INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

REPORT OF THE EIGHTH MEETING OF THE
PERFORMANCE BASED NAVIGATION TASK FORCE (PBN/TF/8)

NEW DELHI, INDIA, 9 – 13 MAY 2011

The views expressed in this Report should be taken as those of the Meeting and not the Organization

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

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History of the Meeting

Report of the Meeting

Appendices

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1.1 Introduction

1.1.1 The Eighth Meeting of the Performance Based Navigation Task Force (PBN/TF/8) was held in conjunction with the PBN Workshop and the PBN Implementation Seminar 2011, which were graciously hosted by the Airports Authority of India (AAI), at the Ashok Hotel, New Delhi, India from 09 to 13 May 2011.

1.1.2 The PBN Workshop was conducted by Eurocontrol from 9 to 12 May 2011 in parallel with the PBN Implementation Seminar, which was held from 10 to 11 May 2011. The PBN/TF/8 itself was held from12 to 13 May 2011.

1.2 Officers, Secretariat and Participants

1.2.1 Mr. Len Wicks, Regional Officer ATM, acted as the Moderator for the meeting.

1.2.2 Mr. Noppadol Pringvanich, Acting Director, Procedure Design for Air Navigation Services Department, Aeronautical Radio of Thailand Limited (AEROTHAI) and PBN/TF Rapporteur served as Acting Chairman.

1.2.3 Sixty-three (63) participants from Australia, Bangladesh, Brunei Darussalam, Cambodia, Hong Kong China, Fiji, India, Indonesia, Malaysia, Maldives, Mongolia, Nepal, Papua New Guinea, Philippines, Republic of Korea, Sri Lanka, Thailand, United States, IATA, IFALPA, IFATCA and AIRBUS attended the meeting. A list of participants is in **Appendix A.**

1.3 Opening of the Meeting

1.3.1 Dr. S.N.A. Zaidi, Secretary of Civil Aviation, Government of India and Mr. V.P. Agrawal, Chairman of Airports Authority of India (AAI), presented key note addresses. Earlier, Mr. Somasundaram (Member ANS) extended a warm welcome to all participants of the PBN Seminar, Workshop and PBN/TF/8 meeting.

1.3.2 Mr. Len Wicks on behalf of Mr. Mokhtar A. Awan, Regional Director, ICAO Asia and Pacific Office thanked AAI for their warm and generous support in hosting this significant meeting, and welcomed all the delegates to the PBN/TF/8 meeting.

1.3.3 Mr. Noppadol Pringvanich, Acting Chairman of the PBN/TF, thanked the Government of India for hosting the meeting and warmly welcomed everyone to this event.

1.4 Documentation and Working Language

1.4.1 The meeting was conducted in English. All meeting documentation was in English.

1.4.2 Eleven (11) working papers, five (5) information papers and two (2) flimsies were presented to the meeting. A list of the papers is at **Appendix B**.

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Agenda Item 1: Adoption of Agenda

1.1 The meeting adopted the following agenda:

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Global PBN Implementation and PBN SG Update

Agenda Item 3: APAC Region PBN Plans and Implementation

Agenda Item 4: PBN Implementation Issues

Agenda Item 5: State/Industry Updates

Agenda Item 6: Review of APANPIRG Subgroups and PBN TF Role

Agenda Item 7: Review and Update PBN Task List

Agenda Item 8: Any Other Business

Agenda Item 9: Date and Venue of the Next Meeting

Agenda Item 2: Global PBN Implementation and PBN SG Update

2.1 The meeting discussed WP11, which provided an update on PBN initiatives by the ICAO PBN Programme Office in Montreal, including policy decisions, implementation support such as Go-teams, workshops courses, and recent outcomes of Panels, Study groups and taskforces.

