for the all critical fuel scenario calculations.
6) Ability to apply minimum equipment list (MEL)/Configuration Deviation List (CDL) restrictions and penalties unique to ETOPS operations.
7) Automated equal time point (ETP) calculations. (The AOC holder should maintain the ability to calculate and plot the ETP manually.)
8) Ability to plan a random route flight plan and depending on the operation, select the best route of flight based on a GRIB wind forecast.
9) Calculation of flight information region (FIR) entry and exit points.
10) EEP and ETOPS Exit Point (EXP) calculations and display on the computer flight plan.
11) Ability to display to the dispatcher and list on the CFP the forecast valid time of integrated GRIB wind data.
12) ARINC-424 navigation data to show consistency between the CFP and the Navigation Database (NDB) utilized in the airplane.
13) International duty/rest time calculations.

> - The AOC holder should substantiate all values in the computer flight planning system against aircraft manufacturer data prior to validation flights.
> - The computer flight planning values will be validated during the ETOPS validation flights.

7.11.6 WEATHER INFORMATION SYSTEM

A. The AOC holder should substantiate that the weather information system that it uses can be relied on to forecast terminal and en route weather, including icing forecasts, with a reasonable degree of accuracy and reliability in the proposed areas of operation.

> APPLICABLE ACTION NUMBER
> 2387M: Eval ETOPS Weather Forecast Availability

B. Such factors as staffing, dispatcher, training, sources of weather reports and forecasts and, when possible, a record of forecast reliability should be evaluated.

7.11.7 ALTERNATE WEATHER MINIMUMS

A. Alternate weather minimums will be those listed in the AOC holder's OpSpec . These minimums must reflect the current requirements of regulations, as applicable.

B. Although no consideration is given for the use of global positioning system (GPS)/Area Navigation (RNAV) approaches, AOC holders may obtain authorization to use these approaches from the CAAP who will authorize the approaches in the AOC holder's OpSpecs.

7.11.8 COMMUNICATIONS

A. The AOC holder must have a communications system in place that complies with the Required Communicatioons Performance for the area of operations.

APPLICABLE ACTION NUMBER
2387Q: Eval ETOPS Communications Provisions

B. The communication system is usually two-way very high frequency (VHF) radio, but alternate means such as VHF data link, high frequency (HF) voice or data link or the AOC holder might substitute a satellite communication (SATCOM) if approved by the CAAP.

C. The communications requirements must be addressed in the MEL considerations, limitations, and restrictions.

7.11.9 NAVIGATION

The AOC holder must show the availability of navigation facilities adequate for the operation, taking into account the navigation equipment installed on the airplane, the navigation accuracy required for the planned route and altitude of flight, and the routes and altitudes to the airports designated as ETOPS alternates.

APPLICABLE ACTION NUMBER
2387P: Eval ETOPS Avialable Navigation Capability

7.12 DISPATCH OR FLIGHT RELEASE

A. For all ETOPS operations, the dispatch or flight release must list all ETOPS alternates and the planned ETOPS diversion time under which the flight is dispatched or released.

B. The CAAP may grant approval to conduct ETOPS greater than 180 minutes. In selecting ETOPS Alternate Airports, the AOC holder must make every effort to plan ETOPS with maximum diversion distances of 180 minutes or less, if possible.

C. If conditions necessitate using an ETOPS Alternate Airport beyond 180 minutes, the route may be flown only if the requirements for the specific operating areas are met.

D. 207 minute ETOPS in the North Pacific Area of Operation (NOPAC) and 240 minute ETOPS in the North Polar Area of the NOPAC, north of the equator, may be granted by the CAAP as an exception which may be used on a flight-by-flight basis.

- This exception may only be used when an ETOPS Alternate Airport is not available within 180 minutes.

- Any operation that is authorized beyond 180 minutes must be approved in accordance with the aircraft time limiting systems, corrected for wind and temperature.
- In addition, the airplane must remain within the ETOP S-authorized diversion time from an adequate airport that isequivalent to International Civil Aviation Organization (ICAO) Category 7, or higher.

E. The AOC holder must inform theflight crews each time an airplane is proposed for dispatch for greater than 180 minutes and tell them why the route was selected.

> The current edition of AC 08-005 should be reviewed for the specific criteria required for ETOPS operations greater than 180 minutes.

- The reason for the route selection must be included in, or attached to, the dispatch or flight release.

7.12.1 PUBLIC PROTECTION

7.12.1.1 Protection from the Elements

If the AOC holder is applying for ETOPS operations beyond 180 minutes and for operations in the North Polar Area and South Polar Area, dispatch/flight release policies and procedures must be included for facilities at each airport, or in the immediate area, sufficient to protect the passengers and cargo from the elements.

7.12.1.2 Passenger Recovery Plan

The AOC holder must provide training to flight crews members and dispatchers relative to their perspective roles in the AOC holder's passenger recovery plan.

> APPLICABLE ACTION NUMBER
> 1320A: Eval ETOPS Passenger Recovery Plan

7.12.2 POTENTIAL DIVERSION AIRPORTS AFTER DEPARTURE

A. The AOC holder must demonstrate the pilot andthe person authorized to exercise operational control are able to monitor the airports within the ETOPS Area of Operation.

B. The AOC holder must make information regarding weather, airport field conditions, and airport facilities readily available and should communicate this information to the pilot in command (PIC) in the event changes in these conditions would render an airport unsuitable for landing.

- For AOC holders authorized passenger carrying, this information will be communicated to the flight crews by a flight dispatcher.
- For AOC holders authorized cargo-only operations, this information will typically be communicated by a person authorized to exercise operational control by the AOC holder.

C. Prior to reaching the EEP, the PIC and the dispatcher or flight follower must ensure the capability and availability of all en route alternates to support any en route contingencies.

- Weather from the earliest to latest time of arrival (TOA) at an ETOPS alternate as well as the landing distances, airport services, and facilities must be evaluated.
- If changes to any of these conditions since the time of departure would preclude a safe approach and landing, the dispatcher or flight follower will notify the PIC and will select a new ETOPS alternate where a safe approach and landing can be made.

7.12.3 EMERGENCY CONDITIONS

A. PIs will ensure sure the following emergency conditions are simulated during the ETOPS non-revenue validation flights—

> - The critical scenario will result in an actual diversion to an alternate airport.
> - Planned diversions must be coordinated with the applicable air traffic control (ATC) facility.

1) Total loss of thrust of one engine (throttle at idle),
2) Total loss of engine-generated (or normal) electrical power,
3) Any other condition considered more critical in terms of airworthiness, crewmember workload or performance risk.

B. If a scenario requires the changing of en route alternates, a dispatcher must issue a new dispatch release. If the flight is en route, a dispatcher must communicate this revised release by voice or data link to the PIC for concurrence.

C. If the flight is on the ground, the dispatcher may use any approved method to transmit flight documentation to deliver the amended release.

- The revised release should have current weather and any appropriate information for the new ETOPS alternate to it.

7.12.4 DIVERSION & FAILURE SCENARIOS

PIs should be sure that there was an assessment of scenarios for system failure and partial system failure. The CAAP should also include other diversion scenarios such as—

- Medical emergencies
- Onboard fire
- Loss of pressurization
- Security threats.

7.12.4.1 Air Operator Certificate

Whenever the AOC holder conducts a flight to a destination outside the Philippines, PIs should ensure that the aircraft has an original, certified copy of the Air Operator Certificate on board the aircraft as required by ICAO Annex 6.

7.12.5 AFTER FLIGHT REVIEWS

After the conclusion of each validation flight, the CAAP and the AOC holder should conduct an in-depth review of the flight.

- All active participants in the validation flight should participate in the review.
- If there are any areas of concern to the CAAP regarding the conduct or operation of the flight, the AOC holder must offer remedies prior to initiation of the next validation flight or final approval process.

7.13 AUTHORIZATION TO CONDUCT ETOPS OPERATIONS

7.13.1 CAAP RECOMMENDATION

As stated earlier in this chapter, the CAAP determines the final decision on whether the AOC holder has demonstrated the appropriate qualifications to receive ETOPS authorization. The CAAP will make a recommendation through their region to HQ for approval to issue the applicable OpSpecs.

7.13.2 HEIGHTENED SURVEILLANCE

After the above affirmative recommendations, AFS-1 authorizes the issuance of the OpSpec by the CAAP. The CAAP initially completes this via e-mail, with a followup letter by mail. The CAAP issues the appropriate OpSpecs paragraphs. Although the AOC holder now has the authority to begin ETOPS revenue flights, heightened surveillance by the CAAP will continue for 6 months.

7.14 DEMONSTRATION FLIGHT

A. Prior to ETOPS approval, an operator will be required to validate its ETOPS training, dispatch and operational procedures through a demonstration to the CAAP of the following—

1) The conduct of at least one ETOPS flight in a simulator on a route representative of one to be flown by the operator, including a failure enroute requiring a descent and diversion to the enroute alternate; and

2) An actual ETOPS flight.

- The entire operation must be assessed including dispatch, pre-flight planning and briefing and the conduct of the flight.
- This demonstration flight may, at the discretion of the CAAP, be a revenue or non-revenue flight.
- If a diversion is not required, a simulated emergency will be introduced to determine the capabilities of the dispatcher and flight crew and to test the communications network.

B. Operators with ETOPS authority adding a new aircraft will be required to gain a minimum of three months of operating experience with the aircraft prior to applying for its addition to the ETOPS approval, before the conduct of the actual ETOPS validation flight.

7.15 ISSUE ETOPS OPERATIONS SPECIFICATIONS

7.15.1 ETOPS AUTHORITY

A. The CAAP may grant an AOC holder the authority to conduct ETOPS Part 9 and AC 08-005. Authority to conduct ETOPS is granted through the issuance of OpSpecs. AOC holders who have been granted approval to conduct ETOPS with—

- Two-engine airplanes, and
- Passenger-carrying airplanes with more than two engines.

7.15.2 ADDITIONAL OPSPECS

A. In addition to the ETOPS OpSpecs, the type of operation conducted may require additional OpSpecs, such as—

- RNP-10
- NOPAC airspace.
- North Atlantic Tracks (NAT)/MNPS airspace.
- Areas of magnetic unreliability.
- Reduced fuel reserves in ETOPS.
- **North or South Polar Operations**

7.15.3 AOC HOLDERS WITH EXISTING ETOPS AUTHORITY

A. Recognize that once an AOC holder has authorization to conduct ETOPS, procedures and systems should be in place to support any additional ETOPS authority. Therefore, the application package for an AOC holder who is experienced in ETOPS and who is requesting a new aircraft/engine combination, a change to their existing authorization (120 minutes to 180 minutes), or a new geographic area of operation may not need to be as complex as an application package from an AOC holder who has never held ETOPS authority. The CAAP will determine the necessary level of complexity with the concurrence of the respective RO and HQ.

B. For AOC holders with existing ETOPS authority wishing to add a new ETOPS destination, an inspection of the new ETOPS station/facility must be conducted by an Airworthiness inspector from the CAAP no later than 90 days after initial start-up.

- Additionally, for existing ETOPS stations that have never had a facility inspection or have not had an inspection within the last 24 months, a station/facility inspection by an Airworthiness inspector and, if appropriate, an Operations inspector should be conducted within 120 days of issuance of this guidance.
- The CAAP should make every effort to schedule complementary inspections, during the same station/facility visit. For example, also conduct contract maintenance, fuel facility, CAMP requirements inspections, etc., as applicable.

7.16 SURVEILLANCE ACTIVITIES

A. The objective of Extended Operations (ETOPS) Surveillance is to ensure that the AOC holder continually maintains the highest possible level of safety in its ETOPS operation.

B. Since extended range programs have such a great potential for adverse safety impact if not properly administered, aviation safety inspectors (ASI) with oversight responsibility for an ETOPS AOC holder must place special emphasis on surveillance activities.

C. Surveillance consists of the following—

1) Trend analysis,

2) Safety concern identification and resolution, and

3) Implementation of corrective action.

7.16.1 DAILY OVERSIGHT

A. In addition to the normally scheduled National Surveillance and Inspecetion Program requirements, daily oversight of the AOC holder's ETOPS program is essential to ensure the continued highest possible level of safety required for an effective ETOPS operation.

- Examples may include (but are not limited to) reviewing the AOC holder's daily fleet performance, event reports, adverse trends, and pilot reports.

B. Daily oversight will lead to constant process improvement. Process improvement can only come about if good communications between the AOC holder and the CAAP-FSIS exist.

- Although oversight of AOC holders is conducted primarily through the use of inspections, some daily reports such as Service Difficulty Reports (SDRs) and utilization reports should be reported using the appropriate CASORT Action numbers.

7.17 SURVEILLANCE

7.17.1 PHASES OF OVERSIGHT

There are generally two distinct phases of ETOPS oversight. The initial period of hightened surveillance (usually 6 months), followed by normal surveillance.

7.17.1.1 Initial Period

A. The initial period usually encompasses a hightend period of surveillance during the the first 6 months after an AOC holder receives its ETOPS Authorization. This is further broken down into two 3-month segments.

B. The first segment is a period of time where the CAAP-FSIS and the AOC holder evaluate the new ETOPS programs in action.

> This is the "wring-out" phase to find any program weaknesses or potential problem areas missed during the validation process..

C. The second segment of time is used to address issues found in the first segment. The AOC holder and the CAAP-FSIS make adjustments or fine tune the ETOPS programs to ensure they consistently meet the requirements of the applicable rules and the objective of ensuring the highest possible level of safety in the AOC holder's ETOPS operation.

D. During the first 6 months of ETOPS operations, many AOC holders whose authority was just recently granted will request—

1) Additional ETOPS authority such as an increase from 120 minutes to 180 minutes; and/or

2) Addition of new areas of ETOPS operation.

> The high liklihooh of such requests illustrate another reason why the heightened surveillance period is particularly important.

7.17.1.2 Normal Surveillance

A. Normal surveillance follows the initial period. During normal surveillance, the inspectors must ensure that the AOC holder maintains their ETOPS program in accordance with the authorizations granted and continues to follow the policies and procedures contained in their program, including any revisions.

B. Normal surveillance also includes required ETOPS reporting.

7.18 TYPES OF OVERSIGHT

There are two types of oversight. Both types are employed when assessing the quality of ETOPS operations—

7.18.1 PROACTIVE OVERSIGHT

A. Proactive oversight focuses on prevention. It should include observation, of actual ETOPS operations as they are being conducted, as well as thorough review of the AOC holder's ETOPS policies, procedures, documents, and manuals for deficiencies. In addition, ETOPS reports, flight records, training, facilities, and human factors should all be evaluated whenever possible.

B. The key here is "prevention" by actively, and constantly, looking for latent hazards that may exist in the ETOPS programs or the organization.

7.18.2 REACTIVE OVERSIGHT

A. This typically occurs "after the fact." The ETOPS event has already occurred. These events include—

- In-flight shut downs (IFSD) of engines,
- Diversions and/or turn-backs,
- Lack of auxiliary power unit (APU) in-flight start reliability, and
- ETOPS significant systems reliability.

B. Obviously, this list is not all-inclusive. In reactive oversight, you review and analyze ETOPS event reports to determine the root cause of an event and ensure the AOC holder has taken appropriate corrective action.

7.19 OPERATIONS OVERSIGHT

7.19.1 REQUIREMENTS

The validation flights is also applicable for flight operations surveillance and oversight. Additionally, the CAAP-FSIS should ensure that the AOC holder is adhering to the time limitations authorized in their operations specifications.

7.19.2 ADVANCE NOTIFICATION

The CAAP-FSIS should will request advance notification of non-scheduled ETOPS operations during the first 6 months following ETOPS approval. This will allow the CAAP-FSIS to observe thee operations as they occur.

7.20 MAINTENANCE OVERSIGHT

Due to the critical nature of maintenance on an AOC holder's ETOPS program and its relationship to safety, place special emphasis on surveillance of the authorized ETOPS maintenance program.

7.20.1 THE INTENT OF ETOPS

The intent of ETOPS is to preclude a diversion and, if it does occur, to have programs in place to protect that diversion.

- ASIs should ensure that the AOC holder follows their ETOPS maintenance programs as outlined in the maintenance manual sections referenced in the OpSpec.
- The ASI should closely monitor any revisions to the AOC holder's program that could adversely affect the ETOPS program.

7.20.2 ETOPS CULTURE

Oversight should include conformation of a "positive" ETOPS culture at all levels of the organization. Surveillance and oversight will provide evidence that the corporate culture and infrastructure to support the ETOPS operation continues to exist.

- Additionally, surveillance will ensure the maintenance program continues to provide safe ETOPS operations.
- If the AOC holder's reliability program, Continuing Analysis and Surveillance System (CASS) (as applicable), is marginal, an effective ETOPS program is questionable.

7.20.3 REPORTING AN ETOPS EVENT

A. In addition to the reporting requirements in for malfunction or defects and the service difficulty reports, the AOC holder must report the following items to the CAAP-FSIS on their ETOPS airplanes (regardless of ETOPS or non-ETOPS operation) within 96 hours to its occurrence—

> - If there is an event on an ETOPS airplane that has occurred on a non-ETOPS flight, the AOC holder has an obligation to report this event even though it was not an ETOPS flight.
> - Because it is an ETOPS airplane, it is still a reportable event.

1) IFSDs, except planned IFSDs performed for flight training.
2) Diversions (including time) and turnbacks for failures, malfunctions or defects associated with any ETOPS significant systems.
3) Uncommanded power or thrust changes or surges.
4) Inability to control the engine or obtain desired power or thrust.
5) Inadvertent fuel loss or unavailability, or uncorrectable fuel imbalance in flight.
6) Failures, malfunctions or defects associated with ETOPS significant systems.
7) Any event that would jeopardize the safe flight and landing of the airplane on an ETOPS flight.

7.20.4 ETOPS NORMAL REPORTING

A. In addition to the 96 hour requirements, the AOC holder is also responsible to submit a comprehensive report to the CAAP-FSIS on a regular basis (customarily monthly).

- Although the CAAP does not have a requirement mandating these monthly or quarterly reports, the current version of AC 08-005 prescribes the necessity for these reports.

B. This monthly report should all compile—

1) Summaries of IFSD rate;12 month rolling average,
2) Delays and cancellations related to the ETOPS event,
3) Number of ground events; i.e., aborted takeoff, power shortfall or loss and unscheduled engine removals,
4) Number of events; i.e., APU failed to start, or failed in use, while intended for ETOPS or during an ETOPS event, and
5) The monthly information is submitted as one report, generally called the ETOPS report.

7.21 ETOPS NORMAL MAINTENANCE SURVEILLANCE

7.21.1 REVIEW THE AOC HOLDER'S MANUAL

A. In addition to the processes and procedures required to conduct ETOPS, the manual should also represent the AOC holder's ETOPS philosophy and define the airline's infrastructure.

B. These elements should be evident at all levels of the company. The overall intent is to preclude, and if it happens, protect the diversion.

7.21.2 OBSERVATION

A. Each of the ETOPS maintenance requirements described below must be evaluated against the applicable rule requirements, and the guidance described in the current edition of AC 08-005.

B. To this end, the inspector must ensure that the ETOPS Maintenance Program contains at least the following supplemental programs—

- It is imperative that the inspector workforce understand that the information provided below is an overview only.
- It is absolutely essential that the inspector review the applicable regulations and the AC in this regard in their entirety prior to evaluation of these activities for initial ETOPS authorization, and for ongoing ETOPS oversight.

- The following paragraphs provide a brief description of the ETOPS supplemental requirements.
- An important prerequisite to an AOC holder's ETOPS CAMP is to first ensure the certification holder's non-ETOPS CAMP is capable of supporting the ETOPS supplemental elements. Specifically, does the basic CAMP contain the maintenance and inspection programs' instructions for continued airworthiness (ICA) necessary to support an ETOPS operation.

7.21.3 ETOPS MAINTENANCE DOCUMENT

A. The ETOPS maintenance document(s) must reflect the actual policies and procedures the AOC holder expects their ETOPS maintenance personnel to adhere to accomplish the required ETOPS program elements.

APPLICABLE ACTION NUMBER
3361G: Eval ETOPS Manual/Maintenance Document

B. The ETOPS maintenance document(s) should be user friendly and be accessible to all affected personnel.

7.21.3.1 Procedural Changes

A. The AOC holder's ETOPS maintenance document must contain procedures to gain approval from the CAAP-FSIS for any changes to its ETOPS maintenance procedures.

B. These procedures should ensure that changes are submitted in a timely manner. This will allow the CAAP-FSIS time for review before the AOC holder incorporates the change into its ETOPS document.

