



INTERNATIONAL CIVIL AVIATION ORGANIZATION

**SEVENTH MEETING OF THE PERFORMANCE BASED NAVIGATION
TASK FORCE (PBN/TF/7)**

Bangkok, Thailand, 1 – 3 September 2010

Agenda Item 2: Global PBN Implementation – Update

PBN UPDATE

(Presented by the Secretariat)

SUMMARY

The purpose of this Working Paper is to provide an update on PBN initiatives being worked or coordinated by the ICAO PBN Programme Office in Montreal.

Updates are provided on the Global PBN Task Force (GPBNTF), Panel and Study Group activity.

Reference:

This Working Paper relates to Strategic Objectives:

Strategic Objective A: *Safety*

Strategic Objective C: *Environmental Protection*

Strategic Objective D: *Efficiency*

1. INTRODUCTION

1.1 The purpose of this Working Paper is to provide an update on PBN initiatives being worked or coordinated by the ICAO PBN Programme Office in Montreal. This concerns the Global PBN Task Force, recent outcomes of Panels, Study groups and taskforces on work related to PBN and new manuals or changes that are published or about to be published.

2. DISCUSSION

2.1 Global PBN Task Force

2.1.1 At the invitation of ICAO and IATA, representatives of States, industry and international organizations have worked together as the Global PBN Task Force (GPBNTF). The objectives are to build upon the global and regional structures, which have already been put in place for PBN implementation, and to produce tools and enablers to facilitate and expedite the work. The TF is divided into Teams to work on specific plans and deliverables. Several activities are currently underway and this paper provides some insight into those activities.

2.1.2 **Promotion Team.** The Promotion Team has been producing and sending out the PBN Newsletter, *Waypoints* every quarter. Issues of *Waypoints* are available on the PBN web site at, <http://www2.icao.int/en/pbn/Pages/default.aspx>. Future newsletter will be distributed through the PBN website.

2.1.3 **Implementation Support Team (IST).** The IST produced a consolidated model action plan and several model action plans directed at the enroute, terminal, and approach phases of implementation. These model action plans are available on the PBN web site, <http://www2.icao.int/en/pbn/Pages/default.aspx>. The Implementation Support team is also in the process of developing guidance for States and/or training on the following topics.

2.1.3.1 **PBN Airspace design.** Four workshops are planned for 2010, the first two were held in Bangkok, Thailand and Santiago, Chile. The objective of these workshops is to familiarize participants with airspace design as it relates to implementation of Performance Based navigation. The remaining two will be held in Johannesburg, South Africa (6-10 September 2010) and Damascus, Syria (October 2010). The workshops have proven to be very successful and provide States a hands-on exercise in developing the airspace. An airspace design manual is currently being developed and finalized by the end of the year.

2.1.3.2 **GNSS manual.** The GNSS manual is currently being updated and aligned with PBN and will be ready by the end of the year.

2.1.3.3 **Operational Approval.** In a cooperative effort with ICAO COSCAP-SEA and the Australian CASA, an PBN OPS approval handbook has been developed. Based on this document, ICAO is developing guidance for global application. In the first week of August a meeting took place in where the next steps for this manual were discussed. The way forward is to expand the PBN manual with high level guidance on PBN ops approval and to develop detail guidance material that can also be used as technical reference material for course. A consultant has been hired by ICAO and material is expected to be finalized by the end of the year.

1. Update the PBN Manual (Doc 9613) to include additional text addressing Operations Approval Guidance. All changes should be kept at a high level consistent with the rest of the Manual. Scope of changes:

- a) Address mechanisms and processes and authorization vehicles for operational approval of PBN, similar to other approvals. The changes should provide guidance to States as to how to conduct a PBN ops approval.
 - Start from ANNEX 6 PBN provisions;
 - Consider existing guidance provided in Doc 8335;
 - Clarify that basis and process for approval is intended for Public Procedures i.e., Specials are outside of scope;
 - Identify and describe a basis for approval of PBN within a regulatory framework - refer to sample model regulations (COSCAP proposal) for those States without established regulatory frameworks;
 - Identify the applicable approval processes;
 - Identify required Inspector qualification and competence including inspector training syllabus and procedures;
 - Amend ANNEX 6 and PBN Manual;