2.2 Key global ICAO PBN initiatives and features included the following:

a) Measurement of the PBN implementation performance using an actual implementation database coordinated with Jeppesen, and an ATM Operational Improvement tool;

b) Measurement of actual PBN;

c) Adoption of Assembly Resolution 37-11;

d) Educational activities of the GO Teams, which have been to three States, including Thailand in the APAC Regions;

e) PBN Airspace design workshops (including Bangkok in 2010);

f) ICAO is developing Operational Approval guidance for global application, based to a large degree on the APAC Cooperative Development of Operational Safety and Continuing Airworthiness Programmes (COSCAP) Handbook in cooperation with the Civil Aviation Safety Authority of Australia (CASA);

g) Separation and Airspace Safety Panel (SASP) regarding:

i. variations allowed in true airspeed;
ii. ADS-B (Automatic Dependent Surveillance-Broadcast) and MLAT (Multilateration) 3 NM aircraft separations;
iii. applicability of the 2.5 NM radar separation to 20 NM;
iv. availability of GLS approaches;
v. Five Minute Arrival/Departure Procedure amendment;
vi. Advanced Strategic Offset Concept;
vii. 5 NM minima for terminal operations between B-RNP1 aircraft;

h) Instrument Flight Procedures Panel (IFPP) regarding PANS OPS amendments:

i. Definition of GLS (GBAS - Ground-based Augmentation System (Landing System);
ii. General cautions in conventional procedure design;
iii. Quality assurance;
iv. Alignment of RNAV holding criteria with PBN;
v. Use of SBAS equipment for flying APV/Baro-VNAV procedures;
vi. Continuous Descent Operations (CDO, Doc 9931);
vii. RF legs charting to achieve an unambiguous description both for the pilot and for the navigation;
viii. Identification of SBAS service provider;
ix. Definition of the term ‘course’;
x. Clarification on vertically guided approach requirements;
xi. Continuous Climb Operation (CCO Manual, Final draft Q3, 2012);
xii. Helicopter Manoeuvre Visual segment, LPV criteria, PBN Departure & En-route Criteria and PinS Departure procedures charting;

i) Navigation Systems Panel (NSP) regarding the GNSS Manual (Global Navigation Satellite Systems, ICAO Doc 9849);

j) Performance Based Navigation Study Group (PBN SG), regarding the:

i. RNP 2 navigation specification;
ii. Application of RF turns outside final approach for all RNP applications;
iii. ‘Advanced’ RNP navigation specification applicable for en-route, arrival, departure and approach;
iv. RNP 0.3 navigation specification; and
v. RNP AR departures.

2.3 The meeting discussed the implications of the new RNP 0.3 and ‘Advanced RNP’ Navigation Specifications. Participants were not clear on how these specifications would be applied, and in particular some delegates were not aware that the ‘Advanced RNP’ Specification was a means of bringing together appropriate specifications to account for all phases of flight. The RNP 0.3 navigation specification was explained as being designed for helicopter operations although its use by aeroplanes was not excluded.

2.4 Action Item 8/1: the Secretariat should request ICAO HQ to provide clarification on intent of the RNP 0.3 and 'Advanced RNP' Navigation Specifications by the next meeting.

Agenda Item 3: APAC Region PBN Plans and Implementation

APAC State PBN implementation (WP02)

3.1 This paper provided information on the progress of APAC State PBN implementation. Out of the 20 current PBN Plans, nine (9) had been assessed by the PBN Plan Review Team as robust, four (4) were rated as marginal and eight (8) were rated incomplete. This meant that less than one quarter of APAC administrations had adequate plans, when all States were expected to have appropriate PBN Plans in place by 2009. However, this number was expected to improve significantly after the current PBN Plan assessments (12) have been completed.

3.2 The meeting reviewed and made changes to the State Implementation Progress Report to clarify the data required, to incorporate the latest APANPIRG Conclusions and to capture en-route PBN information. The meeting noted that few States had submitted up-to-date information using the State Implementation Progress Report. The Chairman urged States to ensure they regularly submitted these reports so the Regional Office could regularly update the PBN implementation progress information presented to the Task Force.