- Each revision or procedural change to the ETOPS maintenance document will require a revision to the AOC holder's OpSpecs.
- The CAAP-FSIS must receive and approve all revisions or procedural changes to the ETOPS program.
- The AOC holder must receive an approval that reflects the new ETOPS maintenance document date prior to implementation.

7.21.4 PRE-DEPARTURE SERVICE CHECK (PDSC)

A. The AOC holder must have an ETOPS predeparture service check to verify that the airplane and certain significant items are airworthy and ETOPS-capable immediately before the ETOPS flight.

In this case, one should generally accept that word "immediately" to mean "2 to 4 hours" prior to departure on the ETOPS flight segment.

B. In the Philippines, an appropriately licensed and trained AMT must complete the predeparture service check. Outside the Philippines, under certain circumstances, the person completing and documenting the predeparture service check may not need to hold a Philippine license.

For non-scheduled operations, a pilot that holds an AMT license and who received proper training in accordance with the AOC holder's approved ETOPS program to accomplish the predeparture service check.

C. Each AOC holder's predeparture service check may vary in form and content. The specific AOC holder's needs should drive the content and suitability for an acceptable predeparture service check.

APPLICABLE ACTION NUMBERS
3361F4: Eval ETOPS Pre-Departure Service Check
3361P: Eval ETOPS PDSC Arrangements

7.21.5 DUAL MAINTENANCE

A. The AOC holder must establish procedures that minimize scheduling dual maintenance actions to multiple similar elements in any ETOPS significant system during the same routine or non-routine maintenance visit.

APPLICABLE ACTION NUMBER
3361G4: Eval ETOPS Dual Maint Policy/Procedures

B. In order to manage this requirement, the AOC holder must develop a list of fleet-specific ETOPS significant systems and include them in their ETOPS maintenance document(s).

C. The AOC holder should include a clear definition of what constitutes dual maintenance in their ETOPS maintenance document.

D. The procedures must ensure that such maintenance actions are performed by a different qualified technician, or if performed by the same technician, then she or he must be under the direct supervision of a second qualified individual.

In the event that the AOC holder performs dual maintenance, their procedures must ensure the verification of positive corrective action prior to entry into ETOPS airspace..

- In either case, a qualified individual must conduct a ground verification test and ensure any in-flight test that is required by the AOC holder be done as well.
- An AOC holder may choose to conduct a Functional Check Flight after a heavy maintenance visit to address dual maintenance actions in addition to first performing ground verification action.

7.21.6 VERIFICATION PROGRAM

APPLICABLE ACTION NUMBER
3361N: Eval ETOPS Verification after Maintenance

A. The AOC holder must establish a verification program to verify corrective actions on ETOPS significant systems. The AOC holder must have procedures that prevent an airplane from being dispatched for ETOPS after propulsion system shutdown, any primary system failure or significant adverse trends on a previous flight, unless appropriate corrective action has been taken.

B. Any time a positive corrective action is not verifiable on the ground (could not duplicate malfunction, etc.) for any reason, there is a requirement for an in-flight verification.

C. Aoc holders with authority to conduct ETOPS must have ground and in-flight verification flight procedures described in their supplemental maintenance program for events involving propulsion system shutdown, engine or major engine module change, primary system failure, and for certain adverse trends or prescribed events.

D. It is permissible to designate the period of time from airport departure to entry into the ETOPS environment as maintenance verification flight, in combination with a regularly scheduled ETOPS revenue flight, provided the verification phase is found satisfactorily prior to reaching the ETOPS Entry Point (EEP). It is important to note when the AOC holder conducts this type of ETOPS verification flight—

1) Written procedures exist to ensure that the flight crew receives a full briefing prior to dispatch concerning the event and/or the maintenance performed.

2) Appropriate maintenance personnel should convey to the flight crew the specific observations and/or actions required of them during the verification portion of the flight as well as the method used to properly record the satisfactory completion of that verification flight.

3) All flight crew observations and/or actions must be complete prior to entering the ETOPS portion of the flight.

4) Documentation of pass/fail. Communications with the dispatch or flight following center and maintenance control, and an appropriate logbook entry must be completed in accordance with the AOC holder's ETOPS maintenance document.

7.21.7 TASK IDENTIFICATION

APPLICABLE ACTION NUMBER
3361F1: Eval ETOPS-Specific Task Identification

A. The AOC holder must identify all tasks that need to be complete and certified as complete by ETOPS-qualified maintenance personnel. The intent is to have ETOPS-trained maintenance personnel accomplish these tasks because they are related to ETOPS.

B. If the AOC holder does not specifically identify the tasks, an ETOPS trained maintenance person must accomplish all maintenance tasks.

7.21.8 CENTRALIZED MAINTENANCE CONTROL PROCEDURES

APPLICABLE ACTION NUMBER
3361G1: Eval ETOPS Centralized Maintenance Control

A. An AOC holder conducting ETOPS, regardless of the size of its ETOPS fleet, must have a centralized entity responsible for oversight of the ETOPS maintenance operation.

B. The AOC holder must develop and clearly define in its ETOPS maintenance document specific procedures, duties, and responsibilities for involvement of their centralized maintenance control personnel in their ETOPS operation.

7.21.9 ETOPS PARTS CONTROL

The AOC holder must have an ETOPS parts control program that ensures only parts approved for ETOPS are utilized to maintain the integrity of the systems that are unique to ETOPS.

> APPLICABLE ACTION NUMBER
> 3361M: Eval ETOPS Parts Control Program

- This program must include provisions to verify parts placed on aircraft through parts borrowing and pooling agreements meet this requirement as well.

7.21.10 RELIABILITY PROGRAM / ENHANCED CONTINUOUS ANALYSIS AND SURVEILLANCE SYSTEM (ECASS)

A. AOC holders conducting ETOPS may modify their CAAP-approved reliability program to include the ETOPS maintenance elements, or if they do not have a reliability program, the AOC holder's existing CASS must be enhanced to include ETOPS elements.

B. The AOC holders should design their program primarily to prevent, identify, and correct problems. The program should incorporate reporting criteria for use by the carrier and the CAAP as a measure of ETOPS reliability.

C. the AOC holder must enhance the CASS program to include all of the ETOPS maintenance elements and the AOC holder should design their CASS program primarily to identify, correct, and prevent problems.

D. Regardless of which program the AOC holders have, it must include the additional reporting procedures for significant events detrimental to ETOPS flights .

7.22 CONTRACTED MAINTENANCE & RELIABILITY

> APPLICABLE ACTION NUMBERS
> 3361O1: Eval ETOPS Contracted Reliability
> 3361O2: Eval ETOPS Contracted Mainteneance
> 3361O3: Eval ETOPS Contracted Service Check

A. Air operators who contract any part of their maintenance control and/or reliability programs, necessary to support their ETOPS approval, to any other organization, remain responsible for ensuring that all elements of this program are addressed and continue to meet the applicable requirements.

B. For those air operators whose ETOPS approval is based on reliability levels established by other organizations, the CAAP does not consider ETOPS approval privileges beyond those granted by the other organization's Civil Aviation Authority.

7.22.1 ENGINE CONDITIONING MONITORING (ECM)

> APPLICABLE ACTION NUMBER
> 3361J: Eval ETOPS Engine Condition Monitoring

A. There is a requirement for AOC holders who conduct ETOPS to have an ECM program.

B. The AOC holder should design this program to ensure their engines can continue to operate at maximum continuous thrust (MCT) for extended periods of time within operating limits, in the event single-engine operation is required because of an IFSD or failure of other powerplant systems.

C. This program may be a recognized program from an engine manufacturer, a contractor, another airline or it may be the AOC holder's own program.

> The purpose of the ECM program is to recognize and ensure timely correction of engine problems.

- Regardless of origin, the ECM program should provide a system for data collection and timely analysis to detect engine deterioration and preclude failure.

7.22.2 PROPULSION SYSTEM MONITORING

A. AOC holders who conduct ETOPS are required to have a propulsion system monitoring program to monitor and detect adverse trends in their propulsion systems.

> APPLICABLE ACTION NUMBER
> 3361I: Eval ETOPS Propulsion System Monitoring

B. If the AOC holder or CAAP-FSIS determines that corrective action is necessary, the AOC holder must implement a corrective action.

> This propulsion system monitoring program requires each AOC holder to conduct an investigation into the cause of each IFSD and submit findings to the CAAP-FSIS.

- This program also contains a fleet average IFSD rate system.
- See the current edition of AC 08-005 for IFSD calculations, values and reporting requirements.)

C. An AOC holder may include the IFSD rate statistics of all engines that are configured for ETOPS (i.e; meet the Configuration Maintenance Procedures (CMP)).

- The AOC holder must ensure these engines are maintained in that configuration and in accordance with the AOC holder's ETOPS Program.
- However, these engines, while installed on non-ETOPS aircraft, do not have to be maintained by ETOPS qualified mechanics.
- Including the non-ETOPS engines is advantageous to small fleet size AOC holders to minimize the statistical impact.

D. Prior to use of these engines on an ETOPS aircraft, an ETOPS qualified AMT must accomplish an inspection to ensure the engine still meets the AOC holder's ETOPS configuration.

E. While the engine is in ETOPS operation (installed on an aircraft listed on the operator's ETOPS OpSpec, a qualified AMT must accomplish all maintenance in accordance with the AOC holder's approved ETOPS maintenance document.

7.22.3 OIL CONSUMPTION MONITORING

A. The oil consumption monitoring program must monitor oil consumption on a flight-by-flight basis, with verification of the oil system integrity made prior to each ETOPS leg.

> APPLICABLE ACTION NUMBER
> 3361K: Eval ETOPS Oil Consumption Monitoring

B. The AOC holder's program must include a process for reporting and analyzing oil consumption.

- The oil consumption monitoring program should be capable of tracking oil usage trends and recognizing a sudden spike in the oil consumption rate.
- If increased oil consumption is found, it must be corrected prior to release for ETOPS flight.

> Although there is a flight deck indication system for engine oil quantity, the CAAP and other aviation authorities highly recommend that before ETOPS departure, the engine oil levels are physically checked at the engine using the sight gauge, if installed, or via the oil tank filler neck.

- Any corrective actions taken regarding oil consumption must be verified in accordance with the ground and in-flight verification process (as required) prior to ETOPS entry.

C. Additionally, if ETOPS operations require the APU, the oil consumption monitoring program must include it as well.

- If available, the APU oil level can be determined using the flight deck oil quantity indication system.

7.22.4 APU IN-FLIGHT START PROGRAM

A. The AOC holder must have an APU In-flight start program for each applicable specific airframe/engine combination.

APPLICABLE ACTION NUMBER
3361R: Eval ETOPS APU In-Flight Start Program

- The AOC holder must ensure *each* airplane's APU is periodically sampled.
- Periodic sampling customarily begins with the AOC holder sampling each APU every 30 days.

B. After an agreed upon length of time with the CAAP-FSIS, if the sampling data confirms the reliability level consistently tracks at 95 percent or better, then the sampling intervals can be systematically escalated to no more than every 120 days.

C. APU in-flight starts should be made on flights of 4 hours or more and be subject to the following conditions—

1) In-flight APU starts do not need to occur on ETOPS flights. The APU must be in the ETOPS configuration in accordance with the applicable CMP document, in order to allow credit.

2) If in-flight APU starts occur on an ETOPS flight, the start should occur on the return leg to the United States.

3) The start attempt should occur just before top of descent, or at such time that will ensure at least a 2-hour cold soak at altitudes that are representative of the ETOPS routes flown.

D. If the APU fails to start on the first attempt, subsequent start attempts may be made within the limits of the airframe and APU manufacturer design specifications.

- If less than 95 percent of in-flight start reliability is achieved, the AOC holder's APU reliability should be questioned.
- This may warrant a thorough review of the APU maintenance and reliability programs including consideration for performing the task more often until positive corrective action is confirmed.

E. For some AOC holders conducting ETOPS, depending on the airplane/engine combination in question, an APU in-flight start program may not be required.

- Specifically, where the APU is required to be operational upon entering ETOPS airspace.
- An APU in-flight start program is not required in these circumstances.

7.22.5 CMP

A. The CMP standard specifies any additional configuration, maintenance or operational requirement, including non-optional Service Bulletins (SB), Service Letters (SL) and maintenance instructions that are uniquely applicable to ETOPS.

This CMP does not relieve the AOC holder of the responsibility to review all additional SBs and SLs that are issued against the AOC holder's fleet.

B. The requirements in the CMP are established at the time of initial ETOPS type design approval of the airplane-engine combination. Typically, the airplane manufacturer publishes and maintains the CMP document and the document includes identified CMP requirements.

- The CAAP may impose additional CMP requirements via the Airworthiness Directive (AD) process.
- Not all airplanes will have a CMP Document.

C. Although there is no requirement for the AOC holder to update their configuration beyond the baseline CMP that was in effect at the time they received their ETOPS authorization (unless mandated by AD), PIs should ensure that AOC holders have procedures in their manual to review applicable CMP documents for changes on a regular basis.

D. PIs should encourage the AOC holders to incorporate applicable changes to the CMP into their ETOPS program. To this end, they should have procedures in their manual to review applicable CMP documents for changes on a regular basis.

APPLICABLE ACTION NUMBER
3361D: Eval ETOPS CMP Procedures & Matrix

7.22.6 MAINTENANCE TRAINING

A. The AOC holder is responsible for ensuring that all maintenance personnel who perform maintenance on its ETOPS airplanes, including repair stations, vendors, and contract maintenance, have received adequate technical training for the specific airplane-engine combination it intends to operate in ETOPS.

APPLICABLE ACTION NUMBER
3361G3: Eval ETOPS Maintenance Training

B. The maintenance training program should focus on ETOPS awareness for all personnel involved in the ETOPS program. The AOC holder may include the maintenance training program in the normal maintenance training but should emphasize the special nature of ETOPS maintenance requirements.

- For additional information, see the current edition of AC 08-005 for more details concerning the ETOPS Maintenance Training Program requirements.

7.22.7 CASS

A. The airline's normal CASS must receive supplements to require regular surveillance of the ETOPS program. The AOC holder should use the program's analysis as a means to ensure the integrity of, and adjust, their ETOPS programs.

B. All ETOPS stations and associated facilities should be inspected at least every 3 years to ensure they continue to meet the requirements of the AOC holder's ETOPS program.

C. The CAAP-FSIS should make every effort to schedule complementary inspections, during the same station/facility visit.

- For example, also conduct contract maintenance, fuel facility, CAMP requirements, etc., as applicable.

7.23 MONITORING OF ETOPS OPERATIONS

This chapter provides guidance for ensuring that the operator's program for ETOPS continues to include the monitoring, corrective action and reporting necessary to maintain its aircraft at a level of reliability necessary.

7.23.1 RELIABILITY

A. ETOPS reliability reports are required to be submitted by the operator containing information relative to events that have impact of the reliability level of the aircraft, engines and systems.

The determination that the level is adequate for the operators competence and capability to safely continue ETOPS operations must be made by the CAAP in conjunction with the operator.

B. The engine condition monitoring program describes parameters to be monitored, the method of data collection, and the corrective action process.

- The program should provide for engine limit margins to preclude any prolonged single engine diversion exceeding approved engine limits at all power levels and environmental conditions.
- The procedures for corrective action following any engine shut-down, primary system failure, adverse trend or any other prescribed event that may require a verification flight or other follow-up action to ensure accomplishment.

C. A reliability program should be designed to provide for early identification and prevention of ETOPS related problems.

- The program should be event oriented and incorporate reporting procedures for significant events.
- There must be a method of reporting events and reliability information to the CAAP in a timely manner.

D. Ensure that the items identified to be reported to the CAAP include—

1) Engine in-flight shut-downs
2) Diversions or turn-backs
3) Un-commanded power changes or surges
4) Inability to control the engine or obtain desired power
5) Problems with systems critical to ETOPS
6) Any other event detrimental to ETOP.

E. Review the reporting format intended for use by the operator. It should include in addition to the information required above the following data—

1) The aircraft identification (make, model, serial number)
2) The engine identification (make, model, serial number)
3) Total time, cycles and time since last shop visit
4) If systems, identification and time since last overhaul or last inspection of the defective component
5) Phase of flight
6) Corrective action

F. ETOPS training in addition to the general training for the personnel that will be involved in the ETOPS program should be provided and documented. The ETOPS program should identify the personnel that have completed the training and have satisfactorily accomplished ETOPS task under supervision as ”authorized personnel”.

7.23.2 PROCEDURE

A. Monitoring an ETOPS program is an ongoing responsibility of the CAAP. Each reliability and/or malfunction report submitted by an operator should be immediately reviewed and evaluated for program impact.

B. Determine that the operator is following the policy and procedures that are required for maintenance thru reliability methods including data collection, analysis, establishing alert values, corrective action, follow-up and reporting.

C. In addition to the review of the above reports the CAAP inspector should ensure that the procedures utilized are the same as the approved manual.

D. Inspect the engine/APU oil consumption program, recording requirements and corrective action procedures.

E. Inspect the engine condition monitoring program to ensure all identified parameters are—

1) Being monitored
2) The data is being collected in the method approved
3) The corrective action process is being followed.

F. Review the training program for inclusion of ETOPS related procedures and/or task.

G. Inspect training records to ensure all personnel identified as "authorized personnel" have documented formal and OJT training on all ETOPS parameters.

H. Inspect parts configuration control and determine that all parts are identified in accordance with the CMP document. Determine that spare parts are properly identified and controlled.

I. Review logbooks to determine that—

1) Reportable items noted in logbooks are reflected in the programs
2) MEL items are properly handled regarding ETOPS items
3) Engine monitoring data is properly recorded
4) Engine and APU oil consumption is recorded

J. Review and discuss the operator's reliability assessment of his systems for the extended range fleet. Review as a minimum—

1) Engine hours flown for the assessment period
2) In-flight shutdown rate for all causes
3) Engine removal rate computed on a 12 month rolling average

- Determine, based on the above review and inspections if corrective action to any program or procedure is necessary or if any operational restrictions should be implemented.

End of Chapter Text - Appendices Follow

APPENDIX 7-A

Job AO-010: ETOPS Certification Project Coordinator Checklist

Date		Control #	
Action #	2602B	Record ID#	
Inspector		Org Identifier	
Location		Project#	
Destination		Aircraft MMS	
Action Taken		Aircraft Reg#	
Maint Rep		PIC #	
Mgmt Rep		Other PEL#	

- For completion instructions, refer to Chapter 2 of the Operations or Airworthiness Inspector Manual.

YES	NO	NS	NA	1	SUBMISSION OF APPLICATION
					Letter of Intent Submission?
					Develop Review Gates?
					ETOPS Meeting with FSIS?
					Review AOC Holder's Basic CAMP
					Develop AOC Holder's ETOPS Maintenance Program
					ETOPS Manual(s)
					ETOPS Predeparture Service Check
					Limitations on Dual Maintenance
					Verification Program
					Oil Consumption Monitoring Program
					APU In-flight Start Program
					Maintenance Training: Classroom
					Maintenance Training: OJT
					Configuration, Maintenance and Procedures (CMP) Document
					Procedural Changes
					Maintenance/Flight Operations Interfaces
					Develop Flight Operations ETOPS Program
					Flight Operations Manual(s)
					Flight Operations Training
					Dispatcher Training
					Simulated ETOPS Flight

					ETOPS Validation Flights
					Revise OpSpecs to permit ETOPS
					Review of ETOPS Operation Including In-service Problems and Their Resolution (3 Month)
					Review of ETOPS Operation Including In-service Problems and Their Resolution (6 Month)

INSPECTOR SIGNATURE		**ORG REP SIGNATURE**	

End of 7-A

APPENDIX 7-B

Job Aid AW-036: ETOPS Evaluation

Date		Control #	
Action #		Record ID#	
Inspector		Org Identifier	
Location		Project#	
Destination		Aircraft MMS	
Action Taken		Aircraft Reg#	
Maint Rep		PIC #	
Mgmt Rep		Other PEL#	

- For completion instructions, refer to Chapter 2 of the Operations or Airworthiness Inspector Manual .

AIRCRAFT CONFIGURATION	
• Aircraft Make & Model?	
• Engine Make & Model & Serial Number?	
• Engine Make & Model & Serial Number?	
• APU Make & Model & Serial Number?	