- Include a sample listing of OPS SPECS for PBN – See ANNEX 6.
 - b) Provide additional clarification and guidance on operational aspects.
2. Additional guidance material to the PBN Manual for consideration by the PBNSG. This material might take the form of Regional guidance e.g., COSCAP handbook, South African Training Document but needs to be endorsed and coordinated by Montreal and made widely available to ensure harmonisation. The guidance material may take multiple and different forms e.g., web-based, list of FAQs, Handbooks.
3. Training Courses for PBN:
- a) Background to PBN as a foundation course covering aircraft, ops, airspace, ATS – as common across the various disciplines (e.g., see web based training packages);
 - b) Detailed courses for individuals and organizations with general qualifications in the associated discipline, plus prerequisite knowledge of PBN having completed a foundation level course.

2.1.3.4 **Continuous Descent Operations (CDO).** The manual on CDO has been completed as an advanced copy and is available on the ICAONET. One CDO workshop was held in coordination with the APAC FPP. Further workshops are suspended depending on resources.

2.1.3.5 **Continuous Climb Operations.** Any work on this element has been suspended, pending resources.

2.1.4 **Implementation Management (GO) Team.** The GO Team is undertaking implementation activities that would develop regional pockets of knowledge and expertise in various States, and could serve as an example of successful implementation to other States in the region. The Implementation Management Team carried out a GO Team visit to Thailand. After a pre-assessment of the PBN implementation gaps, a team formed by ICAO, IATA and industry partners carried out an on-site visit to Bangkok from 25 to 27 August 2010. The recommendation will result into an enhanced implementation plan and a detailed project plan in 6 months which will cover a three-year implementation path. Detailed information on this visit will be provided by Aerothai in a separate paper. The next Go Team visit is tentatively planned for November in the United Arab Emirates.

2.2 **Panels and Study Groups**

2.2.1 **Instrument Flight Procedures Panel (IFPP).** The next IFPP amendments to PANS OPS are approved by the ICAO Council and will be applicable in November 2010. A summary of these amendments follows.

2.2.1.1 **Helicopter flight procedures.** The amendment proposals regarding helicopter procedures provide for Point-in-Space (PinS) helicopter “Proceed visual flight rules (VFR)” and “Proceed Visually” approach procedures as well as heliport route departures with direct visual segments based on RNAV 1 and Basic-RNP 1 navigation specifications. The amendment proposals include pilot, procedure design and charting requirements and affect Annex 4 and PANS-OPS, Volumes I and II. As a result of preliminary review by the ANC this material was sent back to the Panel for some additional review. Consequently the helicopter portions of the PANS-OPS and Annex 4 amendments will not be applicable until November 2011.

2.2.1.2 **Quality assurance.** The amendment proposal to PANS-OPS, Volume II regarding quality assurance explains the instrument flight procedure process and documentation requirements in more detail. It also clarifies the provisions for qualifications of flight validation pilots by providing more defined minimum qualifications.

2.2.1.3 **Alignment of RNAV holding criteria with PBN.** The proposed amendment to PANS-OPS, Volume I pertains to RNAV holding requirements and is consequential to existing PANS-OPS, Volume II design criteria, and seeks alignment with the PBN concept. It furthermore removes some impracticable requirements, incorporated before the PBN concept materialized, that cannot be coded into the navigation database.

2.2.1.4 **Use of SBAS equipment for flying APV/Baro-VNAV procedures.** The amendment proposals to PANS-OPS, Volume I concerning the use of SBAS equipment to fly APV/Baro-VNAV procedures are consequential to existing PANS-OPS, Volume II design criteria. In addition, in the process of developing these proposals, a need was found for a correction to the PANS-OPS, Volume II criteria related to this subject.