3.3 The meeting discussed the matter of who would be monitoring the development of en-route PBN procedures and how this information would be captured. The meeting agreed to the amendment of the State Implementation Progress Report to include the RNAV10, RNAV5, RNAV2, RNP4 and RNP2 en-route navigation specifications, which would allow the Regional Office to track the development of PBN en-route procedures. The revised version (Flimsy 1) is attached at **Appendix C**. Meeting participants agreed to provide an update to the Regional Office every six months, prior to the Task Force meeting.

3.4 The meeting agreed that mechanisms such as the ICAO Asia/Pacific Flight Procedure Programme (FPP) and COSCAPs, and workshop/seminars held at locations that can benefit States which need direct assistance was of benefit and was to be encouraged. The meeting encouraged more advanced 'champion' States to provide direct assistance where this was possible.

3.5 Action Item 8/2: the Secretariat should issue a State Letter to inform States regarding the revised PBN Implementation Progress Report, and remind States to submit the progress report prior to each Task Force meeting.

Asia/Pacific Performance-Based Navigation Implementation Plan (WP03)

3.6 WP03 proposed amendments to the Asia/Pacific Performance-Based Navigation Implementation Plan. These changes were intended to ensure the Regional Plan continues to provide States with essential information for PBN implementation. The following amendments were agreed to by the meeting.

a) Add an Appendix to the Regional plan to include and describe the Basic Planning Elements[1] (BPEs) identified in the Regional plan review. This will help ensure States address all areas required to successfully implement PBN.

[1] Including a new element- 'Regulatory Framework and Processes for regulation of Operational Approval and ANSP Procedure Approvals'.

b) Include the area of Regulatory Framework and Process for regulation of Operational Approval and ANSPs as a Basic Planning Element.

c) Amend Appendix C of the Regional Plan to include guidance for States to consider using the COSCAP Ops Approval Handbook as a reference until ICAO guidance materials are released (probably the updated PBN Manual, Doc 9613).

d) Update Appendix D of the Regional Plan to include real examples of specific measurable benefits resulting from States PBN implementation (Australia, India, Maldives and Thailand volunteered to provide this information by 1 August 2011).

Regional Development and Implementation Initiatives (WP04)

3.7 This paper re-introduced the need for a Regional Support Strategy to provide direct support to States in an effort to accelerate PBN implementation within the Asia Pacific Region. ICAO FPP, COSCAP, and industry stakeholders such as Boeing, Airbus and IATA had already made a significant impact to the progress of PBN development. Due to this, IATA concluded that a formal PBN Regional Development and Implementation Team (REDI) under the APANPIRG Contributory Bodies Structure was not required.

3.8 IATA noted, however, that there is a need for formal recognition of PBN support initiatives in order to create broader momentum and to showcase regional progress. In addition, there was a need for the coordination of some of the State and Regional support activities. Therefore, it was proposed that PBN REDI initiatives be used as a term to associate Regional and State support efforts that include the contributions of ICAO supporting agencies, industry partners and volunteering States, particularly where multiple stakeholders are involved. Airbus noted that the coordinator of regional PBN activity should not be a commercial entity.

3.9 The meeting endorsed the term ‘PBN REDI Initiatives’ as a means to increase the momentum of implementation, help coordinate support efforts and to promote regional progress.

3.10 States that were further advanced in PBN implementation were encouraged to contribute to regional efforts to accelerate implementation. Australia and Thailand volunteered to assist as PBN ‘champion’ States in this regional effort.

3.11 Action Item 8/3: the Secretariat should review the PBN State Updates that had been presented and develop a document that identified areas of implementation where additional support and guidance is needed.

3.12 Action Item 8/4: the Secretariat should consider a mechanism that ensures a more cohesive and coordinated effort to respond to State requests for PBN assistance. The meeting noted that there may be a need to form a steering committee to direct resources and set priorities regarding PBN REDI initiatives. The Steering Committee may include representatives from ICAO and International Organizations.

Agenda Item 4: PBN Implementation Issues

APANPIRG Conclusions (WP05)

4.1 WP05 provided information on the status of APANPIRG Conclusions regarding the implementation of PBN within the APAC Regions and follow-up actions that had taken place. IATA noted that, with regard to Conclusion 21/30 (Limitation of Older Generation FMS), the problem appeared to be the inability to upgrade the capability of systems in a cost-effective manner.