YES	NO	NS	NA	1	Configuration, Maintenance Procedures Document (CMP)
				1.1	Has the applicant supplied the applicable Configuration, Maintenance and Procedures (CMP) document listed in the aircraft's AFM, or TDS, or STC?
				1.2	Does the operator have a contract to receive the latest revisions to the CMP? CAAP-FSIS freezes CM)
				1.3	Is the supplied CMP applicable to the proposed airframe engine combination?
				1.4	Does the supplied CMP have the signed approval statement from the authority of the country of manufacturer?
				1.5	Is the application for ETOPS approval within the times listed in the CMP approvals for that configuration?
				1.6	Are applicable Service Bulletins listed in the CMP complied with?
				1.7	Does the operator have procedures to require priority action (before the next ETOPS flight) in regards to revisions to the CMP?
				1.8	Does the operator have procedures to supply the CAD copies of all revisions received by them with notations as to actions taken?
				1.9	Does the operator have the required ETOPS CMP compliance statement, applicable to the specific aircraft, from the authority of the country of manufacturer? (Only applicable to aircraft specifically manufactured to ETOPs standards)

				1.10	Has all special requirements/retrofits listed in the compliance statement been accomplished?
				1.11	Does the operator receive the manufacturer's industry ETOPS reliability reports?
				1.12	Does the operator have procedures to compare its ETOPS operations to the industry standards?
YES	**NO**	**NS**	**NA**	**2**	**ETOPS Maintenance Manual**
				2.2	Has the operator established a specific ETOPS Maintenance Manual?
				2.3	Does the manual provide for an Engine Oil Consumption Programme?
				2.4	Does the manual provide for an APU Oil Consumption Programme?
				2.5	Does the manual provide for an Engine Condition Monitoring Programme?
				2.6	Does the manual provide for a Reliability Programme?
				2.7	Does the manual provide for a Propulsion System Monitoring Programme?
				2.8	Does the manual provide for Maintenance Training?
				2.9	Does the manual provide for ETOPS Parts Control?
				2.10	Does the manual provide for Aircraft Performance Monitoring?
				2.11	Does the manual provide for monitoring of Sub-Contact Maintenance?
				2.12	Does the manual contain the additional maintenance procedures required to ensure ETOPS requirements are met?
				2.13	Does the manual specify the ETOPS Critical Systems?
				2.14	Does the manual provide for a Continued Airworthiness Programme needed for ETOPS operation?
				2.15	Does the manual spell out specific ETOPS responsibilities?
				2.16	Does the manual spell out specific ETOPS requirements?
				2.17	Does the manual spell out specific ETOPS limitations?
				2.18	Does the manual spell out specific ETOPS interfaces?
				2.19	Does the manual spell out specific ETOPS duties?
				2.20	Does the manual spell out specific ETOPS programme procedures?
				2.21	Does the manual have ETOPS specific Technical Log procedures?
				2.22	Is the manual subject to revision control?
				2.23	Does the programme contain Deferred Item procedures for ETOPS related systems?
YES	**NO**	**NS**	**NA**	**3**	**ETOPS Continued Airworthiness Programme**
				3.1	Has the basic maintenance programme been supplemented with ETOPS tasks?
				3.2	Does the programme clearly define ETOPS related tasks?

				3.3	Has ETOPS related tasks been clearly identified on routine work cards, work forms and check sheets?
				3.4	Does the programme require an ETOPS Service Check to ensure the aircraft status and related critical systems?
				3.5	Is the required ETOPS Service Check accomplished within 3 days of an intended ETOPS flight and/or after ETOPS critical system maintenance?
				3.6	Does the programme call for prompt implementation of modifications and inspections, which could affect propulsion system reliability?
				3.7	Does the programme ensure duel ETOPS significant systems are not maintained during the same check?
				3.8	Does the programme ensure when duel ETOPS significant systems maintenance is performed different individuals accomplish it and/or additional checks are performed?
				3.9	Does the programme contain procedures for verification flights after unscheduled maintenance is performed on ETOPS required systems?
YES	**NO**	**NS**	**NA**	**4**	**Reliability Programme**
				4.1	Does the operator have a CAD-FSD approved Reliability Programme?
				4.2	Are the operator's ETOPS aircraft included in the Reliability Programme?
				4.3	Does the Reliability Programme emphasize ETOPS Systems/Components?
				4.4	Is the ETOPS Reliability Programme event oriented?
				4.5	Does the ETOPS Reliability incorporate specific ETOPS reports and rectification procedures?
				4.6	Is there a requirement in the programme to forward copies of all reliability reports and corrective actions taken to the FSIS?
				4.7	Does the operator have sufficient Reliability Experience for the ETOPS approval applied for?
YES	**NO**	**NS**	**NA**	**5**	**Engine / APU Oil Consumption Programme**
				5.1	Does the operator have procedures to monitor Engine/APU Oil consumption?
				5.2	Is the Technical Log used to monitor Oil consumption?
				5.3	If the Technical Log or another method is used to monitor oil consumption are their procedures to ensure timely notification of oil usage?
				5.4	Are there procedures to ensure the oil consumption is within the limits per 1000 flight hours for the ETOPS approval being sort?
				5.5	Are procedures in place to ensure timely corrective action to high oil consumption reports?
				5.6	Does the programme provide for assessment and reporting of the propulsion system monitoring?
YES	**NO**	**NS**	**NA**	**6**	**Engine Condition Monitoring Programme**
				6.1	Does the ECM reflect the manufacturer’s instructions?
				6.2	Does the programme identify the parameters to be monitored?

				6.3	Does the programme identify the method of data collection?
				6.4	Does the programme define the corrective action process?
				6.5	Does the programme identify responsibilities and interfaces?
YES	**NO**	**NS**	**NA**	**7**	**Maintenance Training Programme**
				7.1	Does the training programme contain the additional maintenance tasks (CMP)?
				7.2	Does the programme include engine and systems review?
				7.3	Does the programme explain ETOPS service checks?
				7.4	Does the programme include spare parts control?
				7.5	Does the programme include engine/APU preventive maintenance?
				7.6	Does the programme include the use of on-board maintenance facilities?
YES	**NO**	**NS**	**NA**	**8**	**ETOPS Parts Control**
				8.1	Are procedures established to ensure ETOPS parts configuration control?
				8.2	Are parts identified in accordance with the CMP document?
				8.3	Are provisions for verification of parts used during parts pooling or borrowing as well as parts used after repair or overhaul to ensure they maintain necessary ETOPS configuration for that aircraft?
YES	**NO**	**NS**	**NA**	**9**	**Aircraft Performance Monitoring**
				9.1	Are all ETOPS significant systems (or component) identified?
				9.2	Are these systems included in the reliability programme?
YES	**NO**	**NS**	**NA**	**10**	**Monitoring of Sub-Contact Maintenance**
				10.1	If contractor is AMO does its authorization include ETOPS?
				10.2	Are the contractor's personnel properly trained, authorized, and equipped to perform ETOPS maintenance functions?
				10.3	Is current technical data available at the location?
YES	**NO**	**NS**	**NA**	**11**	**Minimum Equipment List**
				11.1	Has a current MEL been submitted?
				11.2	Does the submitted MEL contain the items identified by ATA code in the manufacturer's manual as significant?
				11.3	Are the items properly identified as ETOP operations required?

INSPECTOR SIGNATURE		**ORG REP SIGNATURE**	

End of Chapter

Chapter 8
Polar Operations

This chapter provides guidance for approval of an aircraft operator for operations in the identified North and South Polar areas.

APPLICABLE ACTION NUMBER
- 1152G5: Approve Polar Area Operations

8.1 GENERAL POLICIES

8.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal certification process as outlined in CAAP guidance.

B. The formal certification process for approval of Polar Area operations may NOT be administered concurrent with the process for initial certification of the operator.

C. The formal certification process for approval of Polar Area operations MAY be administered concurrent with the request for authorizations for higher ETOPS diversion times.

APPLICATBLE ACTION NUMBERS
2601i: Inspect Polar Procedures In-Flight
1320B: Eval Polar Passenger Recovery Plan
2353G: Eval Fuel Freeze Operations Procedures
2353H: Eval Disabled Aircraft Movement

8.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for Polar Area operations.

B. It is the Airworthiness (Maintenance) Inspector's responsibility to evaluate and approve any additional airworthiness requirements and associated programs in support of =====.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of Polar Area operations.

8.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector or aviation technical assistant to process the documents and events who is not technical qualified in Polar Area operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered Polar Area Operations-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is a qualified maintenance inspector;

2) With documented OJT qualification in Polar Area approval requirements.

C. At least one assigned operations inspector will be considered Polar Area operations-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an qualified operations inspector;

2) Has documented completion of OJT by a qualified instructor for evaluation of Polar Area operational approvals.

D. An assigned flight operations inspector will be considered Polar Area Operations-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Holds a category, class and type rating for the aircraft to be used;

2) Has documented completion of OJT by a qualified instructor for evaluation and inspection of Polar Area operations; and

3) Has documented completion of OJT by a qualified instructor for evaluation and demonstration of Passenger Recovery Plans.

8.2 RELATED TECHNICAL PUBLICATIONS

8.2.1 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for Polar Area operations;
- PCAR Part 8, in that, the operator must have CAAP approval and flight crews must be qualified for operations in Polar Area operations;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for Polar Area operations;

8.2.2 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to approval of Polar Area Operations—

- CAAP AC 08-005, Application & Process: ETOPS Certification, Section 6 Polar Operations.
- The applicable aircraft and component manufacturer's procedures, limitations and relevant operational safety and maintenance practices;

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered without mutual agreement of the operator.

8.3 POLAR OPERATIONS

8.3.1 BACKGROUND

A. AC 08-005 provides specific guidance identifying the preparation for north polar flights and identified the necessary equipment and airplane configuration requirements for all airplanes, regardless of the number of engines.

B. This guidance applies uniformly to all applicants for polar route authority. This process required ETOPS-like planning, equipage and operational requirements in these areas.

C. Operating in the polar areas presents operational issues similar to typical ETOPS flights, and as such, the risks associated with this operation can be mitigated by applying planning, operational, and equipage requirements similar to ETOPS and specific procedures applicable to the risks associated with this type of flying.

D. The processes for approval of polar operations was incorporated into AC 08-005 in anticipation of applications for these types of operations.

- The process for approval of ETOPS operations will also apply to polar operations.
- The guidance in this Chapter details the additional requirements applicable to polar operations.

8.3.2 POLAR REQUIREMENTS

A. The AOC holder applying for authority to fly in the Polar Areas must develop plans in preparation for all polar flights in the North and/or South Polar Areas, as appropriate.

B. The AOC holder's plan for conducting operations within these areas must include the following elements—

8.3.2.1 Requirements for Designating Alternates

A. AOC holders should designate a set of alternate airports regardless of their distance from the planned route, such that one or more can reasonably be expected to be available in a variety of weather conditions to support a necessary diversion.

APPLICABLE ACTION NUMBERS
2387L: Eval ETOPS Diversion Provisions
2387N: Eval ETOPS Alternate Provisions

B. The flight must have sufficient fuel as required by PCARs, if applicable, and should be able to make a safe landing and the airplane maneuvered off of the runway at the selected diversion airport.

C. In the event of a disabled airplane following landing, the capability to move the disabled airplane should exist at that airport, so as not to block the operation of any recovery airplane.

APPLICATBLE ACTION NUMBER
2353H: Eval Disabled Aircraft Movement

D. In addition, those airports designated for use should be capable of protecting the safety of all personnel by being able to—

1) Offload the passengers and crewmember in a safe manner during adverse weather conditions;

2) Provide for the physiological needs of the passengers and crewmembers for the duration of the stay at the diversion airport until safe evacuation; and

3) Safely extract passengers and crewmembers as soon as possible (execution and completion of the passenger recovery is expected as soon as possible within 48 hours following diversion).

8.3.2.2 Passenger Recovery Plan

A. Except for all-cargo operations, each AOC holder conducting operations in the polar areas must have a passenger recovery plan at designated diversion airports,

APPLICABLE ACTION NUMBER
1320B: Eval Polar Passenger Recovery Plan

B. The passenger recovery plan in these Polar Regions should also include special consideration for the possibility of extreme cold weather, limited passenger facilities and the need to initiate passenger recovery without delay.

8.3.2.3 Fuel Freeze Strategy & Monitoring

A. The AOC holder must have a fuel- freeze strategy and procedures for monitoring fuel freezing.

B. The AOC holder may wish to develop a fuel freeze strategy and monitoring program (e.g., alternate fuel freeze point temperature determination based on actual measurements of

In such cases, the AOC holder's fuel freeze analysis and monitoring program for the airplane fuel load is subject to CAAP approval.

uploaded fuel), in lieu of using the standard minimum fuel freeze temperatures for specific types of fuel used.

C. The AOC holder should have procedures established that require coordination between maintenance, dispatch, and assigned flight crewmembers to convey the determined fuel freeze temperature of the fuel load on board the airplane.

> APPLICABLE ACTION NUMBER
> 2353G: Eval Fuel Freeze Operations Procedures

8.3.2.4 Communication Capability

A. The AOC holder must have effective voice communications and/or data link capability for all portions of the flight route.

B. The communication requirements of apply to all ETOPS operations in these areas. For all other operations, company communications may be accomplished using—

> APPLICABLE ACTION NUMBERS
> 2387Q: Eval ETOPS Communication Provisions
> 4367: Eval RCP [Required Comm Performance]

- HF voice;
- HF data link;
- Satellite communication (SATCOM) voice; or
- SATCOM data link.

C. Because of the limitations of VHF and satellite-based voice communications, ATC communications will probably require high frequency (HF) voice over portions of these routes.

- The CAAP recognizes that SATCOM may not be available for short periods during flight over the Poles.
- Communication capability with HF radios also may be affected during periods of solar flare activity

> The AOC holder should consider predicted solar flare activity and its effect on communications for each flight that is dispatched for operations into these areas.

8.3.2.5 MEL Considerations

A. The AOC holder must amend itsMEL to reflect the items that must be operational for these operations.

> For ETOPS flights, all MEL restrictions for the applicable ETOPS operations apply.

B. Before receiving CAAP authority to conduct these operations, all AOC holders should review its MEL for consideration of the dispatch availability of the following systems/equipment—

> APPLICABLE ACTION NUMBERS
> 2387B: Eval ETOPS MEL Provisions
> 3361Q: Eval ETOPS MEL Considerations

1) Fuel quantity indicating system (FQIS), including the fuel tank temperature indicating system;
2) APU (when the APU is necessary for an airplane to comply with ETOPS requirements), including electrical and pneumatic supply to its designed capability,
3) Autothrottle system;
4) Communication systems relied on by the flight crewmember to satisfy the requirement for communication capability; and
5) Except for all-cargo operations, an expanded medical kit to include automated external defibrillators (AED).

8.3.2.6 Training

A. The AOC holder should address the following training requirements in its approved training programs—

> APPLICABLE ACTION NUMBER
> 2363K: Eval Polar Operations Curriculum

1) QFE/QNH and meter/feet conversions (required for flight crewmember and dispatcher training);
2) Training requirements for fuel freeze, to include maintenance, dispatch, and flight crewmember training (special curriculum segments);
3) General route-specific training on weather patterns;
4) Relevant airplane system limitations (for example fuel temperature limits);
5) Role of the maintenance department in providing airplane systems capability information to dispatch and flight crewmember to aid the PIC in diversion decision making;
6) Crew member training in the use of the cold weather anti-exposure suit,
7) Role of dispatchers and crew members in the AOC holder's passenger recovery plan.

B. For dispatch and crew member considerations during solar flare activity, the AOC holder must have guidance in the operations manual regarding radiation exposure during polar flights and crew members must have completed training regarding in-flight radiation exposure.

> APPLICABLE ACTION NUMBER
> 2353J: Eval In-Flight Radiation Exposure

8.3.2.7 Crew Exposure to Radiation during Solar Flare Activity

The AOC holder must provide a plan for mitigating crew exposure to the effects of solar flare activity at the altitudes and latitudes expected in such operations.

8.3.2.8 Special Equipment for Polar Operations

A minimum of two cold weather anti-exposure suits must be on board each airplane, so that outside coordination at a diversion airport with extreme climatic conditions can be accomplished safely.

- A short term MEL relief for this item may be granted provided the AOC holder has arranged ground support provisions for providing such protective clothing at alternate airports.
- The CAAP may also relieve the AOC holder from this requirement during those periods of the year when the seasonal temperature makes the equipment unnecessary.

8.4 VALIDATION BEFORE APPROVAL

A. Prior to receiving an authorization to conduct polar operations a AOC holder must conduct an CAAP observed validation flight.

> APPLICATBLE ACTION NUMBERS
> 1157D: Conduct Validation Flight
> 2601I: Inspect Polar Procedures In-Flight

B. As part of polar area validation, the AOC holder must exercise its passenger recovery plan.

C. Adequate and timely notification must be made to the CAAP before the validation flight so that any necessary coordination between the CAAP inspector and personnel at the selected diversion airport can be completed.

D. The inspector will witness the effectiveness and adequacy of the following areas of operation—

1) Communications,
2) Coordination,

3) Facilities,

4) Accuracy of Notices to Airman and weather information, and

5) Operability of ground equipment during the simulated diversion.

E. The exercise of the AOC holder's passenger recovery plan may be completed before the validation flight.

- The CAAP will not consider a request by a AOC holder to conduct the validation flight in a passenger revenue status if the AOC holder's passenger recovery plan has not been previously and satisfactorily demonstrated to the CAAP.
- If the AOC holder elects to demonstrate its passenger recovery plan as part of and during its validation flight, the flight may not be conducted in a passenger revenue status.
- However, the carriage of cargo revenue is permissible in this case and is encouraged for airplane weight and balance purposes.

8.5 CAAP POLAR AREA APPROVAL

A. AOC holders must obtain CAAP approval to conduct these operations and to operate in any area of magnetic unreliability. The CAAP will grant such authority based on a specific airplane-engine combination.

> APPLICABLE ACTION NUMBER
> - 1152G5: Approve Polar Area Operations

B. Any AOC holder wishing to obtain Polar authorization must submit an application with all supporting data to CAAP. This application must address all the regulatory requirements for Polar operations and may follow the guidance as found in this AC.

C. The application should be submitted at least 60 days prior to the proposed start of polar operations with the specific airplane-engine combination.

> CAAP approval is granted by an amendment to the AOC holder's OpSpecs.

End of Chapter

Chapter 9
All-Weather Operations (AWO) Approvals

This chapter provides guidance for authorization of aircraft operators for Category II and Category III approach and landing operations.

APPLICABLE Action NUMBER
- 1152B2: Add CAT II Instrument Approach Authority
- 1152B3: Add CAT IIIa Approach Authority
- 1152B4; Add CAT IIIb Approach Authority
- 1152B5: Add CAT IIIc Approach Authority

9.1 GENERAL POLICIES

9.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal AWO certification process as outlined in CAAP guidance.

B. The AWO formal certification process may NOT run concurrent with the process for initial certification of the operator.

Because of the citical nature of this certification, it must be accomplished separately.

9.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for lower minimums.

B. It is the Airworthiness (Avionics) Inspector's responsibility to evaluate and approve the avionics requirements and associated support programs.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of all original Category II and IIIa operations.

9.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector to process the documentation and approval issuance who is not technical qualified in AWO operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered AWO-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an avionics inspector;

2) With documented formal training in AWO certification requirements; and

3) Has documented completion of OJT by a qualified instructor for AWO Program and Conformance

C. An assigned flight operations inspector will be considered AWO-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Is qualified in large turbojet aircraft;

2) With documented formal training in AWO certification requirements;

3) Has documented completion of OJT by a qualified instructor for AWO Program and Conformance; and

4) Has documented aircraft qualification of completion of LOFT simulator session for the application of AWO-related procedures.

9.1.4 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 5, in that, the aircraft must have a type certificate (or supplemental type certificate) which includes AWO.
- PCAR Part 5, in that the general aviation operator must have an approved aircraft inspection program that includes AWO specifics;
- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for AWO operations;
- PCAR Part 8, in that, the operator must have CAAP approval and flight crews must be qualified for operations in AWO operations;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for AWO operations;

9.1.5 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to RVSM—

- CAAP: AC 08-006, *Application & Process: All-Weathr Operations Approvals*;
- Aircraft manufacturer’s procedures, limitations and relevant safety practices;
- EASA: JAR-AWO Subpart 2 (CAT II), Subpart 3 (CAT III).
- CAAP: Advisory Circular 120-28, *Criteria for Approval of Category II Landing Weather Minima*
- CAAP : Advisory Circular 120-29, *Criteria for Approving Category I and Category II Landing Minima for FAR 121 Operators*
- ICAO: *Manual of All-Weather Operations* (Doc 9365).

> - Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
> - After the operator submission of the application, no other documents may be considered without mutual agreement of the operator.

9.2 APPROACH SPECIFICATIONS

A. The regulations require that aircraft cannot be descended below established minima during instrument approaches unless the required visual reference has been established.