2.2.1.5 **Aeronautical database and procedure design interface issues.** The amendment proposals relate to PANS-OPS, Volume II design criteria which include instructions to the procedure designer to allow for better interpretation of the design criteria by navigation database encoders. It affects both conventional criteria as well as RNAV criteria. These types of amendments are part of an ongoing review by the panel to ensure complete alignment of the criteria with the navigation database capabilities. To ensure close coordination with industry, and this topic in particular, ARINC has agreed to participate as a member of the IFPP.

2.2.1.6 **Flight validation.** The International Committee on Airspace Safety and Calibration (ICASC) developed initial drafts of a new volume or volumes to be incorporated in the Quality Assurance Manual for Flight Procedure Design, Doc 9906, with Flight Validation guidance and Flight Validation Pilot Training requirements. The IFPP reviewed this work at its March 2010 meeting. It was decided that further work is required and the manual is going to be reviewed at the IFPP/7 meeting.

2.2.1.7 **IFPP/6 and 7 meeting.** The sixth meeting of the IFPP was hosted by AEROTHAI 15-26 March 2010, in Bangkok, Thailand. The following meeting will be held in Montreal from 11 to 22 October 2010.

2.2.2 **Separation and Airspace Safety Panel (SASP).** The Separation and Airspace Safety Panel Working Group of the Whole finalized details of separation minima to be used between PBN-approved aircraft in terminal operations in PANS-ATM. These requirements have been approved by the ANC on 22 April 2010 and are going to be applicable 18 November 2010.

2.2.2.1 Currently the Panel is working on guidance that will allow controllers to separate a departure from a PBN arrival that does not make a straight in approach. The current guidance in 4444 only protects airspace 45 degrees either side of the final approach course. With PBN the final approach course may not be a straight in but an “S” shaped course. Consequently, the departing aircraft has to have different restrictions in order to be separated from that wandering course.

2.2.3 **Navigation Systems Panel (NSP).** The NSP has undertaken a review of the ICAO GNSS Manual (Doc 9849), with a view to developing an updated edition of the document. The updated edition is intended to take into account issues identified in the course of initial PBN implementation, and to provide additional focus on implementation guidance in support of PBN.

2.2.4 **Performance Based Navigation Study Group (PBN SG).** The PBN SG met March 29 to April 1 2010, and worked on the next phase of PBN. Decisions were made on the direction to take with respect to new navigation specifications. These additions will be included in the new edition of the PBN Manual which is expected to be available as an advanced edition by March 2011. Included in these additions were:

- Development of a navigation specification for SBAS and its inclusion in RNP APCH. These amendments were finalized in the last meeting and were made

available by means of a State Letter prior to publication of the new addition of the manual;

- Development of an RNP 2 nav spec for enroute continental application, including remote continental;
- Application of RF turns outside final approach in RNP APCH,
- Advanced RNP nav spec applicable for enroute, arrival, departure and approach. It is envisaged that this will be a “super navspec” and avoid the need for separate approvals for enroute, terminal and approach; and
- Development of an RNP 0.3 navigation specification. This navspec is specifically designed for helicopter operations but can also be applied by fixed wing ops.
- RNP AR APCH navspec will be extended by RNP AR departures. Also the SG is looking into AR operations with one engine inoperative.

The next meeting of the PBN SG is 11 to 15 October 2010.

2.2.5 **AIS/AIM Study Group.** The ANC approved an amendment to Annex 15 relating to Electronic Terrain and Obstacle Data (ETOD) on 28 January 2010. It was agreed that ETOD for Area 1 and 4 is required, ETOD for Area 2, with exceptions will be a recommended practice. Subcomponents of Area 2 will become a Standard, to be required where obstacles and/or terrain are a hazard for air navigation or penetrate specified identification surfaces.

2.3 **Flight Procedure Programme (FPP).**

2.3.1 Details on the FPP are discussed in a separate paper.

2.3.2 State letter for an African FPP is being formulated.

3. **ACTION BY THE MEETING**

3.1 The meeting is invited to review and consider the information in this WP as they develop plans for implementation of PBN in their State.

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