RNP4 Surveys (WP06)

4.2 WP6 presented the results of the two Regional RNP4 Surveys. The Task Force noted from the Surveys that it was unlikely APAC State aircraft operators would achieve RNP4 approval by 2012 in accordance with Conclusion 19/17 (copied below).

4.3 Airbus stated there was no additional requirement in terms of equipment, so it was just a matter of the approval process. Australia noted that the refresh rate of the communications and surveillance elements of the 30 x 30 separation standard were the limiting factor, not the navigation specification. IATA noted that until there was a priority accorded to RNP4 aircraft or a mandate, then airlines would continue to resist the cost of RNP4 approval. India noted that they would like to utilise RNP4 to implement 30NM separation standards. The Maldives noted that the implementation of RNAV10 should be completed before RNP4.

4.4 IATA advised that the benefits of RNP4 were not seen as expected by Conclusion 19/17. IATA also stated that there may be a need to mandate RNP4 operations, rather than simply urge its implementation. The meeting noted the information in this paper and further encouraged States to present papers that would update the Regional Plan at the same time as the new navigation specifications become available.

APANPIRG Conclusion 19/7 RNP 4 capability for operators

That, recognizing the significant benefits expected from the implementation of 30 NM longitudinal separation based on RNP 4, operators of Pacific fleets be urged to equip with RNP 4 avionics for oceanic airspace operations and obtain approval from the States of Registry/Operators as early as possible, but no later than 2012.

Regional RAIM System (WP08)

4.5 Thailand presented information on the establishment of a Regional RAIM (Receiver Autonomous Integrity Monitoring) System. The paper noted that GNSS were considered a main navigation infrastructure supporting PBN operations, and were now also becoming a critical component of surveillance systems, such as ADS-B.

4.6 AEROTHAI had approved the initial investment for the establishment of the APAC Regional RAIM Prediction System to support ABAS (Aircraft-Based Augmentation System), not SBAS (Space-Based Augmentation System) and GBAS. Initial operation for the Bangkok FIR is expected to be near the end of 2011. The system would be capable of providing RAIM prediction services for all participating States within the Asia/Pacific Region within 2012. AEROTHAI estimated the level of financial contribution for each participating State to be a monthly fee of less than USD 1,500, with a one-time database set-up cost of less than USD 3,500 per State. India commented that some advanced States would have their own RAIM prediction services.

Integration of PBN Navigation Specifications (WP10)

4.7 Australia presented WP10, which discussed the problem of PBN navigation specifications not being vertically or horizontally integrated, and suggested a methodology to manage the inconsistency of navigation performance across the Region. Vertical integration would mean that a specification such as RNP1 would be certified to RNP2 standard. Horizontal integration would mean that RNP1 would be certified for RNAV1.

4.8 The paper noted that GNSS was required for RNP 4, RNP 0.3 en-route, RNP APCH and RNP AR APCH and DEP, and was acknowledged as the primary navigation system to support RNP2 and RNP1. In areas with poor DME density, GNSS was the only infrastructure available for RNP navigation specifications.

4.9 The paper proposed that APAC should adopt GNSS-enabled area navigation systems as the minimum requirement for all RNP navigation authorizations, in order to achieve technical, operational and regulatory interoperability. Furthermore, the same effect could be achieved globally should ICAO adopt GNSS-enabled area navigation systems as the minimum requirement for all RNP navigation authorizations, and would be a key enabler for Seamless ATM.

4.10 Hong Kong China asked whether the continued development of RNP2 would affect the requirement for GNSS. Australia stated that the draft navigation specification for RNP2 strongly suggested that GNSS would be required in this specification. IATA strongly supported the initiative as it would assist the implementation of Seamless ATM. The meeting agreed to the following Recommendation.