- International convention has established the standard minima for precision and non-precision approaches and these values have been applied to all approaches and published in the appropriate IFR publications.
- The lowest standard approach minimum for a precision approach is 200 feet above the touCAAPwn zone elevation.
- Technology, training and equipment improvements now enable this “standard” minimum to be lowered. Accordingly, there is the capability for aircraft to land automatically or manually to limits of zero feet and zero visibility.

B. Depending on a variety of factors, an operator may be granted approval to conduct the following categories of approaches to the limits specified—

Category	Height Above Threshold (DH)	Runway Visual Range
Interim CAT II	150 ft	1200 ft (350 m)
CAT II	100 ft	1200 ft (350 m)
CAT IIIa	No DH or <100 ft	700 ft (200 m)
CAT IIIb	No DH or <50 ft	<700 ft to =150 ft (50 m)
CAT IIIc	No DH	No RVR

C. This section contains the criteria pertaining to operations and flight crew to be used by Operations Inspectors when asked to approve Category (CAT) II and III landing minima for operators.

- When the criteria for approval are met, an OpsSpecs revision will be made to Section H, as applicable, or a LOA for GA aircraft operators will be issued.
- The OpSpecs will included specific reference to the location of the applicable policy and procedure in the company manual system.
- The LOA will contain specific guidance regarding pilots, aircraft and airports when CAT II and CAT III landing minima are used.

9.3 AIRWORTHINESS FUNCTIONS: AWO

The purpose of this section is to provide CAAP Airworthiness personnel with guidance for evaluation and approval an operator's application/ request for all weather operations approval.

Applicable Action Number
- 4364: Evaluate All Weather Ops Conformance & Program
- 4364A-C: Evaluate Cat II, IIIA,IIIB Conformance & Program
- 4664: Inspect All Weather Ops Program Conformance
- 4664A-C: Inspect Cat II, IIIA & IIIB Ops Program Conformance

9.3.1 PROCEDURES

9.3.1.1 Review Maintenance Program

The Avionics Inspector must review the applicant's maintenance/inspection Program to ensure that it contains control and accountability of the following—

1) All maintenance accomplished on lower minimum required systems and equipment
2) All alterations to systems and equipment
3) Approach status of each aircraft at all times
4) Evaluations of self-test, Built-In Test Equipment (BITE), or Automated Test Equipment (ATE) to ensure stability
5) Spare equipment
6) Maintenance calibration, use of test equipment, records/reporting requirements
7) Repetitive and chronic discrepancies to ensure the affected aircraft remains out of lower minimums approach status until positive corrective actions is made
8) All aircraft in the fleet that have not been evaluated for lower minimums approaches

9.3.1.2 Review the Existing Maintenance/Inspection Programs

The airworthiness inspector should ensure that the existing maintenance/inspection program has procedures for the following—

1) Identifying chronic discrepancies and corrective action follow-up
2) Keeping aircraft with chronic and/or repetitive discrepancies out of a lower minimum status until positive corrective action is taken
3) Training maintenance personnel assigned to reliability analysis
4) Initial evaluation checks for existing aircraft for new aircraft to the fleet before inclusion in the operator's lower minimum operations
5) Identification of all components used in the lower minimum systems in the existing parts pool, parts borrowing procedure, and control of spare parts
6) Ensuring that calibration standards for all test equipment used for maintaining lower minimum systems and equipment are met
7) Ensuring that each flight crew and persons with operational dispatch authority are aware of any equipment malfunction that may restrict lower minimum operations

9.3.1.3 Review the Functional Flight Checks

If a functional flight check has been submitted, ensure that the following information is included—

1) Maintenance clearance and/or concurrence before an aircraft is returned to a lower minimum status, even if the functional flight check was found to be satisfactory
2) Request for a flight check by maintenance in the aircraft log
3) Maintenance entry acknowledging the results and the action taken

9.3.1.4 Evaluate the Supporting Data

Unless the applicant provides supporting approval data, the Avionics Inspector should coordinate with the Operations Inspector and the aircraft Type Certificate Holding Authority to determine the acceptability of each aircraft for the authorizations requested.

9.3.1.5 Review Minimum Equipment Lists

Review, the Minimum Equipment List (MEL) to ensure that all appropriate sections have been revised to identify Category II required systems and special procedures, if applicable.

9.3.1.6 Review the Personnel Training Requirements

The airworthiness inspector should ensure there are procedures for the following—

1) Ensuring personnel contracted to perform Category II related maintenance are qualified and the program requirements are made available to these persons
2) Training and/or recurrent training for the operator’s maintenance personnel.
   - ♦ Personnel not qualified to perform maintenance on Category II systems and equipment, including flight crew and dispatch, should be trained in the airworthiness release requirements of the lower minimums program.

9.3.1.7 Notification of Assigned Operations Inspector

After all requirements have been adequately addressed the approval of the maintenance procedures will be accomplished and reported to the appropriate operations Inspector for operational approval.

9.4 FLIGHT OPERATIONS CONSIDERATIONS

9.4.1 OPERATIONS MANUAL

A. AOC holders are required to amend their flight crew training manual to reflect their CAT II/III training program.

B. In addition, a Company Operations Manual amendment will be required to establish the dispatch and operating procedures associated with CAT II/III.

C. Finally, SOP amendments may be required, particularly if company procedures restrict the approaches to Captains only.

9.4.2 TRAINING

A. Operators requesting CAT II and III landing minima shall provide flight crew member training program for low visibility operations that include structured courses of ground and simulator training.

> The course content may be abbreviated for pilots with previous CAT II or III experience converting to new aircraft, if approved by the CAAP.

B. Flight crew members with no previous CAT II or III experience must complete the initial training program prescribed in this section.

9.4.3 INITIAL GROUND TRAINING

Operators requesting CAT II and III landing minima shall provide an initial ground training course for low visibility operations that covers at least—

1) The characteristics and limitations of the precision approach being used;
2) The aircraft requirements to conduct CAT II/III approaches;
3) The ground system requirements to conduct CAT II/III approaches;
4) The characteristics of the visual aids;
5) The effect on minima caused by changes in the status of ground installations;
6) The effects of known unserviceabilities and the use of minimum equipment lists;
7) Operating limitations resulting from airworthiness certification;
8) Guidance on the visual cues required at decision height (DH), if applicable, together with information on maximum deviation allowed from glide path or localizer;
9) The importance and significance of Alert Height (AH), if applicable, and the action in the event of any failure above and below the AH;
10) The characteristics of fog;
11) The operational capabilities and limitations of the particular airborne system;
12) The effects of precipitation, ice accretion, low level wind shear and turbulence;
13) The effect of specific aircraft malfunctions;
14) The use and limitations of RVR assessment systems;
15) The principles of obstacle clearance requirements;
16) Recognition of and action to be taken in the event of failure of ground equipment;
17) The procedures and precautions to be followed with regard to surface movement during operations when the RVR is 600ft (180m) or less;

18) The significance of DH based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on the automatic approach/landing systems;

19) The qualification requirements for pilots to obtain and retain approval to conduct CAT II and III operations; and

20) The importance of correct seating and eye position.

9.4.4 INITIAL SIMULATOR TRAINING

9.4.4.1 General Requirements

A. The operator's simulator training for low visibility operations shall include—

1) Checks of satisfactory functioning of equipment, both on the ground and in flight;

2) Monitoring of automatic flight control systems and autoland status annunciators with emphasis on the action to be taken in the event of failures of such systems; and

3) Actions to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control systems.

B. An operator must ensure that each flight crew member is trained to carry out his duties and instructed on the co-ordination required with other crew members.

C. Training must be divided into phases covering normal operation with no aircraft or equipment failures but including all weather conditions that may be encountered and detailed scenarios of aircraft and equipment failure which could affect CAT II or III operations.

D. If the aircraft system involves the use of hybrid or other special systems (such as heads-up displays or enhanced vision equipment) then flight crew members must practise the use of these systems in normal and abnormal modes during the simulator phase of training.

E. Incapacitation procedures appropriate to CAT II and III operations shall be practised.

9.4.5 REQUIRED MANEUVERS & EVENTS

A. CAT II and III training shall include at least the following events—

1) Approaches using the appropriate flight guidance, autopilots and control systems installed in the aircraft, to the appropriate DH and to include transition to visual flight and landing;

2) Approaches with all engines operating using the appropriate flight guidance systems, autopilots and control down to the appropriate DH followed by a missed approach, all without external visual reference;

3) Where appropriate, approaches utilizing automatic flight systems to provide automatic flare, landing and roll out; and

4) Normal operation of the applicable system both with and without acquisition of visual cues at decision height.

B. Subsequent phases of training must include at least—

1) Approaches with engine failure at various stages on the approach;

2) Approaches with critical equipment failures (e.g. electrical systems, autoflight systems, ground and/or airborne ILS/MLS/GPS systems and status monitors);

3) Approaches where failures of autoflight equipment at low level require either—

(a) Reversion to manual flight to control flare, landing and roll out or missed approach; or

(b) Reversion to manual flight or a downgraded automatic mode to control missed approaches from, at or below DH including those that may result in a touCAAPwn on the runway;

4) Failures of the systems which will result in excessive localizer and/or glideslope deviation, both above and below DH/AH, in the minimum visual conditions authorised for the operation.

5) In addition, a continuation to a manual landing must be practised if a heads-up display forms a downgraded mode of the automatic system or the heads-up display forms the only flare mode; and

6) Failures and procedures specific to the aircraft type or variant.

C. The training program must provide practice in handling faults that require a reversion to higher minima.

D. The training program must include the handling of the aircraft when, during a CAT III approach, the fault causes the autopilot to fail at or below DH/AH when the last reported RVR is 1000ft (300m) or less.

The training is to include both fail-passive and fail-operational situations.

9.5 FLIGHT CREW QUALIFICATION

9.5.1 FLIGHT CREW MEMBER QUALIFICATIONS: AOC HOLDERS

A. Prior to being authorised for unrestricted CAT II/III approaches—

1) The pilot conducting the approach shall have acquired the following as part of the line indoctrination training on the aircraft type being flown under the supervision of a qualified company training pilot or Check Pilot—

(a) For CAT II operations, a minimum of 3 manual landings from autopilot disconnect at DH; and

(b) For CAT III operations, a minimum of 3 autolands except that only 1 autoland is required if the simulator training had been completed in a Level D simulator;

2) The pilot conducting the approach shall have acquired a minimum of 100 hours or 20 sectors on the aircraft type, whichever is earlier, unless converting from a similar type aircraft (turbo-prop to turbo-prop or turbo-jet to turbo-jet) in which he/she had maintained a CAT II/III qualification to the same limits prior to conversion.

3) Upon completion of the line indoctrination training on the new aircraft, such pilots may be authorised for CAT II/III operations; and

4) While acquiring the required experience and for an additional 100 hours or 20 sectors on type, whichever is earlier, 300 ft (90m) must be added to the applicable CAT II or III RVR unless—

(a) The flight crew includes a qualified training pilot or a check pilot; or

(b) He/she has been previously qualified for CAT II or III operations with a CAAP-approved operator.

B. Prior to a pilot conducting a CAT II/III approach—

1) He /she shall have completed the CAT II/III training within the preceding 12 months; and

2) He /she shall have been checked by a CAAP Flight Operations Inspector or a check pilot within the preceding 6 months.

9.5.2 FLIGHT CREW MEMBER QUALIFICATIONS: GENERAL AVIATION

A. The pilot conducting the approach shall have completed the qualification requirements of this section under the supervision of another pilot qualified in CAT II/III operations on that aircraft type.

> The CAAP may authorise a reduction in the qualification requirements, if the pilot has previous CAT II/III experience.

B. The pilot conducting the approach shall acquire the specified experience in paragraph 27.7.3, except that the RVR increase may be disregarded—

1) If the crew includes another pilot qualified in CAT II/III operations on that aircraft type or

2) The pilot has had previous CAT II/III experience in aircraft of a similar type.

C. The pilot shall, within the preceding 12 months prior to conducting a CAT II or III approach, have completed the CAT II/III training and been checked by a CAAP Flight Operations Inspector.

9.5.3 TRANSITION TRAINING REQUIREMENTS

An operator shall ensure that each flight crew member completes the following CAT II/III training if transitioning to a new type or variant of aircraft in which CAT II and III operations will be conducted—

1) Ground Training. The appropriate initial training requirements, taking into account the flight crew member's CAT II and CAT III training and experience.

2) Simulator Training—

(a) A minimum of eight (8) approaches and/or landings in a simulator approved for the purpose.

(b) Additional training if any special equipment is required that the pilot has no previous experience, such as heads-up displays or enhanced vision equipment.

9.5.4 SUPERVISED LINE FLYING

An AOC holder must ensure that each flight crew member undergoes the following line flying under supervision—

1) For CAT II, a minimum of three (3) landings from autopilot disconnect at DH; and

2) For CAT III, a minimum of three (3) autolands except that only one autoland is required when the required simulator training has been carried out in a Level D flight simulator.

9.5.5 RECURRENT TRAINING & CHECKING

A. An operator must ensure that, in conjunction with the normal recurrent training and operator proficiency checks, a pilot's knowledge and ability to perform the tasks associated with the particular category of operation for which he is authorised is checked.

- The required number of approaches to be conducted during such recurrent training is to be a minimum of two, one of which is to be a missed approach.

B. An operator must use a flight simulator approved for CAT II/III training.

C. An operator must ensure that, for CAT III operations on aircraft with a fail-passive flight control system, a missed approach is completed at least once every 18 months as the result of an autopilot failure at or below DH/AH when the last reported RVR was 1000ft (300m) or less.

> This may be accomplished in the simulator or in actual flight.

9.5.6 CATEGORY II / III RECENCY REQUIREMENTS

A. An operator must ensure that, in order for pilots to maintain a CAT II or CAT III qualification, they have conducted—

1) A minimum of 3 approaches and landings using approved CAT II/III procedures during the previous six month period,

2) At least one of which must be conducted in the aircraft.

B. An operator may not substitute this recency requirement for recurrent training.

9.6 AUTO-LAND POLICY

A. Before operators commence low-visibility operations using an auto-land facility, CAAP should be satisfied that the operator is adequately prepared. This requires an assessment of the following matters—

1) Aircraft certification and equipment

2) Maintenance procedures

3) Demonstration of achievement of required accuracy

4) Internal reporting system of results of auto-lands

5) Crew training and procedures

6) Recency standards

7) Operations Manual material

8) Airport evaluation

9) Environmental limits.

B. The aircraft must be certified for auto-land and the *Flight Manual* should indicate the minimum equipment that satisfies the certification requirement — for example, the number of serviceable autopilots, radio altimeters, auto-brake etc.

C. Minimum equipment requirements for the conduct of auto-lands must also be included in the MEL.

D. The operator must include in the *Aircraft Maintenance Program* any special maintenance requirements that the manufacturer has specified for auto-land operations.

E. The accuracy with which the aircraft is delivered to the runway during an auto-land may depend upon the physical characteristics of the runway, the ILS, wind velocity and gradient, or upon the maintenance system in so far as all components of the auto-land system and the integrated system itself are operating within tolerance.

F. With the introduction of a new aircraft type or when first introducing auto-landings, the operator should conduct a series of trials in VMC conditions to confirm that acceptable results are being obtained.

- At least the first five landings should be made during training flights without passengers and conducted, preferably, by a nominated company ‘development pilot’.
- Significant displacement either laterally or longitudinally or “firm” landings should be investigated and the cause rectified. Trials should continue until ten consecutive acceptable landings are achieved.

G. The company should initiate a system of pilot reporting where the crew fills out an appropriate form after each auto-land.

- This provides assistance in fault rectification for unsuccessful auto-lands and is a means of providing trend information for the maintenance system.

H. To assist in the maintenance process for system reliability, at least the following topics must be addressed in the *Operations Manual*—

1) Minima to be used for auto-land Nomination of ‘monitoring pilot’ and ‘lookout pilot’ (lookout when approaching minima)
2) Limitations on conduct of auto-lands including recency, nominated crew etc.
3) Action in the event of system failures
4) Auto-coupled approaches to runways not cleared for auto-land, such as those subject to cross, head, tail wind and gust limitations
5) Reporting and MEL requirements.

9.7 OPERATIONAL AUTHORISATION WITH LIMITING FACTORS

9.7.1 OPERATIONAL AUTHORISATION

A. After successful accomplishment of the training and all open discrepancies have been closed, the operator can be re-issued Section H of the operations specifications (AOC holder) or Letter of Authorisation (General Aviation operator).

B. The CAAP may impose higher minima than the lowest applicable for an additional period.

C. The increase in minima will normally only refer to RVR and/or a restriction against operations with no DH, and must be selected such that they will not require any change in the operational procedures.

After successful accomplishment of the training/checking and all open discrepancies have been closed, the operator can be issued an OpsSpecs revision to include the LVTO authorisation (for AOC holders) or Letter of Authorisation (General Aviation). Demonstrated limiting factors that may be cited—

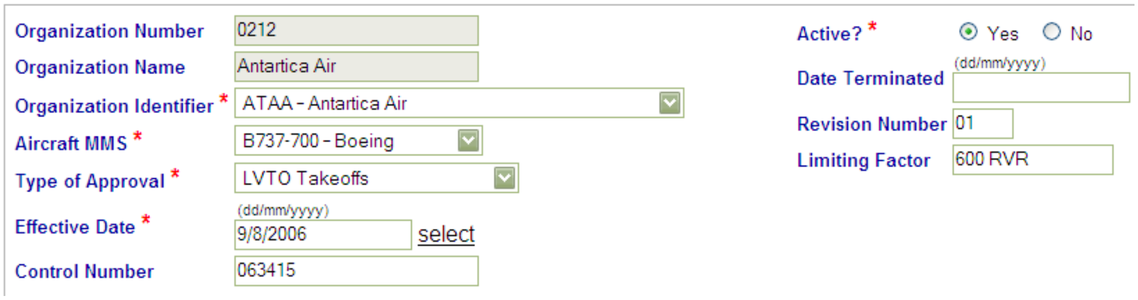
- RVR 600; X-W 5 kts
- RVR 1200; X-W 10 kts
- RVR 1800; X-W 12 kts

9.7.2 ENTERING THE AOC ORGANISATION AUTHORISATION

1) For the LVTO authorisation, select ***Home Page >AOC Approval (Ops Fleet)>Add.***

2) That action will take the user to an AOC Approvals (Ops Fleet) Entry Page.
3) Select the ***Type of Approval*** drop-down menu and, from that menu, select the type of instrument approach category to authorise.

4) Complete the record, as shown below.



Organization Number	0212	Active? *	(•) Yes ( ) No
Organization Name	Antartica Air	Date Terminated	(dd/mm/yyyy)
Organization Identifier *	ATAA - Antartica Air	Revision Number	01
Aircraft MMS *	B737-700 - Boeing	Limiting Factor	600 RVR
Type of Approval *	LVTO Takeoffs		
Effective Date *	(dd/mm/yyyy) 9/8/2006 select		
Control Number	063415		

9.8 AWO MONITORING PROGRAM

A. After obtaining the initial authorisation, the operations must be continuously monitored by the operator to detect any undesirable trends before they can become hazardous.

- Close liaison with the operator’s maintenance personnel is required.
- For AOC holders, the following information must be submitted to the Flight Operations Department and retained for a period of 12 months.

B. The total number of approaches, by aircraft type, where the airborne CAT II or III equipment was utilized to make satisfactory approaches (actual or practice) to the applicable CAT II/III minima;

C. Reports of unsatisfactory approaches and/or automatic landings, by aerodrome and aircraft registration, in the following categories—

1) Airborne equipment faults (these may be recorded through the Maintenance Reliability program;
2) Ground facility difficulties;
3) Missed approaches because of ATC instructions; or
4) Other reasons.

D. An operator must establish a procedure to monitor the performance of the autoland system of each aircraft. This is usually accomplished through the Maintenance Reliability program for AOC holders.

End of Chapter

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Chapter 10
Lower-than-Standard Take-Off Minima Approval

APPLICABLE Action NUMBER
- 1152B1: Approval: Low Visibilty Takeoff [LVTO]

A. This chapter provides guidance for authorization of aircraft operators for low visibility takeoff operations associated with all weather operations.

B. This guidance will be used by operations inspectors when asked to approve lower-than-standard take-off minima for AOC holders or individual operators.

- When the criteria for approval are met, a revision to the operations specifications will be issued to include any requirements regarding pilots, aircraft and aerodromes when lower-than-standard take-off minima are used.
- If an operator is not authorised to use lower-than-standard take-off minima, this authorisation will not appear in their Ops Specs.

C. The PCARs require that an operator's aircraft may only take off in weather conditions that are at or above those published for the departure airport.

- The normal minimum visibility for take-off is ½ statute mile, which equates to a Runway Visual Range (RVR) of 2600ft or 2400ft in some countries (approximately 790 and 730 m).
- However, the published value may be greater, in which case the higher value is to be observed.
- Take-off minima below the standard may be approved down to as low as RVR 600 (approximately 175 m).

10.1 GENERAL POLICIES

10.1.1 FORMAL CERTIFICATION PROCESS IS REQUIRED

A. The air operator will required to complete a formal certification process as outlined in CAAP guidance.

B. The formal certification process for approval of LTVO operations MAY be administered concurrent with the process for initial certification of the operator.

10.1.2 CERTIFICATION RESPONSIBILITIES

A. The Principal Operations Inspector has the primary responsibility to grant the operator approval for LTVO operations.

B. It is the Airworthiness (Avionics) Inspector's responsibility to evaluate and approve any additional airworthiness requirements and associated programs.

- Successful completion of this task will therefore consist of coordination with the Operations ASI for final approval of LTVO operations.

10.1.3 QUALIFIED INSPECTORS REQUIRED FOR CAAP CERTIFICATION TEAM

A. The CAAP may assign an inspector or aviation technical assistant to process the documents and events who is not technical qualified in LTVO operational and maintenance policy and procedures.

- This assigned person may not affect the issuance of any document that has not been previously assessed as acceptable by a technically qualified inspector.

B. An assigned airworthiness inspector will be considered LTVO-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is a qualified avionics inspector;

2) After completion of formal training regarding the specific flight guidance installation and maintenance used by the applicant for LTVO; and

3) With documented OJT qualification in LTVO airworthiness requirements.

C. An assigned operations inspector will be considered LTVO-qualified (for the purposes of evaluations and inspections required by this chapter if that inspector—

1) Is an qualified operations inspector;

2) Has documented completion of OJT by a qualified instructor for LTVO documentation evaluations

D. An assigned flight operations inspector will be considered LTVO-qualified for the purposes of the evaluations and inspections required by this chapter, if that inspector—

1) Holds a category, class and type rating for the aircraft to be used;

2) Has completed formal ground and flight training for LTVO operations in that aircraft;

3) Has documented completion of OJT by a qualified instructor for evaluation and inspection of LTVO operations; and

10.2 RELATED TECHNICAL PUBLICATIONS

10.2.1 APPLICABLE REGULATIONS

The applicable regulations will include—

- PCAR Part 7, in that, the aircraft must meet the minimum instrument and equipment requirements for LTVO operations;
- PCAR Part 8, in that, the operator must have CAAP approval and flight crews must be qualified for operations in LTVO operations;
- PCAR Part 9, in that, the AOC holder must complete a formal certification process with all relevant documentation and validation for LTVO operations;

10.2.2 TECHICAL GUIDANCE TO BE USED BY INSPECTORS

In addition to the applicable regulations and the policy/procedures of this chapter, the assigned inspectors may use the following technical guidance for the evaluations and inspections relating to approval of LTVO Operations—

- Additional relevant safety documentation may be used if identified to the operator during the Pre-Application Phase.
- After the operator submission of the application, no other documents may be considered without mutual agreement of the operator.

- CAAP AC 08-006, Application & Process: All Weather Operations.
- The applicable aircraft and component manufacturer's procedures, limitations and relevant operational safety and maintenance practices;

10.3 TRAINING

10.3.1 GENERAL

A. Operators requesting lower-than-standard take-off minima shall develop flight crew member initial and annual recurrent training programme for low visibility operations that include structured courses of ground, simulator and/or flight training.

B. Flight crew members with no previous lower-than-standard take-off visibility experience must complete the full training programme prescribed in this section.

> The course content may be abbreviated for pilots with low visibility take-off experience converting to new aircraft if approved by the CAAP.

10.3.2 INITIAL GROUND TRAINING

Operators requesting lower-than-standard take-off minima shall provide an initial ground training course for low visibility operations that covers at least the following subject elements—

1) The aircraft requirements to conduct CAT II/III approaches;
2) The ground system requirements to conduct CAT II/III approaches;
3) The characteristics of the visual aids;
4) The characteristics of fog;
5) The operational capabilities and limitations of the particular airborne system;
6) The effects of precipitation, ice accretion, low level wind shear and turbulence;
7) The effect of specific aeroplane malfunctions;
8) The use and limitations of RVR assessment systems;
9) The principles of obstacle clearance requirements;
10) Recognition of and action to be taken in the event of the failure of ground equipment;
11) The procedures and precautions to be followed with regard to surface movement during operations when the RVR is 1200ft or less (approximately 365m) and any additional procedures required for take-off in conditions as low as RVR 600 (approximately 180m);
12) The qualification requirements for pilots to obtain and retain approval to conduct low visibility take-offs;
13) The importance of correct seating and eye position; and
14) Take-off alternate requirements.

10.3.3 INITIAL SIMULATOR TRAINING & AIRCRAFT TRAINING

A. The operator's simulator and/or initial flight training for low visibility operations shall include events that demonstrate the following—

1) Checks of satisfactory functioning of equipment, both on the ground and in flight;
2) Effect on minima caused by changes in the status of ground installations;
3) Actions to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control systems;

> - For training to RVR 600, or RVR 1200 if the aircraft is without certified take-off performance, an operator must ensure that the training is carried out in an approved simulator.
> - Where no type-specific simulator exists, the training and procedures shall be practised in the aeroplane.
> - The training programme must provide practice in handling faults that require a reversion to higher minima.

4) The effects of known unserviceabilities and the use of minimum equipment lists;

5) Operating limitations resulting from airworthiness certification;

6) Rejected take-offs in a low visibility environment appropriate to that being sought;

7) Engine failure at V1 in the lowest visibility being sought;

8) Taxing in a low visibility environment with emphasis on preventing runway incursion; and

9) Appropriate additional training if any special equipment is required such as heads-up displays or enhanced vision equipment.

B. Training must be divided into phases covering—

1) Normal operation with no aeroplane or equipment failures but including all weather conditions that may be encountered, followed by

2) Detailed scenarios of aeroplane and equipment failures that could affect operations.

> If the aeroplane system involves the use of hybrid or other special systems (such as heads-up displays or enhanced vision equipment) then flight crew members must practise the use of these systems in Normal and Abnormal modes during the training.

C. An operator must ensure that each flight crew member is trained to carry out his/her duties and instructed on the co-ordination required with other crew members.

- This training must include the use of any special procedures and equipment.

D. Incapacitation procedures appropriate to Low Visibility Take-Offs (LVTO) shall be practised.

10.4 FLIGHT CREW MEMBER QUALIFICATIONS

10.4.1 INITIAL QUALIFICATION

A. Prior to being authorised for lower-than-standard take-offs, the pilot conducting the take-off shall have acquired a minimum of 100 hours on the aircraft type

> Upon completion of the line indoctrination training on the new aircraft, such pilots may be authorised for LVTO operations.

- Unless converting from a similar type aircraft (turbo-prop to turbo-prop or turbo-jet to turbo-jet) in which he/she had maintained a low visibility take-off qualification at the same limits for at least 90 days prior to conversion.

B. Prior to conducting a lower-than-standard take-off, within the preceding 12 months—

1) Each pilot shall have completed the low visibility training; and

2) Pilots authorised to conduct RVR 600 take-offs shall have been checked by a flight operations inspector or a check pilot.

10.4.2 RECURRENT TRAINING

A. An operator must ensure a pilot's knowledge and ability to perform the tasks associated with LVTO are maintained.

B. The recurrent flight training shall include at least one low visibility rejected take-off and a take off to the lowest applicable minima approved.

10.4.3 LVTO RECENCY REQUIREMENTS

Recency for LVTO is maintained by the requirement for annual recurrent training.

10.5 MANUAL REQUIREMENTS

> Flight dispatchers will be required to be trained in LVTO operations prior to the issuance of a revision to Section H of the Opspecs to authorise LVTOs.

A. AOC holders are required to amend their flight crew and flight dispatcher training manuals to reflect their LVTO training programme.

B. In addition, a Company Operations Manual amendment will be required to establish the dispatch and operating procedures associated with LVTO.

C. Finally, SOP amendments may be required, particularly if company procedures restrict the take-off to Captains only.

10.6 ISSUE OF OPERATIONAL AUTHORIZATION

10.6.1 OPERATIONAL AUTHORISATION WITH LIMITING FACTORS

After successful accomplishment of the training/checking and all open discrepancies have been closed, the operator can be issued an OpsSpecs revision to include the LVTO authorisation (for AOC holders) or Letter of Authorisation (General Aviation). Demonstrated limiting factors that may be cited—

- RVR 600; X-W 5 kts
- RVR 1200; X-W 10 kts
- RVR 1800; X-W 12 kts

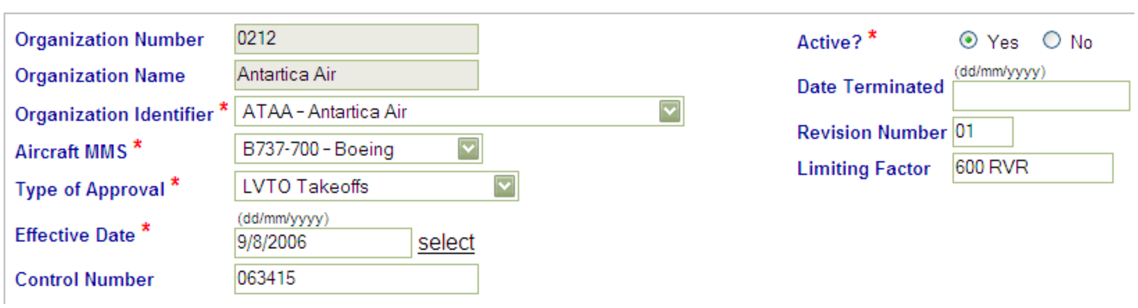
10.6.2 ENTERING THE AOC ORGANISATION AUTHORISATION

1) For the LVTO authorisation, select ***Home Page >AOC Approval (Ops Fleet)>Add***.

2) That action will take the user to an AOC Approvals (Ops Fleet) Entry Page.

3) Select the ***Type of Approval*** drop-down menu and, from that menu, select ***LVTO Takeoffs***.

4) Complete the record, as shown below.



Organization Number	0212	Active? *	(•) Yes ( ) No
Organization Name	Antartica Air	Date Terminated	(dd/mm/yyyy)
Organization Identifier *	ATAA - Antartica Air	Revision Number	01
Aircraft MMS *	B737-700 - Boeing	Limiting Factor	600 RVR
Type of Approval *	LVTO Takeoffs		
Effective Date *	(dd/mm/yyyy) 9/8/2006 select		
Control Number	063415		

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Chapter 11
Electronic Flight Bag

This chapter provides guidance for approval of an aircraft operator for “quthorization to use” an Electronic Flight Bag..

11.1 ELECTRONIC FLIGHT BAG OPERATIONAL AUTHORIZATION PROCESS

11.1.1 GENERAL

A. The POI will coordinate the coordinate the review of an operator’s requested EFB program with the assigned—

- Avionics inspector
- Aircraft type-qualified flight operations inspector
- Maintenance inspector.

B. The Principal Operations Inspector will be responsible for the issue of the “authorization to use” an EFB.

C. Once the assigned inspectors have completed their review of an EFB application, and have determined that the request is valid, authorization to use an EFB will be made by issuing the formal authorization.

D. The final result will be an authorization to use an EFB without issuing any sort of approval to any particular hardware system or software application.

The CAAP evaluation process for an EFB follows the generic process for approval and acceptance as described in AC 00-003, CAAP Certification Process.

APPLICABLE ACTION NUMBER
- 2389+: Evaluate Electronic Flight Bag Program
- 2389A: Evaluate Class 1 EFB Hardware
- 2389B: Evaluate Class 2 EFB Hardware
- 2389C: Evaluate Class 3 EFB Hardware
- 2389D: Evaluate Type A EFB Software
- 2389E: Evaluate Type B EFB Software
- 2389F: Evaluate Type C EFB Software
- 2601J: Inspect EFB Procedures In-Flight
- 4410J: Evaluate EFB Installation
- 4671J: Inspect EFB Installation

11.1.2 APPLICABILITY

A. This process for EFB authorization is to be used the evaluation and the issuance of an authorization from CAAP for the use of the EFB.

B. The processes described in this section may also be used to determine if an EFB may be substituted for aeronautical charts and data used within aircraft operated under PCAR Parts 9 or 14 of the Philippine Civil Aviation Regulations.

OTHER CAA REFERENCES:
FAA AC 120-76, EFB guidelines

No written authorization is required for general aviation or aerial work operators.

11.1.2.1 Evaluation Process for Class 1 or 2 EFBs Using Type A and/or B Software

A. The evaluation process described in this section is applicable to Class 1 or 2 EFBs using Type A and/or B software applications.

> The State of Design documentation will be used for specific guidance relating to any TC or STC installation of EFBs.

B. Coordination with the State of Design may be expected when an EFB has new or novel functions not addressed in this guidance and/or when there are concerns about EFB use and standardization.

C. When an State of Design report exists for a particular Class 1, 2, or 3 EFB or Type A and/or B application, that is controlling for the determination of operational suitability.

11.1.2.2 Evaluation Process for Class 3 Hardware and/or Type C Software

A. Class 3 hardware and/or Type C software applications are evaluated by the State of Design in conjunction with type certification (TC), amended TC, Supplemental Type Certificate (STC), or Technical Standard Order Authorization (TSOA) processes.

B. The State of Design determines operational suitability and provides recommendations regarding pilot training, checking, and currency requirements.

> The operator must address the development of procedures and training associated with EFBs prior to receiving authorization to use each EFB Class 3 and Type C software application.

C. The State of Design determination of suitability for Class 3 EFB hardware is generally referenced for the particular model aircraft and outlines the operational suitability.

D. If Class 3 EFB hardware is not addressed in a State of Design document, the aircraft manufacturer should be contacted to determine if the State of Design has accomplished an operational suitability evaluation.

E. Authorization for EFB Class 3 with Type C software application is subject to existing operator requirements for implementing new or modified certificated equipment, including compliance with State of Design recommendations for differences training, checking, and currency.

11.2 EFB HARDWARE CLASSES

A. Figure 4-75, Flow Chart for Determining EFB Hardware Class, is provided to aid in the determination of the EFB hardware classes.

11.2.1 CLASS 1 EFB HARDWARE

A. These EFBs are portable, commercial off-the-shelf (COTS), devices which are part of a pilot's flight kit and are not attached to the aircraft.

> Refer to Appendix 11-A for a flowchart for determination of hardware class applicability.

B. An EFB attached to the pilot's leg (e.g., kneeboard type) may still be considered a Class 1 EFB because it is not attached to the aircraft.

> - The EFB must meet the hardware specifications to be used in an aircraft during flight operations.
> - It is the user's/operator's responsibility to document compliance with these specifications for each EFB and aircraft operating combination.

C. Class 1 EFBs that have Type B applications for aeronautical charts, approach charts or electronic checklist must be secured and viewable during critical phases of flight and must not interfere with flight control movement.

D. The need for aeronautical charts, approach charts and electronic checklists to be immediately available for viewing for all phases of flight is essential for an electronic format to be equivalent to the paper format being replaced.

> The ability to have departure and arrival charts, approach charts and airport diagrams continuously in view is essential for situational awareness during critical phases of flight and very important to runway incursion prevention during takeoff, landing and taxi operations.

E. This view ability requirement is consistent with current CAAP policy that pilot crew members have approach charts and airport diagrams viewable during those respective operations.

11.2.2 CLASS 2 EFB HARDWARE

A. These EFBs are typically attached to the aircraft by a mounting device, and may be connected to a data source, a hard-wired power source, and an installed antenna.

> In order to be considered portable, tools must not be required to remove an EFB from the flight deck and a pilot crew member must be able to perform the task.

B. Portable EFBs must be located on the flight deck and controlled by the flight crew during all flight operations.

C. Although attached to the aircraft via a mounting device, Class 2 EFB hardware must be accessible to the flight crew and must be removable without the use of tools. The components of the Class 2 EFB include all the hardware and software needed to support EFB intended functions. A Class 2 EFB may consist of modular components (e.g., computer processing unit, display, controls).

- Any EFB hardware not located on the flight deck and not accessible by the flight crew must be a certified installation via TC, amended TC, or STC.
- Any EFB hardware not accessible on the flight deck by the flight crew and/or not portable must be installed and certificated equipment covered by a TC, amended TC, or STC.

> The one exception to being accessible on the flight deck is a remotely mounted antenna that provides signal reception to a Class 1 or 2 EFB.

D. Normally, portable EFBs are limited to hosting Type A and B software applications or Technical Standard Order (TSO) functions limited to a minor failure effect classification.

- However, Type C software associated with the provision of own-ship position on airport moving map displays (AMMDs) may be hosted on Class 1 or Class 2 portable EFBs.

11.2.3 CLASS 3 EFB HARDWARE

These EFBs employing any type software application must be approved by TC, amended TC, or STC.

- Type A or B software applications and user-modifiable software are not subject to CAAP certification when installed on a Class 3 EFB.
- Type A, B, or user-modifiable software must not interfere with certificated Type C software or software having received design approval by the State of Design.

11.3 HARDWARE SPECIFICATIONS

11.3.1 CLASS 1 & CLASS 2 EFBS

A. Major components such as motherboards, processors, Random-Access Memory (RAM), video cards, hard drives, power supplies, and connections (modem, wireless, etc.) must be configuration controlled.

B. Any change to these components will require the EFB to be re-evaluated to demonstrate that the EFB still meets its intended function, non-interference, and reliability requirements.

11.3.2 DISPLAY

11.3.2.1 Legibility

A. The screen size and resolution must be proven to display information in a comparable manner to the aeronautical charts and data it is intended to replace.

- The screen must display an approach chart in an acceptable aeronautical chart format similar to a published paper approach chart.
- The screen must be large enough to show an entire instrument approach procedure chart at once, with the equivalent degree of legibility and clarity as a paper chart. This requirement is not meant to preclude panning and zooming features, but is intended to prevent a workload increase during the approach phase of flight.

> The display requirements specified in this section apply when a Type B application is available on an EFB during certain critical phases of flight (e.g., taxi, takeoff, approach, and landing).

> Alternate representations of approach charts will need to be evaluated and approved by the FSB process for functionality and human factors.

11.3.3 BRIGHTNESS

A. The display must be proven to be readable in all anticipated lighting conditions by each pilot and in each aircraft in which it is to be used.

- The display must have a dimming capability that would prevent the EFB from being a distraction or impairment to night vision in a night flight deck environment.
- The display must also be demonstrated to be readable on the flight deck in direct sunlight.

B. Display brightness must be equally adjustable whether the EFB is operating on battery or aircraft power.

- Users should be able to adjust the screen brightness of an EFB independently of the brightness of other displays on the flight deck.
- When automatic brightness adjustment is incorporated, it should operate independently for each EFB on the flight deck.

> - Buttons and labels should be adequately illuminated for night use.
> - All controls must be properly labeled for their intended function.

11.3.4 VIEWING ANGLE

The display must be viewable from an offset angle to preclude difficulty in positioning the EFB on the aircraft flight deck. When screen protectors are used, they must be maintained and be proven not to impede viewing of the screen.

11.3.5 STYLUS

For a stylus screen, there must be an easily accessible stowage position for the stylus and an accessible spare stylus (or substitute stylus) must be available.

11.3.6 DIGITIZER PEN

When a digitizer pen is used to operate the EFB, the digitizer pen must have an easily accessible stowage position and be tethered. A spare digitizer must be immediately available and adjusted for use on each EFB.

11.3.7 TOUCH-SCREEN

If a touch-screen is used it must be evaluated for ease of operation. The touch-screen must be responsive and not require multiple attempts to make a selection, but not be so sensitive that erroneous selections occur.

11.4 RAPID DECOMPRESSION (RD) TESTING

> It is the operator's responsibility to provide the POI with documented results of the RD testing.

A. RD testing is required to determine an EFB's functional capability when Type B software applications are used in pressurized aircraft where no alternate procedures or paper backup are available.

- RD testing is not required when only Type A applications are used on the EFB.

B. The information from the RD test is used to establish the procedural requirements for the use of that EFB in a pressurized aircraft.

C. RD testing should follow the guidelines in Radio Technical Commission for Aeronautics (RTCA)/ Document (DO)-160, Environmental Conditions and Test Procedures for Airborne Equipment, for RD testing up to the maximum operating altitude of the aircraft in which the EFB is to be used.

11.4.1 PRESSURIZED AIRCRAFT

A. Rapid decompression testing for Class 1 and/or 2 EFBs must be conducted when Type B applications are used in lieu of paper-based aeronautical charts in pressurized aircraft in flight.