The CNS/MET SG should:

a) include within the *Strategy for the Provision of Navigation Services in the Asia/Pacific Region* the minimum requirement of GNSS-enabled area navigation systems for all RNP navigation authorizations; and

b) recommend that ICAO adopt, as a minimum requirement, GNSS-enabled area navigation systems for all RNP navigation specifications.

Integration of PBN Navigation Specifications (IP02)

4.11 The Acting Chairman presented IP2, which provided an update on the activities and progress of the FPP and COSCAPs for consideration by the meeting.

Agenda Item 5: State/Industry Updates

Japan - MTSAT Service Update (IP05)

5.1 An update on the status of MTSAT (Multifunctional Transport Satellite) services was provided by Japan in IP05. The MTSAT service commenced in 2007, and had 100% availability until an unplanned service interruption for 1 hour 46 min in November 2010. This interruption was due to a JCAB- Datalink Service Provider (DSP) line failure. MTSAT Operations foresaw the failure and intentionally halted transmission from the GES (Ground Earth Station), making an immediate handover to the Inmarsat service provider in order to resume discontinued aircraft communications.

5.2 The paper noted that the service area of MSAS (Multi-functional Satellite Augmentation System) was currently only within the Fukuoka FIR, although MTSAT coverage was over much of the APAC regions. The paper also noted that MSAS had been achieving very stable performance since its commissioning, with horizontal accuracy of less than 1.5 m in most parts of Japan except Naha in the Southwest.

5.3 The severe earthquake which hit north-eastern Japan on 11 March caused significant damage to the Hitachi-Ota ASC (Aeronautical Satellite Center), located in East Japan. The Operations Team managed to successfully switch all services from the damaged site to the alternate when the earthquake began without service interruption.

5.4 India enquired as to whether ICAO was encouraging a coordinated regional SBAS programme, as there may be benefits if Japan and India worked together.

5.5 Action Item 8/5: the Secretariat should coordinate to clarify to the PBN Task Force whether ICAO was encouraging a coordinated regional SBAS programme.

Sri Lanka

5.6 Sri Lanka updated the meeting on PBN implementation in the Colombo FIR. RNP10 routes across the Colombo FIR are being introduced, while 'short distance' RNAV5 routes will also be implemented. RNAV1 SIDs and STARs are being introduced for Colombo's International Airport (BIA) within the existing radar environment. In the medium term, RNP APCH procedures were being designed, and APV procedures would be introduced after an updated obstacle survey had been completed. There was a lack of experienced instrument procedure designers in Sri Lanka.

5.7 A PBN Roadmap has been submitted to the Regional Office and the PBN Committee formalised. PBN Plans had been prepared for major and secondary airports, and 13 domestic airports were to have PBN plans developed.

Thailand

5.8 An update on the progress of PBN implementation within Thailand was presented by the Acting Chairman (IP3). Key features included completion of Thailand PBN Implementation plan and the publications of RNP APCH procedures for Phuket, Hat Yai and Samui Airports and successful flight validation for RNP APCH procedures for Chiang Mai Airport.

Other States

5.9 State updates were also provided as part of the Seminar programme (Agenda Item 8).

Agenda Item 6: Review of APANPIRG Sub-Groups and PBN Task Force Role

ACBSRTF (IP04)

6.1 This paper provided information on the upcoming APANPIRG Contributory Bodies Structure Review Task Force (ACBSRTF), which may have implications for the future of the PBN TF.

Task Force Role

6.2 Australia introduced WP7, which discussed the future role of the PBN TF. The role, tasks and meeting frequencies and schedules had been reviewed by the Task Force and APANPIRG on a number of occasions since the Task Force was established. Various options have been considered that ranged between integration of the work program into existing APANIRG subgroups to the current twice yearly meeting, with one including a PBN Seminar.

6.3 It was noted that where possible, that a meeting with a seminar would be held outside the ICAO Regional Office to maximise the training benefits. The reviews recognised that other significant PBN activities were taking place globally and in the region and that the Task Force work program and meeting schedules should be integrated with these where possible.