B. When a Class 1 or 2 EFB is turned *on* and operates reliably during the RD test, no mitigating procedures need to be developed beyond redundancy.

C. When a Class 1 or 2 EFB is turned *off* during the RD test and is fully functional following the RD, then procedures must be in place to ensure one of the two EFBs on board the aircraft remains *off* or configured so no damage will be incurred should an RD occur in flight above 10,000 feet mean sea level (MSL).

11.4.2 UNPRESSURIZED AIRCRAFT

> RD testing is not required for a Class 1 or 2 EFB used in an unpressurized aircraft.

A. The EFB must be demonstrated to reliably operate up to the maximum operating altitude of the aircraft.

B. If EFB operation at maximum operating altitude is not attainable, procedures must be established to preclude operation of the EFB above the maximum demonstrated EFB operation altitude while still maintaining availability of required aeronautical information.

11.5 ELECTROMAGNETIC INTERFERENCE/NON-INTERFERENCE TESTING

11.5.1 PORTABLE ELECTRONIC DEVICES

> It is the user's/operator's responsibility to determine that the operation of a portable electronic device (PED) will not interfere, in any way, with the operation of aircraft equipment.

A. In order to operate a PED in other than a non-critical phase of flight, the user/operator is responsible for ensuring that the PED will not interfere in any way with the operation of aircraft equipment.

B. The following methods are applicable to Class 1 and 2 EFBs with Type B applications required for use during all phases of flight. Either Method 1 or Method 2 may be used for non-interference testing.

11.5.1.1 Method 1

A. Method 1 for compliance with PED non-interference testing for all phases of flight is completed in the 2 steps.

B. Step 1 is to conduct an electromagnetic interference (EMI) test in accordance with RTCA/DO-160, section 21, paragraph M.

> This Step 1 test can be conducted for an EFB user/operator by an EFB vendor or other source.

- The results of the RTCA/DO-160 EMI test must be evaluated to determine an adequate margin exists between the EMI emitted by the PED and the interference susceptibility threshold of aircraft equipment.
- If Step 1 testing determines adequate margins exist for all interference, both “front door” and “back door” susceptibility, then method 1 is complete.
- If Step 1 testing identifies inadequate margins for interference, either “front door” or “back door” susceptibility, then Step 2 testing must be completed; and

C. Step 2 testing is specific to each aircraft model in which the PED will be operated, but testing only the specific equipment and/or equipment operation.

> Step 2 testing must be conducted in an actual aircraft and may be credited to similarly equipped aircraft of the same make/model as tested.

- Step 2 testing must show that no interference of aircraft equipment occurs from the operation of the PED.

D. Method 2 for compliance with PED non-interference testing for all phases of flight is a complete test in each aircraft using an industry standard checklist.

- This industry standard checklist must be of the extent normally considered acceptable for non-interference testing of a PED in an aircraft for all phases of flight.
- Testing for a particular aircraft make/model may be credited to other similarly equipped aircraft of the same make/model.

11.5.2 TRANSMITTING PORTABLE ELECTRONIC DEVICES (T-PED)

A. In order to operate a T-PED in other than a non-critical phase of flight, the user/operator is responsible to ensure the T-PED will not interfere with the operation of the aircraft equipment in any way.

B. Non-interference testing for T-PEDs consists of two separate test requirements.

11.5.2.1 Test Requirement 1

Each T-PED must have a frequency assessment based on the frequency and power output of the T-PED.

> The following method is applicable to all Class 1 or 2 EFBs with Type B applications required for use during all phases of flight.

- This frequency assessment must consider applicable international frequency standards and be in accordance with applicable processes set forth in RTCA/DO-294B, Guidance on Allowing Transmitting Portable Electronic Devices (T-PEDs) on Aircraft.
- This frequency assessment must confirm that no interference of aircraft or ground equipment will occur as a result of intentional transmissions from these devices.

11.5.2.2 Test Requirement 2

A. Once a frequency assessment determines there will be no interference from the T-PED's intentional transmissions, each T-PED must then be tested while operating using either Method 1 or Method 2 for basic non-interference testing requirements described above.

B. This basic non-interference testing is applicable to both a T-PED that is integrated into an EFB and a T-PED that is remote to an EFB.

> T-PED position is very critical to T-PED non-interference testing, therefore the operating/testing locations of a T-PED must be clearly defined and adhered to in T-PED operating procedures.

- When a T-PED is integrated into an EFB, the basic non-interference testing must be completed both with and without the T-PED function being operative.
- If a T-PED is located remote from the EFB, the T-PED basic non-interference testing is independent from the EFB non-interference testing.

11.5.3 ANTENNAS

11.5.3.1 Satellite Weather Antennas

A satellite weather antenna may be built into a Class 1 or 2 EFB or external to the EFB.

- A portable satellite antenna is considered ancillary PED equipment and must be included in EFB evaluation and testing.
- Installed antennas for satellite weather may be used to provide signal reception for EFB intended functions.

> When a satellite receiver is installed separate from the portable EFB, it must meet appropriate installation requirements.

11.5.3.2 Global Positioning System (GPS) Antennas

A. A GPS antenna may be built into a Class 1 or 2 EFB or external to an EFB.

- A portable GPS antenna is considered ancillary PED equipment and must be included in EFB evaluation and testing.
- An installed GPS antenna may be used to provide signal reception to an EFB and must support the intended function of the EFB.

B. GPS data may be used for map centering when en route charts are displayed on an EFB.

- Map centering may be used as an en route chart feature only and may not be used when an approach chart is displayed;
- "Own-ship position" may never be displayed on a Class 1 or 2 EFB in flight; and
- A GPS installation in compliance with AC 20-159 is required for the depiction of own-ship position on an airport moving map display.

C. If a portable GPS is used to provide position information to an EFB, the portable GPS is subject to the same requirements as the EFB.

- The EFB must demonstrate its intended functions with the GPS both enabled and disabled.
- In addition, the EFB must be non-interference tested with the portable GPS attached and operative, as well as with the portable GPS not attached (unless the EFB is considered inoperative without the portable GPS).
- Class 1 or 2 EFBs may use position information from a portable GPS only for en route map centering or page-turning, but must not display own-ship position on the EFB.

> An acceptable exception to this requirement allows for use of own-ship position on an AMMD.

11.5.4 POWER SOURCES

11.5.4.1 Battery Primary

A. For Class 1 or 2 EFB s where the primary power source is a battery, useful battery life must be established and documented for the EFB.

- When procedures are not established for aircraft power to provide battery recharging during flight operations, at least one fully charged spare battery must be provided for each EFB that is providing a paperless source of aeronautical information pertinent to flight.
- When EFB battery charging is not possible in the aircraft, additional fully charged EFB batteries must be available to ensure operational performance for the planned duration of the flight, plus one hour.

11.5.4.2 Battery Maintenance

EFB battery maintenance needs to be addressed as either a maintenance or operating procedure to ensure battery life, change intervals, and safety. EFB batteries, including those carried as spares, must be maintained in an appropriate state of charge.

> Batteries must be replaced at the EFB manufacturer's recommended interval.

11.5.4.3 Aircraft Power Secondary

Where the EFB primary power source is a battery, procedures may be established to use aircraft power for battery recharging during flight operations.

- In this case, aircraft power is secondary and not considered essential to EFB operation because the EFB will operate without aircraft power.

11.5.4.4 Aircraft Power Primary (Class 2 Only)

When an EFB uses aircraft power as the primary power source, design approval is required for this connection and power source by TC, amended TC or STC.

> This type of EFB power source will normally be hard wired to the EFB mounting device or directly to aircraft power source through a connector.

11.5.5 DATA CONNECTIVITY (CLASS 2 ONLY)

EFB data connections to aircraft data sources require design approval by TC, amended TC, or STC to ensure the aircraft systems are protected from any EFB failure modes.

- These data connections should be "read only," except for non-essential Airline Administrative Communications (AAC) or Airline Operational Communications (AOC) systems.
- Data connection from the aircraft navigation system may not be used to display own-ship position on a Class 1 or 2 EFB in flight.

> Aircraft navigation system source data may be used for AMMD position on taxi diagrams.

11.5.6 DATA LOADING/DATABASE CHANGES

A. Class 1 or 2 EFBs must have a reliable means for revising the EFB databases.

- Database currency is determined by what required aeronautical information the EFB is replacing.
- Each method of data revision must ensure integrity of the data being loaded and not negatively impact the reliability of EFB operation.
- Procedures must exist to protect the EFB from corruption, especially when internet and/or wireless means are used.

> External drives for data loading are considered ancillary EFB equipment and not subject to specific requirements of this paragraph beyond those identified for data loading/database revision.

- Database revision does not include application software or operating system changes.

B. Application software and/or operating system program changes must be controlled and tested prior to use in flight.

- Database and/or application software changes may not be performed during operations (taxi, takeoff, in-flight, landing).

11.5.7 MOUNTING DEVICES (CLASS 2 ONLY)

A. The EFB, when attached to its appropriately designed mounting device, must be evaluated to ensure operational suitability in all ground and flight operations and conditions.

- When attached to its mounting device, the EFB must not interfere with flight crew duties and must be easily and safely stowed when not in use.
- The attached EFB must also not obstruct flight crew primary and secondary fields of view, nor impede safe egress.

11.6 EFB SOFTWARE SPECIFICATIONS

11.6.1 TYPE A SOFTWARE APPLICATIONS

Type A applications are those applications intended for use on the ground or during non-critical phases of flight when pilot workload is reduced.

> Refer to Appendix 11-A for a flowchart for determination of software type applicability.

11.6.1.1 Type A Aeronautical Chart Applications

Type A applications for aeronautical charts are applications that require all aeronautical charts pertinent to the flight to be printed prior to departure of the flight.

> Malfunction of a Type A application must be limited to a “minor failure effect” classification for all flight phases and have no adverse effect on the completion of a flight operation..

11.6.1.2 Type A Weight & Balance Applications

Type A applications for Weight and Balance (W&B) are applications that present existing information found in the applicable Aircraft Flight Manual (AFM) or pilot’s operating handbook (POH).

- Type A W&B applications may accomplish basic mathematics, but must not use algorithms to calculate results.
- Type A W&B applications must retrieve and apply existing published information.

11.6.1.3 Type A Performance Information Applications

Type A applications for aircraft performance are applications that present existing information found in the applicable AFM or POH.

- Type A applications for performance may be software applications that retrieve and apply existing published information.
- Type A performance applications must not use algorithms to calculate results.

11.6.2 TYPE B APPLICATIONS

Type B applications are applications that are intended for use during critical phases of flight or have software and/or algorithms that must be tested for accuracy and reliability.

> Type B applications must be available for use during all phases of flight.

11.6.2.1 Type B Aeronautical Chart Applications

A. Type B aeronautical chart applications are applications that display aeronautical charts in electronic format.

B. These applications do not require paper printing of aeronautical charts and the viewable electronic format allows chart manipulation.

11.6.2.2 Type B Electronic Checklist Applications

A. Type B electronic checklist applications provide cockpit checklists in compliance with regulatory requirements

B. Electronic checklist (systems) must be tested for flight operations suitability and must not adversely impact pilot workload.

11.6.2.3 Type B Weight & Balance Applications

Type B W&B applications are applications with algorithms to calculate weight and balance results.

- Type B W&B applications are produced for a specific aircraft and therefore, must be tested and proven accurate by the applicant.

11.6.2.4 Type B Aircraft Performance Applications

Type B aircraft performance applications are performance applications with algorithms to calculate performance results.

- Type B aircraft performance applications are produced for a specific aircraft and therefore, must be tested and proven accurate by the applicant.

11.6.3 TYPE C APPLICATIONS

These software applications are RTCA/DO-178B, Software Considerations in Airborne Systems and Equipment Certification, compliant and require State of Design approval.

- Type C applications can be used on Class 3 EFB equipment which are approved by TC, amended TC, or STC.
- Type C applications that receive a TSOA and meet the safety condition for “minor failure effect” or “no safety effect,” may be authorized for use on Class 1 or Class 2 EFBs.

11.7 OPERATIONAL SUITABILITY REQUIREMENTS

11.7.1 APPLICATION DOCUMENTATION

A. The user/operator must present application documentation to the POI demonstrating that the EFB meets its intended function.

- Determining the operational suitability of a particular EFB is the responsibility of the user/ operator and may be subject to specific guidelines from the applicable State of Design reports.

> The user/operator is responsible for ensuring that a Class 1 or 2 EFB along with Type A and B applications will reliably perform its intended function while not interfering with other aircraft equipment or operations.

B. When an operator has completed the evaluation of a Class 1 or 2 EFB, the operator must submit an application requesting authorization to use the EFB.

- The POI will review the application submitted by the operator and authorize or not authorize the use of the EFB.

> Refer to Appendix 11-B (Job Aid OP-54) for certification guidance.

C. When a new aircraft model is added to an existing EFB authorization, the suitability of the EFB for that aircraft must be addressed as part of aircraft conformity using this evaluation process.

- When a new EFB is added to an existing EFB authorization, the suitability of the new EFB must be addressed using this same evaluation process.

11.7.2 OPERATIONAL EVALUATION OF CLASS 1 OR 2 HARDWARE/TYPE A OR B SOFTWARE

A. The user/operator must evaluate the EFB for suitability of intended functions in each aircraft model.

B. The user/operator must evaluate the operational suitability of the proposed EFB intended functions and aircraft model suitability.

> Refer to Appendix 11-C (Job Aid OP-55) for EFB evaluations.

C. The intended functions of software applications must be appropriate to the individual aircraft make and model.

- Electronic Documents,
- Electronic Checklist Software,
- W&B Software,
- Performance Software,
- Electronic Aeronautical Chart Software, and
- Weather Information.

D. Operators requesting initial EFB authorization must include their POI in the flight/simulator evaluation of an initial EFB implementation.

> Refer to Appendix 11-D (Job Aid OP-56) for in-flight or simulated in-flight scenarios.

- Operational evaluations for subsequent additions of EFBs or aircraft models need not conduct flight/simulator evaluations provided intended functions remain substantively the same as previously evaluated EFBs.

11.7.3 OPERATIONAL SUITABILITY OF CLASS 3 HARDWARE/TYPE C SOFTWARE

A. Class 3 hardware and/or Type C software applications are evaluated by the State of Design in conjunction with a TC, amended TC, or STC certification process.

- The State of Design determines operational suitability and pilot training, checking, and currency requirements.

B. The State of Design determination of suitability for Class 3 EFB hardware may be referenced in the FSB report (FSB reports are found at opspecs.com) for the particular model aircraft or other State of Design report of operational suitability.

- If Class 3 EFB hardware is not addressed in an State of Design report, the manufacturer should be contacted to determine if the State of Design has completed an operational suitability evaluation.

C. Class 3 EFB and Type C software application authorization is subject to existing operator requirements for certified equipment.

> The operator must address the development of procedures and training associated with EFBs prior to receiving authorization to use each Class 3 EFB and Type C software application.

11.8 EFB PROCEDURES

A. The operator's operations and maintenance procedures must be specific to each EFB and the operations conducted.

- The operator's manual must identify each model of EFB authorized and each model of aircraft.

11.8.1 EFB CONFIGURATION CONTROL

A. Standard EFB configuration control must be established and base lined (i.e., initial hardware and software version at time of

> Class 1 or 2 EFB configuration affects usability and battery life through setup of suspend/sleep modes.

application) along with procedures to ensure the EFB configuration control is maintained during system updates/revisions.

B. All classes of EFBs must have established standard operating procedures (SOP) to ensure reliable use of hardware and software.

C. This should include verification of continued intended function prior to use in flight operations following an EFB database revision.

Procedures must be established for EFB database revision.

- Software updates, especially in the EFB operating system, must have extensive test procedures prior to use in flight operations.
- Software revision procedures must be comprehensive to ensure continued reliability of the EFB and verification of reliable intended function.

11.8.2 NORMAL & ABNORMAL OPERATING PROCEDURES.

A. Normal procedures for flight operations must be developed for all flight operations with EFBs.

- Preflight must address battery charging, EFB database revision and data currency, EFB configuration control, and SOP for EFB setup.
- In-flight procedures must include standard application operating procedures, and EFB standard flight operating procedures for use.
- Abnormal procedures must be established to address likely EFB function failures.
- Class 1 or 2 EFB operating procedures and limitations must be established if the EFB being used has not demonstrated rapid decompression testing while *on* and operating.

Procedures for single and dual EFB failure must be established.

B. Checklists must be established or revised to include normal and abnormal EFB procedures to be used by pilots in flight.

- This may be accomplished by amending checklists when approved operator customized cockpit checklists are used or by creating an EFB checklist supplement when aircraft manufacturer cockpit checklists are used.

11.8.3 MINIMUM EQUIPMENT LIST (MEL)

A. When MEL relief is requested, the MEL must be amended in compliance with the aircraft's Master Minimum Equipment List (MMEL).

- An inoperative Class 1 EFB may be removed from the aircraft without MEL relief being utilized, provided redundancy is maintained, or paper backups for all Type B applications are available.

11.8.4 MAINTENANCE

A. Regular maintenance procedures are required for Class 1 and 2 EFBs including measures to ensure the continued readability of the viewing screen.

B. EFB battery maintenance needs to be addressed to ensure battery life, change intervals, and safety.

C. Class 3 EFB maintenance must comply with the aircraft instructions for continued airworthiness (ICA).

11.8.5 RISK MITIGATION

A. Procedures must be established for a transition to paperless authorization. Initial procedures establish an independent backup during the EFB validation period.

- Procedures must be established for continuous reporting of problems with EFBs.
- There must be procedures in place for the user/operator to review these reports periodically to mitigate potential unreliability issues and correct operating procedures where necessary.
- Procedures must be established to notify flight crews of EFB problems or use issues.

B. When certain Type B applications (e.g., approach charts, aeronautical charts, electronic checklists, and flight manuals) are utilized on Class 1 or 2 EFBs to replace aeronautical charts or data required by regulation, risk mitigation is required

- Such mitigation methods may be satisfied by use of multiple EFB hardware and software or backup paper aeronautical charts and data.
- Redundancy in the form of traditional paper aeronautical charts or data, a second EFB, or other procedural means may satisfy acceptable risk.
- When determining the need for redundancy, take into consideration that no single failure or common mode error can cause the loss of required aeronautical information or data.
- The need for redundancy should also consider independent power sources or battery backup for the EFB.

11.8.6 TRAINING

The operator must develop EFB training for all personnel involved with EFB use, database servicing, and maintenance.

> EFB training must comply with training prescribed by CAAP and be CAAP-approved where applicable.

11.9 AIRWORTHINESS REQUIREMENTS

A. This paragraph outlines the airworthiness and return to service requirements for installed components or provisions of Class 1 or 2 EFBs.

> These airworthiness requirements are applicable to all installed provisions capable of supporting EFB functions at flight crew stations, regardless of any other stated intended function.

B. The installer remains responsible to ensure all certification and airworthiness requirements are met for each installation.

C. For provisional installations, each installer remains responsible for compliance with EFB airworthiness requirements and each operator is responsible for EFB operational use requirements of the installed provisions capability.

> All Class 3 EFB installations require certification under TC, amended TC, or STC, prior to installation.

11.9.1 EFB POWER SOURCE

11.9.1.1 Class 1 EFB Power Source

A. Airworthiness criteria for Class 1 aircraft power sources may be in accordance with existing airworthiness requirements for PED outlets installation.

> A Class 1 power source is defined as aircraft power being used to recharge the EFB battery during flight operation, but the EFB battery remains the primary EFB power supply.

B. Such outlets, if installed must be labeled for exclusive use by the EFB.

- NOTE: Special consideration must be given to the type of electrical power provided for the recharging of lithium ion batteries.
- Lithium ion batteries pose a safety hazard if overcharged or excessively discharged.

- Operators should have lithium ion battery charging procedures which are in total accordance with the battery manufacturer's charging instructions and prevent aggravation of lithium ion battery thermal hazards.

11.9.1.2 Class 2 EFB Power Source

A Class 2 power is aircraft power used as the primary EFB power supply and requires the power supply to be hard wired or connected with certified connectors to ensure reliability.

A. This is an EFB that continuously depends on connection to aircraft power to perform its intended function (no sustaining battery power).

B. The aircraft power for Class 2 EFB power supplies must be designed to remain available, at an acceptable level for required flight information, in the event of aircraft electrical malfunctions.

- Class 2 EFB power supplies require design approval by the State of Design under TC, amended TC, or STC which excludes the installation from eligibility for CAAP local approval.

11.9.2 EFB DATA CONNECTIVITY

A. This read-only data is provided to an EFB from the aircraft's systems (e.g., flight management system, GPS, air data, fuel system, etc.) through a certified ARINC 429, RS-232, RS-485, or other compatible interfaces or certified router.

- EFB data connectivity does not include raw antenna reception data from an installed antenna going directly to the EFB.

B. EFB data connectivity must include isolation to preclude the EFB from interfering with any aircraft system and all associated wiring must be protected from damage and secured.

- EFB data connectivity requires design approval. Such design approval must be accomplished under TC, amended TC, or STC by the State of Design and excludes the installation from eligibility for CAAP local approval.
- Data converters (e.g., ARINC 429 to RS-232, etc.) that are capable of supporting EFB functions at flight crew stations must have design approval issued by the State of Design.

11.9.3 EFB MOUNTING DEVICES.

Cockpit Mounted EFB is a Class 2 EFB mounted in the cockpit other than on the control yoke.

A. Yoke-Mounted EFBs must be certificated by a design approval by the State of Design under TC, amended TC, or STC.

1) All the structural and dynamic, as well as wiring protection and security requirements affecting the flight controls, (including autopilot (AP), stall warning, stick pusher, crashworthiness, human factors, etc.), must be addressed prior to installation.

2) Designated Engineering Representative (DER) approval without a design approval from the State of Design by TC, amended TC, or STC, is not permitted for Yoke-Mounted EFBs.

B. The EFB mounting device requires airworthiness approval by the State of Design. CAAP policy excludes this installation from eligibility for CAAP local approval.

11.9.4 INSTALLED ANTENNAS

A. Installed antennas are those antennas permanently installed in the aircraft.

- Portable antennas attached to a portable EFB, but not attached to the aircraft, are not subject to these airworthiness requirements.
- Portable antennas and temporary antenna holders, like suction cups, are subject to EFB evaluation requirements only.

B. Installation of antennas capable of supporting EFB functions at flight crew stations must be accomplished using existing guidance for antenna airworthiness considerations.

C. Antennas combining reception for both aircraft navigation and EFB must be TSO approved for this intended function providing isolation to preclude the EFB from interfering with antenna reception for aircraft navigation.

D. TSO or STC approved antennas may be used to independently provide GPS and/or satellite weather for an EFB in accordance with existing installation airworthiness requirements.

- Portable EFB-only antennas without a TSO may be used to provide a GPS or satellite weather signal for EFB-only use.
- Non-interference testing by the installer is required.

11.9.5 INSTALLED SATELLITE RECEIVERS

A. If any component of a weather receiver is installed in an aircraft separate from a portable EFB on the flight deck, it is subject to avionics installation requirements and may not be considered a PED.

The user/operator is responsible for EFB non-interference as a PED and the installer is responsible for non-interference for the weather receiver as part of installation requirements.

B. If the result of the received weather data is capable of being displayed on an EFB, the individual components of the weather receiver system cannot be installed as STC provisions only because the installation cannot meet requirements for testing of non-interference without performing its intended function.

- The weather receiver must be non-interference tested with the intended EFB installed and operative even though the installation only applies to the weather receiver.
- The airworthiness for the weather receiver installation is independent of EFB/PED suitability responsibility of the user/operator.

C. This installation requires design approval under TC, amended TC, or STC which excludes the installation from eligibility for CAAP local approval.

11.10 AUTHORIZATION PROCESSES

11.10.1 GENERAL

The operator is responsible to ensure all operational requirements are met for an EFB. The operator must submit documentation demonstrating compliance with all operational requirements for EFB's to their POI.

The CAAP evaluation process for an EFB follows the general process for approval and acceptance as described in AC 00-003, CAAP Certification Process.

11.10.2 PHASE ONE, INITIATION

A. Phase one of the process begins when the operator requests authorization to use the EFB from the CAAP.

B. During this phase, the CAAP and the operator reach a common understanding of the role of the CAAP and what documents and actions the operator is responsible for during each phase of the authorization process.

11.10.3 PHASE TWO, REQUIRED APPLICATION INFORMATION

A. Phase two begins when the operator submits a formal EFB plan to the POI for evaluation. The plan is reviewed for completeness and the POI facilitates coordination with other inspectors and FSIS divisions, as necessary.

> Refer to Appendix 11-B (Job Aid OP-54) for initial review of operator EFB application.

B. During phase two, the POI may coordinate with the appropriate State of Design for guidance on EFBs having functions not addressed in this guidance.

> Once the plan is accepted, the operator follows that plan to produce a complete EFB program.

C. The operator must submit the following information in the application package—

1) EFB hardware and application specification,

2) EFB operator procedures/manual revisions,

3) EFB cockpit procedures checklists,

4) EFB training program,

5) EFB evaluation report),

6) Rapid decompression test data (when required),

7) Completed non-interference test results, and

8) Airworthiness documents for Class 2 equipment (mounting device, aircraft data connection, aircraft power primary, remote antenna).

11.10.4 PHASE THREE, POI REVIEW

A. The POI must use the job aid found in Appendix 11-C, to conduct a review of the application submitted by an operator.

> All inspector specialties should coordinate the review of an operator's EFB program.

B. The POI should participate in the simulator evaluation or flight evaluation of an EFB when a user/operator is requesting initial EFB authorization.

- Additional simulator/flight evaluations are not required for adding a new EFB to an existing authorization unless there is a substantial change in EFB intended functions.

C. When a new aircraft is added to a certificate with existing EFB authorization, the suitability of the EFB for that aircraft must be addressed as part of aircraft conformity and configuration control process.

D. Inspectors should examine the technical content and quality of the proposed EFB program and other supporting documents and procedures.

> The user/operator's program for EFB management is critical to EFB reliability and must be well documented for EFB users.

11.10.5 PHASE FOUR, INTERIM AUTHORIZATION TO USE AN EFB

A. An interim EFB authorization is granted to allow the user/operator to proceed with EFB validation testing.

> During this validation phase, the operator must maintain a paper backup of all electronic information.

- The paper backup of all required operating information is required to be available and accessible to the flight crew during operation.

B. The validation phase begins when the operator formally begins use of the EFB combined with paper backup for an established period of time.

Refer to Appendix 11-C (Job Aid OP-56), for data collection during the validation phase.

11.10.5.1 Unacceptable Validation Results

If the POI finds the proposed EFB reliability and/or function to be unacceptable by the conditions of this EFB guidance, the POI should contact the operator for corrective action.

EFB deficiencies must be corrected and the EFB function revalidated prior to paperless authorization being issued..

11.10.5.2 Acceptable Validation Results

If the POI finds the proposed EFB reliability and/or function to be acceptable based on validation data then paperless authorization may be issued.

11.10.6 PHASE FIVE, AUTHORIZATION TO USE AN EFB

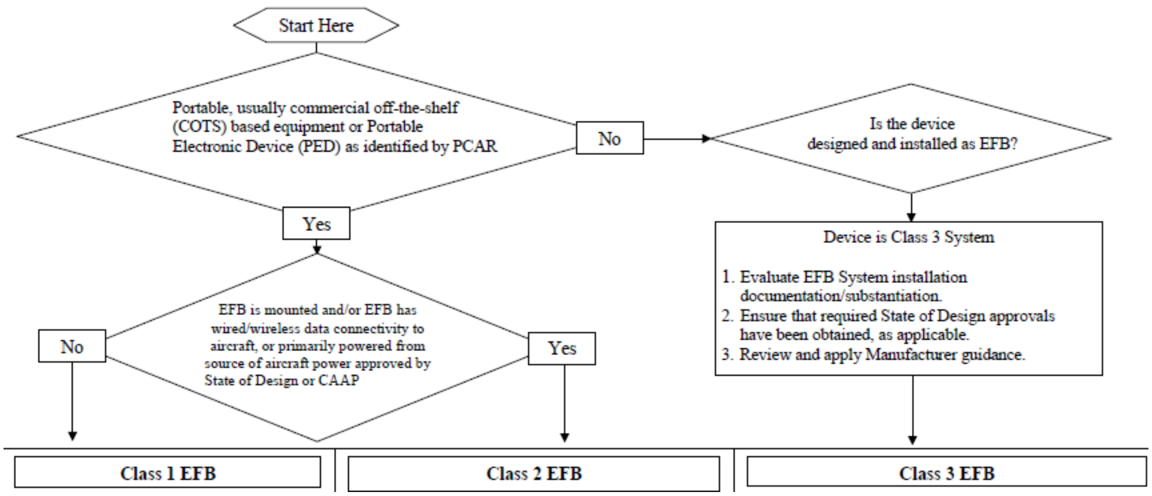
A. An operator subject to regulations under PCAR Parts 9 or 14 is granted authorization to use an EFB only after acceptable completion of validation testing.

B. Any subsequent change to EFB hardware or intended functions must be validated at a level appropriate to the effect of the change on the EFB program.

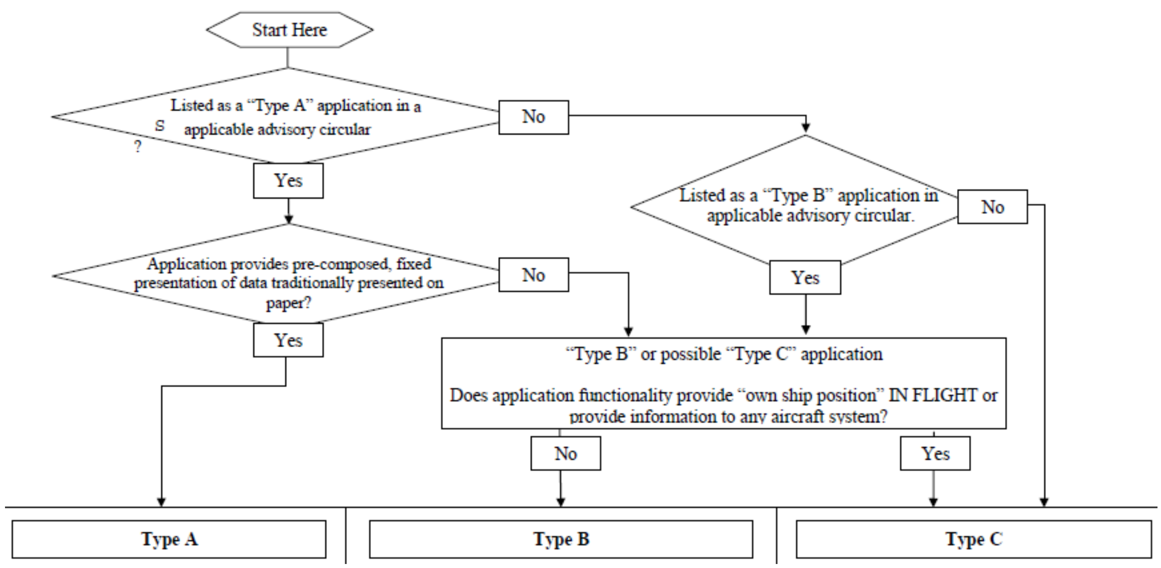
End of Chapter Text - Appendices Follow

APPENDIX 11-A
EFB Flowcharts

1. Determining Applicable Class of EFB Hardware



2. Determining Applicable Type of EFB Software



End of Appendix 11-A

APPENDIX 11-B

Job Aid OP-54: EFB Application Review

Date		Control #	
Action #		Record ID#	
Inspector		Org Identifier	
Location		Project#	
Destination		Aircraft MMS	
Action Taken		Aircraft Reg#	
Maint Rep		PIC #	
Mgmt Rep		Other PEL#	

- For completion instructions, refer to Chapter 2 of the Operations or Airworthiness Inspector Manual .

YES	No	NS	NA	1	GENERAL EFB CONSIDERATIONS
				1.1	Is an in-flight evaluation necessary?
				1.2	Is applicant hardware evaluation acceptable?
				1.3	Are procedures are published and available to all EFB users and maintainers.
				1.4	Verify preflight procedures and checklists are revised to include EFB?
				1.5	Verify procedures are established for single and dual failure of EFB?
YES	No	NS	NA	2	PHYSICAL PLACEMENT
				2.1	Verify user/operator procedures specify locations for both EFB stowage and use??
				2.2	Verify EFB specified locations do not obstruct visual or physical access to flight controls and/or displays?
				2.2	Verify EFB locations do not obstruct the emergency egress path?
				2.3	Verify EFB locations provide for security in flight?
				2.4	Does mounting device have appropriate airworthiness documentation per EFB requirements?
				2.5	Does mounting device lock in position easily?
				2.6	Does mounting device adjustable enough to accommodate a range of flight crew member preferences and does range of adjustment accommodate the expected range of user's physical abilities?
YES	No	NS	NA	3	EFB DOCUMENTATION & POLICIES
				3.1	Verify written policy adequately addresses each specific EFB application, and that any published State of Design recommendations have been incorporated into the operator's EFB program?
				3.2	Verify procedures are in place to communicate upgrades or malfunctions of EFBs to users in a timely manner?

				3.3	Verify the EFB information from the manufacturer is incorporated into operating procedures?
YES	**No**	**NS**	**NA**	**4**	**EFB TRAINING CONTENTS/CURRICULUM**
				4.1	Verify the initial EFB training includes evaluation of knowledge and skill requirements?
				4.2	Verify the training includes demonstration of key tasks?
				4.3	Verify the recurrent training includes evaluation of proficiency with the EFB?
				4.4	Verify minimum training, checking and currency requirements are specified in training programs?
				4.5	Verify EFB training is customized to EFB applications being used?
YES	**No**	**NS**	**NA**	**5**	**APPLICANT EFB VALIDATION DATA COLLECTION**
				5.1	Verify 6-month validation phase requires pilots/users of the EFB to document evaluations?
				5.2	Verify that there is a on-going formal process for gathering feed-back about the EFB and its performance?
				5.3	Verify procedures specify personnel responsible for maintenance and database management?
				5.4	Ensure that the operator has an ongoing data collection and feed-back/correction process that ensures the suitability/reliability of the data?
				5.5	Verify the data collection processes in place are factored into the operator's Safety Management System (SMS)?
YES	**No**	**NS**	**NA**	**6**	**EFB-SMS INTERFACE**
				6.1	Verify that the hazards associated with the use and integration of the EFB have been identified, eliminated, or controlled to an acceptable level throughout the life cycle?
				6.2	Verify applicant's SMS has procedures to mitigate identified haz-ards, availability, and reliability of design, cross-checking of calcu-lation/data, crew training, and misuse potential?
				6.3	Verify applicant's SMS incorporates EFB hazard analysis, risk assessment, and related safety reports?
YES	**No**	**NS**	**NA**	**7**	**EFB SOFTWARE CONSIDERATIONS**
				7.1	Verify procedures are established for testing of each software revi-sion or database update prior to operational use.
YES	**No**	**NS**	**NA**	**8**	**EFB HARDWARE CONSIDERATIONS**
				8.1	Verify display lighting and reflectivity has been evaluated for acceptability in each aircraft model?
				8.2	Verify EFB maintenance procedures are in place for batteries, dis-plays, display interaction devices (pens, etc.), display pixel burn-out, and component condition?
YES	**No**	**NS**	**NA**	**9**	**EFB ELECTRONIC DOCUMENTS**
				9.1	Verify electronic documents are easily accessed and clearly con-trolled as to revision and currency?

				9.2	Verify use of electronic documents is incorporated in training program for initial and recurrent?
YES	**No**	**NS**	**NA**	**10**	**EFB ELECTRONIC CHECKLISTS (ECL) SYSTEM**
				10.1	Verify ECL system is customized to aircraft being operated?
				10.2	If checklist is "interactive." verify the checklist is subject to 6 month validation phase?
				10.3	If checklist is "automatically linked, verify State of Design and manufacturer's involvement and concurrence was obtained?
				10.4	Verify use of ECL system is incorporated into training program for initial and recurrent?
YES	**No**	**NS**	**NA**	**11**	**EFB WEIGHT & BALANCE**
				11.1	Verify EFB procedures provide means to comply with load manifest record keeping requirements?
				11.2	Verify procedures clearly identify if EFB W&B program is for "planning purposes only" when not an approved means for calculating W&B?
				11.3	Verify use of W&B is incorporated into training program for initial and recurrent?
YES	**No**	**NS**	**NA**	**12**	**EFB FLIGHT PERFORMANCE CALCULATIONS**
				12.1	Verify EFB procedures provide means to comply with load manifest/flight plan record keeping requirements?
				12.2	Verify procedures clearly identify if EFB aircraft performance program is for "planning purposes only" when not an approved means for calculating aircraft performance?
				12.3	Verify use of aircraft performance is incorporated into training program for initial and recurrent?
YES	**No**	**NS**	**NA**	**13**	**EFB ELECTRONIC CHARTS**
				13.1	Verify Electronic Charts Application does not display "own-ship position" except on the ground?
				13.2	Verify preflight procedures are established to ensure currency of electronic chart information?
				13.3	Verify EFB display. The screen must be large enough to show an entire instrument approach procedure chart at once, with the equivalent degree of legibility and clarity as a paper chart?
				13.4	Verify use of electronic charts is incorporated into training program for initial and recurrent?

INSPECTOR SIGNATURE		**ORG REP SIGNATURE**	

End of Appendix 11-B

APPENDIX 11-C

Job Aid OP-055: EFB Certification Evaluation

Date		Control #	
Action #		Record ID#	
Inspector		Org Identifier	
Location		Project#	
Destination		Aircraft MMS	
Action Taken		Aircraft Reg#	
Maint Rep		PIC #	
Mgmt Rep		Other PEL#	

- For completion instructions, refer to Chapter 2 of the Operations or Airworthiness Inspector Manual .

YES	No	NS	NA	1	EFB HARDWARE
				1.1	If the EFB is to be used outside of the flight deck can the EFB display be read under direct sunlight?
				1.2	Is the display brightness and contrast adjustable?
				1.3	Is the display brightness acceptable when it adjusts automatically?
				1.4	Are there any display artifacts such as jagged lines that impair functionality?
				1.5	Are controls labeled appropriately to describe their intended function?
				1.6	Are buttons and labels visible and readable under all flight deck illumination conditions?
				1.7	Can EFB inputs be made quickly and accurately in any operational environment?
				1.8	Does the input device provide sufficient tactile feedback in all environmental conditions?
				1.9	Are inadvertent or multiple activation of controls minimized?
				1.10	Does the EFB start up in a predictable state?
				1.11	Can the EFB be rebooted when power is cut to the EFB?
				1.12	Does the EFB function correctly when rebooted?
				1.13	Are all the EFB failure modes easy to see and identify?
				1.14	Is the failure annunciation/message appropriate for the EFB function that has failed?
				1.15	Are EFB recovery means easy to remember and apply when the EFB fails?
YES	No	NS	NA	2	GENERAL USER INTERFACE

				2.1	Is the revision information and currency expiration date available and presented clearly?
				2.2	Does the device respond immediately to user inputs?
				2.3	Is the processing speed always appropriate for normal use?
				2.4	Are appropriate busy or progress indicators displayed when processing is delayed?
				2.5	Is the user interface including functions and navigation consistent throughout the EFB?
				2.6	Is all information that is needed displayed and easily accessible? Is there missing or difficult to find information?
				2.7	Are common actions and time-critical functions easy to access?
				2.8	Are there standard ways to perform common actions?
				2.9	Are the displays and controls used on the EFB similar across applications? Are a common set of controls and graphical elements used?
				2.10	Can all colors be distinguished under the various lighting conditions?
				2.11	Is color coding implemented with a secondary code such as shading or highlighting when used to display critical information?
				2.12	Are the colors red and yellow used appropriately only for warnings and cautions?
				2.13	Is the text easily readable?
				2.14	Do the characters stand out against the display background?
				2.15	Are upper case and italic text used infrequently?
				2.16	Is text that may be used in low-visibility conditions appropriate in size and easy to read?
				2.17	Is it easy to zoom in on text or graphics when they are too small?
				2.18	Is it obvious when information is out of view and can it easily be brought into view?
				2.19	Is the spacing between characters appropriate?
				2.20	Is the vertical spacing between lines appropriate?
				2.21	Are icons and symbols legible?
				2.22	Are icon and symbol functions obvious?
				2.23	Are the icons and symbols distinguishable from one another?
				2.24	Is each icon's meaning explained by a label or other means?
				2.25	Are the EFB icons and symbols consistent with their paper equivalents?
				2.26	Do EFB alerts and reminders meet the requirements in the appropriate regulations and guidelines.?
				2.27	Are alerts and reminders consistent across all applications?
				2.28	Are alerts and reminders implemented so as not to distract?