6.4 The Maldives supported the continuation of the Task Force. India suggested alternately running a Workshop (which had been run very successfully over the past week in India), and a Seminar in conjunction with the Task Force. The Secretariat reminded the meeting that holding a Workshop alone was not viewed as sufficient justification for some delegates to travel to attend the Task Force.

6.5 Australia suggested running an Operational Approval course together in conjunction with the Task Force. The meeting agreed that, for the meantime, the current format of having a Task Force twice a year, which may be supported by a Seminar/Workshop, should be continued.

6.6 Nepal asked how long the Task Force would continue. The Acting Chairman advised that APANPIRG/21 had indicated that the Task Force should continue for three to five years.

6.7 IATA suggested that the Task Force should monitor progress and encourage State reporting of PBN implementations. The meeting agreed to include this role into the Task Force Terms of Reference (TORs). IATA, Australia, Fiji and Thailand volunteered to assist with drafting the revision of the TOR.

6.8 The Maldives suggested that the TF provide policy recommendations to the FPP and COSCAP.

6.9 Action Item 8/6: Before the next meeting, IATA, Australia, Fiji and Thailand should develop a draft amendment of the TORs, which includes monitoring, providing feedback and encouraging State PBN implementations. The amendment should also include coordinating with ICAO FPP and COSCAP in the training area.

6.10 One area in which there had been little progress was the introduction of RNP based air routes within the APAC region. The paper noted that regional implementation of ADS-C should be coupled with PBN based air route reviews using either RNAV10 or RNP4 or perhaps even the RNP2 standard that is being developed by the PBN Study Group. Such routes would provide significant capacity and efficiency gains to airlines.

6.11 While APANPIRG had a Route Review Task Force, its area of interest was very limited. The development of a revised PBN based air-route structure was not considered to be an appropriate task for the Regional PBNTF. It would be best achieved by the establishment of a full-time project group within the Regional Office with States providing the appropriately qualified staff. India also asked about the capability of Regional Office to support a full-time project team within the Regional Office.

6.12 Action Item 8/7: the Secretariat should consider the possibility of a full-time PBN project team supported by States, under the auspices of the Regional Office. The focus of the team would be technical policy advice on PBN oceanic and continental en-route implementations.

Agenda Item 7: Review and update PBN Task List

7.1 The meeting reviewed the Task List and agreed that the Task List, as amended shown as **Appendix D**, represented the current work programme of the Task Force.

7.2 Hong Kong China requested that the Secretariat coordinate with the FPP or COSCAP to provide future Seminars on CDO procedures (Doc 9931).

7.3 Hong Kong China also asked whether safety assessment for PBN implementation required specific processes that APAC States needed to be informed about. Australia noted that the PBN Manual states that safety assessment is expected to be conducted in accordance with the Safety Management Manual (Doc 9859).

7.4 Action Item 8/8: the Secretariat should coordinate with the FPP or COSCAP to provide future Seminars on CDO procedure implementation.

7.5 Action Item 8/9: the Secretariat should clarify with ICAO HQ what safety assessment processes are required for implementation of PBN and draft an update to the Regional PBN Plan with this information as appropriate.

Agenda Item 8: Any other business

Annex 11 Issue

8.1 The Task Force discussed Flimsy 2, which was presented by Nepal. Nepal recommended that the following paragraph in Annex 11 be amended to remove the prescriptive reference regarding self-contained airborne navigation aids, which precludes RNAV waypoints.

> *Annex 11, Appendix 2, paragraph 1.2*
> *Where such ground-based radio navigation aids do not exist, significant points shall be established at locations which can be determined by self-contained airborne navigation aids, or, where navigation by visual reference to the ground is to be effected, by visual observation.*

8.2 Nepal would write to the Regional Office to formally request a change to Annex 11, removing the words 'self-contained' in order to allow area navigation derived RNAV waypoints. Australia supported the Nepalese position that the Annex needed to be amended. The Task Force endorsed the need for this change and noted that this would bring the Annex into line with PBN Manual references (such as paragraph 2.2.1.2).