				2.29	Is there control over when, and whether, the audio or video is activated
				2.30	Is it easy to reset parameters to their default when they have been customized?
				2.31	Is EFB customization controlled through an administrative control process?
YES	**No**	**NS**	**NA**	**3**	**GENERAL SOFTWARE APPLICATIONS**
				3.1	Can required information be found quickly and accurately within all applications?
				3.2	Is the information within applications organized consistently?
				3.3	Is information layout consistent with the paper equivalent?
				3.4	Is the layout of information appropriate for all applications?
				3.5	Is high priority information easy to read?
				3.6	Is it easy to tell which application is currently open/active?
				3.7	Is it easy to switch between applications?
				3.8	Is extra acknowledgement required to open applications that are not flight related?
				3.9	Do all open applications function as intended on an individual basis?
				3.10	Is access or links to related information appropriately supported?
				3.11	Are similar types of information accessed in the same way?
				3.12	Is it easy to return to the place where the user started from?
				3.13	Is printing supported, and if so, is the hard copy usable?
				3.14	Can a portion of a document be selected to be printed?
				3.15	Can a print job be terminated immediately?
YES	**No**	**NS**	**NA**	**4**	**ELECTRONIC DOCUMENTS (if applicable)**
				4.1	Is it easy to tell where one is in relation to the full document?
				4.2	Is it easy to move between documents quickly?
				4.3	Is it easy to tell what document is currently in view?
				4.4	Is there a list of available documents to choose from?
				4.5	Is the document search function appropriate?
				4.6	Are tables, especially complex ones, readable and usable?
				4.7	Are figures readable and usable?
YES	**No**	**NS**	**NA**	**5**	**ELECTRONIC CHARTS (if applicable)**
				5.1	Is there a way to pre-select specific charts for easy access during a particular flight?
				5.2	Is there more than one way to search for a chart?
				5.3	Is it easy to access charts when a last minute change is necessary?

				5.4	If the chart application uses aircraft location to facilitate access to charts, is this function appropriate?
				5.5	Is it easy to switch between a de-cluttered and normal display if de-cluttering is supported?
				5.6	Is there a clear indication when any chart elements are suppressed?
YES	**No**	**NS**	**NA**	**6**	**ELECTRONIC CHECKLISTS (if applicable)**
				6.1	Are normal checklists available in the appropriate order of use?
				6.2	Can checklists be accessed individually for review or reference?
				6.3	During non-normal conditions, are relevant checklists easy to access?
				6.4	During non-normal conditions, does the device indicate which checklists and/or checklist items are required and which are optional?
				6.5	Is it clear where to find all checklists, whether on the EFB or on paper?
				6.6	Is the location of a paper document provided when it is referred to by the electronic checklist?
				6.7	Does each checklist have a constantly visible title distinct from other checklists?
				6.8	Is it easy to select a checklist from a set of open checklists?
				6.9	Is there a reminder to review incomplete items when closing an incomplete checklist?
				6.10	Can an incomplete checklist be closed after acknowledging it is not complete?
				6.11	Does the ECL discourage two or more checklists from being used simultaneously?
				6.12	Is progress through the ECL clear?
				6.13	It is easy to reset the ECL to start over again?
				6.14	Does the checklist provide appropriate reminders for tasks that require a delayed action?
				6.15	Does the checklist clearly highlight decision branches?
				6.16	Can one return to the checklist from links or related information in one step?
				6.17	Is there an indicator of which item in the checklist you are working on?
				6.18	Is the checklist's active item clearly indicated?
				6.19	Can the status of an item be easily changed?
				6.20	Does the next item automatically become active when the previous one is complete?
				6.21	Can the current item be deferred without completing it?
				6.22	Is it easy to view other items, even in a long checklist, without changing the active item?
				6.23	Is it easy to move between items within a checklist?

				6.24	Does the active item change to the next after an item is completed
				6.25	Is there a clear indication that all items as well as the whole checklist are complete when finished
YES	**No**	**NS**	**NA**	**7**	**PERFORMANCE CALCULATIONS (if applicable)**
				7.1	Does the device identify entries that have an incorrect format or type and does it generate an appropriate error message?
				7.2	Does the error message clarify the type and range of data expected?
				7.3	Are units for performance data clearly labeled~~?~~
				7.4	Do the labels used in the EFB match the language of other operator documents?
				7.5	Is all the information necessary for a given task presented together or easily accessible?
				7.6	Can the crews modify performance calculations easily, especially when making last minute changes?
				7.7	Are outdated results of performance calculations deleted when modifications are entered
				7.8	Does the display and/or crew training provide information to the crew on the assumptions on which the calculations are based?
				7.9	Are crews trained to identify and review default values and assumptions about the aircraft status or environmental conditions?
				7.10	Are the assumptions made about any calculation as clear to pilots as similar information would be on a tabular chart?
YES	**No**	**NS**	**NA**	**8**	**CREW PERFORMANCE: PREFLIGHT PLANNING**
				8.1	Do crews with EFB perform as well or better than crews with paper documents when *calculating aircraft weight and balance, takeoff, climb, and maneuvering speeds*~~?~~
				8.2	Do crews with EFB perform as well or better than crews with paper documents when *crews maintain critical data for immediate reference*~~?~~
				8.3	Do crews with EFB perform as well or better than crews with paper documents when *there is a runway change and a need to reference deicing fluid requirements or an MEL item?*
				8.4	Do crews with EFB perform as well or better than crews with paper documents when *there are time critical adjustments prior to block out/taxi and takeoff?*
YES	**No**	**NS**	**NA**	**9**	**CREW PERFORMANCE: TAKEOFF**
				9.1	Do crews with EFB perform as well or better than crews with paper documents *when there is a take-off on a runway that requires briefing a special operator engine-out procedure*?
				9.2	Do crews with EFB perform as well or better than crews with paper documents when *there is complex SID with an abnormal or an emergency during the departure climb-out*?
				9.3	Do crews with EFB perform as well or better than crews with paper documents when *there is an emergency that requires a return to the departure or alternate departure airport*?

				9.4	Do crews with EFB perform as well or better than crews with paper documents *when one EFB fails requiring one pilot to rely on the EFB of the other pilot immediately after takeoff?*
YES	**No**	**NS**	**NA**	**10**	**CREW PERFORMANCE: CRUISE**
				10.1	Do crews with EFB perform as well or better than crews with paper documents when *there is an engine-failure/fire with possible condition of destination below weather minimums?*
				10.2	Do crews with EFB perform as well or better than crews with paper documents when *there is electrical smoke in the cockpit requiring use of smoke mask/goggles while completing checklists or using EFB for approach briefing?*
YES	**No**	**NS**	**NA**	**11**	**CREW PERFORMANCE: DESCENT**
				11.1	Do crews with EFB perform as well or better than crews with paper documents when *there are conditions that require reference to SMGCS taxi routing or a complex clearance?*
				11.2	Do crews with EFB perform as well or better than crews with paper documents when *reported runway conditions require reference to operational limitations?*
YES	**No**	**NS**	**NA**	**12**	**CREW PERFORMANCE: APPROACH & LANDING**
				12.1	Do crews with EFB perform as well or better than crews with paper documents when *there is runway change or the need to re-compute landing weight and V speeds during approach?*
				12.2	Do crews with EFB perform as well or better than crews with paper documents when *there are poor weather conditions or airports with complex taxi routes?*
				12.3	Do crews with EFB perform as well or better than crews with paper documents when *there is a request for a specific taxiway turn during rollout after landing?*
YES	**No**	**NS**	**NA**	**13**	**CREW PERFORMANCE: DESTINATION GROUND OPERATIONS**
				13.1	Do crews with EFB perform as well or better than crews with paper documents when there is an EFB partial failure or erroneous output requiring maintenance discrepancy to be entered?

INSPECTOR SIGNATURE		**ORG REP SIGNATURE**	

End of Appendix 11-C

APPENDIX 11-D

Job Aid OP-56: EFB In-Flight Inspections

Date		Control #	
Action #		Record ID#	
Inspector		Org Identifier	
Location		Project#	
Destination		Aircraft MMS	
Action Taken		Aircraft Reg#	
Maint Rep		PIC #	
Mgmt Rep		Other PEL#	

- For completion instructions, refer to Chapter 2 of the Operations or Airworthiness Inspector Manual .

YES	No	NS	NA	1	OVERVIEW: INSPECTOR OBSERVATIONS
				1.1	Was training adequate to ensure that the pilot(s) could perform in a safe and efficient manner?
				1.2	Were individual pilot knowledge and skills adequate to allow normal coordinated flight deck activities?
				1.3	Was pilot knowledge regarding observed software applications adequate?
				1.4	Are adequate procedures in place to ensure that the EFB is integrated into the crew/operator's system (e.g., normal and abnormal/ emergency operations and maintenance functions)?
				1.5	Was the EFB hardware or software adequate and appropriate during the flight? i.e problems, particularly in a critical phase of flight.
				1.6	Could the pilot(s) recover from usage errors without undue distraction or discussions? Were usage errors were frequent or a distraction?
				1.7	Was the workload required for completing a task with the EFB equal to or less than the workload for completing the task with the conventional method? If no, specify phase of flight and task for any marginal or unacceptable increases in workload.
YES	No	NS	NA	2	GENERAL
				2.1	Was each pilot able to use the cursor, track ball, touch screen, etc. for menu and functionality without frequent errors?
				2.2	Was the device appropriate and operational when exposed to environmental factors (e.g., turbulence, cold weather, vibration)?
				2.3	Was the device free of significant limitations in regard to display (e.g., off-axis view angles, or various different lighting conditions)?
				2.4	The device had easy and adequate dimming functions in low light (nighttime) conditions?

				2.5	The device was adequately backlit and/or was viewable by flight deck lighting in low light (nighttime) conditions
				2.6	The device was clearly visible in bright sunlight conditions?
				2.7	Was the device display clear (adequate resolution)? Confirm that the display was never misinterpreted because of viewing limitations.
				2.8	Did the pilot(s) ensure proper stowage and security (i.e., between flights, etc.) of EFB per standard operating procedures (SOP)? Temperature limitations acknowledged?
				2.9	Does the display continue to be usable after prolonged use in the flight deck environment (if applicable)?
				2.10	Normal functions (e.g., shut down, start up, etc.) are adequate and do not require undue pilot attention or concern?
				2.11	Were procedures adequate for identifying currency of EFB data?
				2.12	Could the pilot(s) easily find and use required items and functions?
				2.13	Were the abbreviations and/or icons easy to understand?
				2.14	If multiple applications are supported, could the pilot(s) easily switch between critical applications?
				2.15	If critical (e.g., abnormal or emergency checklists) applications are authorized in the EFB configuration basis, is their use at least equal to or better than previously approved methods?
				2.16	Was the time to complete normal tasks was appropriate?
				2.17	The audio features did not cause pilot distraction and/or were adjustable and appropriate for the flight deck environment?
YES	**No**	**NS**	**NA**	**3**	**ELECTRONIC CHARTS, DOCUMENTS & CHECKLISTS**
				3.1	Were all necessary documents (including charts, checklists, and manuals) found, identified, and easily viewed by the pilot(s) without undue distraction?
				3.2	Was information contained in electronic charts, documents, and checklists complete, equal in quality to previously provided products, and easily accessible and understandable?
				3.3	Was pilot knowledge of chart/document/checklist selection and viewing adequate?
				3.4	Could the pilot(s) easily rearrange content on the screen to meet needs (e.g., by zooming, panning, or otherwise customizing the view)?
				3.5	If printers are used, are printouts acceptable?
				3.6	Did the pilot(s) exhibit adequate knowledge of EFB functions to efficiently brief and fly required procedures?
				3.7	Did the pilot(s) exhibit adequate knowledge of the software revision process procedure/method that ensures appropriate database accuracy and currency?
				3.8	Did the pilot(s) exhibit adequate knowledge of contingency procedures? In the event of a failure of a single device? In the event that both devices fail?

				3.9	Were both pilots able to monitor necessary electronic chart displays during critical phases of flight?
				3.10	Did the EFB allow quick entry of updates for last minute changes (e.g., flight plan/runway changes)?
				3.11	For electronic checklists, was it easy to track completed items?
YES	**No**	**NS**	**NA**	**4**	**FLIGHT PERFORMANCE DATA CALCULATIONS**
				4.1	Could the pilot(s) interpret and use flight performance data/calculations efficiently and accurately?
				4.2	Did the device allow quick entry of updates for last minute changes (e.g., flight plan/runway changes)?
				4.3	In the event that the weight & balance and/or performance calculation software is not approved by the State of Design, all crew members are aware of the software's limitations and understand that only approved calculation methods may be used as a primary means of computation.
YES	**No**	**NS**	**NA**	**5**	**GENERAL CONCLUSIONS**
				5.1	Were any unique safety issues or events caused or exacerbated by using the EFB during this evaluation?
				5.2	Can the flight be conducted as safely with an EFB as with the methods/products it is intended to replace?
				5.3	Does the EFB add an unacceptable level of complexity for any critical activity or phase of flight?

INSPECTOR SIGNATURE		**ORG REP SIGNATURE**	

End of Chapter

APPENDIX I

Participant Survey Form and Feedback Summary

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Asia-Pacific Economic Cooperation

Project Code: PBNRREVP

Project Title: Perfromance Based Navigation Regulatory Review and Evaluation Program

PARTICIPANT SURVEY

Thank you for participating in the APEC Performance Based Navigation Regulatory Review and Evaluation Program, hosted by the Civil Aviation Authority of the Philippines (CAAP). In order for APEC to ensure that the event met the needs of Participants, we must determine whether you have noted any concrete benefits from participating in this workshop. As such, please take a moment to answer the following questions. Your answers will be treated as confidential and will only be shared with APEC and the CAAP. Under no circumstances will your responses be shared with anyone outside of APEC or CAAP.

PLEASE RETURN THIS FORM TO AN APEC TEAM MEMBER BEFORE YOU LEAVE.

PART 1: Pre-Program Activities

1. Did you hear about the workshop from your ______APEC Delegation, ______ Civil Aviation Authority, ________ Industry or Other (________________)?

2. The registration and participation process was well-organized, and the event venue was suitable.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

Comments:

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Part II: Program Activities

Based on your overall participation during the program, please rank the following statements:

3. The content was just right, not too detailed, and not lacking:

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

4. The PBN Regulatory Review and Evaluation Program is beneficial to my economy's aviation program.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

5. The PBN Regulatory Review and Evaluation Program is beneficial to my civil aviation authority's and/or industry's aviation PBN program.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

6. The PBN Regulatory Review and Evaluation Program is personally beneficial.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

7. Were the APEC Team Members knowledgeable about the topics they discussed? Were there speakers that you did find particularly useful?

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*Based on your participation during **Day 1 (PBN Status Review)** please rank and answer the following statements:*

8. The discussions were beneficial to my understanding of the current status of PBN Implementation in the Philippines.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

or:

____I did not attend this session

9. What information, if any, concerning might have been added to the presentation materials to improve your understanding of PBN?

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*Based on your participation during **Day 2/3 (Flight Operations)** please rank and answer the following statements:*

10. The discussions on PBN Regulatory development in The Philippines were beneficial.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

or:

____I did not attend this session

11. What information, if any, concerning PBN Regulatory development in The Philippines or other relevant issues might have been added to the agenda to provide further knowledge sharing in this area?

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*Based on your participation during **Day 4 (Air traffic Services)**, please rank and answer the following statements*

12. The discussions were beneficial.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

or:

____I did not attend this session

13. What information, if any, concerning the ANSP aspects of The Philippines PBN Implementation might have been added to the discussion to provide further knowledge sharing in this area?

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*Based on your participation during **Day 5 (Procedure Design Authorization)** please rank and answer the following statements*

14. The discussions were beneficial.

____strongly agree ____agree ____neutral ____disagree _____strongly disagree

or:

____I did not attend this session

15. What information, if any, concerning the provisions for the regulation of PBN Instrument Flight Procedure Design and might have been added to the presentation materials to the discussion to provide further knowledge sharing in this area?

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APEC
Asia-Pacific
Economic Cooperation

PART III: Post-Workshop Activities

16. Please rate the overall PBN Regulatory Review and Evaluation Program contents and outcome:

____very great ____ great ____ pretty good ____fair _____rather poor

17. How have you or your economy benefited from the program? What new skills, knowledge, or value have you gained?

18. What needs to be done next? How should this program be built upon with future APEC activities?

19. Please *provide any additional comments on the APEC PBN Regulatory Review and Evaluation Program:*

Asia-Pacific
Economic Cooperation

20. Will you share your experiences with your co-workers/management? ___yes ___no

21. Do you anticipate your discussions to prompt further action? ___yes ___no

Please provide any additional information on your planned post-APEC PBN Regulatory Review and Evaluation Program actions.

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Part IV: General Information

22. What APEC Economy or ICAO State do you represent? ___________________

23. Are you a member of your economy's APEC delegation? ___yes ___no

24. Are you a ____government or an _____ industry representative?

25. If government, do you represent ___Flight Standards, ___Aircraft Certification ___Air Traffic Control, _____ Airports or ____Other (__________________)?

26. If industry, do you represent a _____ manufacturer, _____ a air carrier, _____ association or _____ Other (__________________________)?

27. Would you attend future APEC Aviation Workshops? ___yes ___no

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(*Complete information below, or attach business card*)

Organization:

Name:

Title

Address:

Telephone:

Fax:

Email:

Thank you for taking the time to complete this survey. Your contribution is appreciated.

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PERFORMANCE BASED NAVIGATION REGULATORY REVIEW snd EVALUATION PROGRAM (PBNRREVP)

PARTICIPANT SURVEY REPORT

PHILIPPINES

NOVEMBER 2012

The following is a summary of the responses received to the Participant Survey distributed during the PBNRREVP Team visit to The Philippines from 5th to 9th November 2012.

Participants responded very favorably to a total of 27 questions with no negative comments received.

Relevant notable comments have been included in this report. Of particular note are several responses urging continued staff training and the development of PBN regulatory provisions.

It is clear from the survey that participants valued the program highly and are committed to pursuing the implementation of PBN in The Philippines.

PART 1: Pre-Program Activities

All respondents agreed that the registration and participation process was well-organized, and the event venue was suitable.

Comments:

"It is a good idea to inform economies in advance to give ample time to concerned parties involved in the implementation of PBN in the country to discuss issues and concerns."

Part II: Program Activities

All respondents agreed that the content was just right, not too detailed, and not lacking. No negative reports received.

All respondents agreed (75% strongly) that the PBN Regulatory Review and Evaluation Program is beneficial to my economy's aviation program.

All respondents agreed (90% strongly agreed) that the PBN Regulatory Review and Evaluation Program is beneficial to my civil aviation authority and/or industry's PBN program.

All respondents agreed that the PBN Regulatory Review and Evaluation Program is personally beneficial.

Respondents indicated that the APEC Team Members were knowledgeable about the topics they discussed.

Comments:

"An inspirational group".

"The Team members were very knowledgeable and helpful".

RESPONSES RELATING TO INDIVIDUAL SESSIONS

Day 1 (PBN Status Review)

All respondents agreed that the discussions were beneficial to their understanding of the current status of PBN Implementation in the Philippines.

Respondents were satisfied that adequate presentation materials were provided.

Day 2/3 (Flight Operations)

All respondents agreed the discussions on PBN Regulatory development in The Philippines were beneficial.

Day 4 (Air Traffic Services)

All respondents agreed the discussions were beneficial.

Comments:

"Although training of ATCs are being attended to at this time, ATS management should have been advised that training of ATCs is their responsibility… not merely relying on the expertise of the procedure design division.".

Day 5 (Procedure Design)

All respondents agreed the discussions were beneficial.

PART III: Post-Workshop Activities

All respondents rated the overall PBN Regulatory Review and Evaluation Program contents and outcome as very great or great.

Comments:

"Very, very great"

How have you or your economy benefited from the program? What new skills, knowledge, or value have you gained?

"Yes, now that more stakeholders know what is required from them to effectively implement CAAP PBN it's a step forward"

What needs to be done next? How should this program be built upon with future APEC activities?

"The program should be done at least twice a year"

"Assist CAAP so that flight inspectors become qualified"

"Continue to assist and monitor".

Please provide any additional comments on the APEC PBN Regulatory Review and Evaluation Program:

"All aspects of the subject were covered"

“The approach is good since problems/issues were tackled in detail, reviewing every process thereby eliminating challenges/hindrances to implementing PBN”

All respondendents said that they will share their experiences with your co-workers/management.

All respondendents indicated that discussions will prompt further action.

Please provide any additional information on your planned post-APEC PBN Regulatory Review and Evaluation Program actions.

“Monitoring the continuous progress for good implementation & safety is paramount.”

100% of respondents reported that they would attend future APEC Aviation Workshops.

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