PBN Workshop (New Delhi, 9-12 May 2011)

8.3 The PBN Workshop was held at Hotel Ashok, New Delhi, India from 9-12 May 2011. The Workshop, which was intended for participants who had entry level of exposure to PBN, was attended by participants representing Bangladesh, Hong Kong China, India, Indonesia, Malaysia, Maldives, Nepal, Papua New Guinea, Philippines, Republic of Korea, Sri Lanka, Thailand and IATA.

8.4 The PBN Workshop was conducted with the kind support of EUROCONTROL, Belgium, by Mr. Henri Lissone (Mike) and Mr. Richard Eliot (Charlie).

8.5 The main objective of the workshop was to educate participants on how to develop a PBN airspace concept, supporting PBN Planning. The Workshop provided a broad background on PBN and focused on practical applications of PBN. India noted the Workshop had been highly successful, in providing a number of its attendees the opportunity to learn from the hands-on format of the Workshop.

PBN Implementation Seminar 2011 (New Delhi, 10-11 May 2011)

8.6 The PBN Implementation Seminar 2011 was held in parallel to the PBN Workshop at Hotel Ashok, New Delhi, India from 10-11 May 2011. The Seminar focused on the progress, barriers and innovations in PBN implementation.

8.7 The Seminar programme covered a wide range of subjects related to PBN. The speakers and subjects presented were as follows.

ICAO Global PBN Update – Mr. Erwin Lassooij, ICAO PBN Study Group Secretary − Global PBN Activities

The global update was presented by Mr. Len Wicks, Regional Officer, ATM, ICAO Asia and Pacific Office, on behalf of Mr Erwin Lasssooij, Technical Officer, ATM (Montreal).

Key aspects of the update included:

- Resolution A37-11 updating A36-23 in respect of the requirement to add LNAV minima to any approach chart for approach procedures with vertical guidance; and the allowance to publish LNAV only approaches if there is no traffic equipped for operations with vertical guidance;
- CDO manual (Doc 9931) and CCO material progress;
- Airspace design manual (based on Eurocontrol handbook/ICAO course material);
- Ops approval manual (based on COSCAP handbook, to be finished end of 2011;
- RNP 2 (Remote and oceanic) and RNP2 'light'; and
- 'Advanced' RNP and RNP 0.3 navigation specifications.

India discusses PBN and APV implementation including GAGAN project

This presentation was jointly made by Mr. Sundareshan, ED (CNS-P) AAI and Mr. N.V. Atale, Jt, General Manager (ATM) AAI-CHQ.

GAGAN (meaning 'The Sky') - GPS Aided GEO Augmented Navigation is planned to be operational in 2013. Initial flight test results indicate accuracy below 7.6m.

A New Multi layer Grid Based Model was being used to correct tropical ionospheric signal disturbances.

RNAV-1 SIDs and STARs had been implemented at New Delhi, Mumbai & Ahmadabad in 2008, Chennai in 2009, Hyderabad International in 2010, Kolkata and revised procedures for New Delhi in 2011. RNP-1 STARs and Baro-VNAV Approach procedures, RNP-1 SID & STARs and Baro-VNAV Approach procedures would be implemented in the near future.

APAC FPP Beijing update –Captain Dave Van Ness
This was presented by Mr. Noppadol Pringvanich, PBN/TF8 Acting Chairman.

There were 11 Active Participating States and 12 User Participating States in the FPP Programme. Phase 2 for the FPP will start Jan 1, 2013 and run until Dec 31, 2017. Training that can be completed included the following:

- PANS OPS Procedure Design Initial Course;
- PBN Procedure Design Course;
- Continuous Descent Operations (CDO) Workshop;
- PBN Airspace Design Instructor Workshop;
- PBN Procedure Designer On-the-Job Training (OJT); and
- RNP AR PD Course.

Future training that was expected included the following:

- In-State PBN Airspace Concept Workshops
- PBN Implementation Workshops (w/COSCAPs);
- Procedure Design OJT;
- Advanced Training Courses, e.g.;
- RNP AR procedure design;
- PBN/PANS OPS Recurrent/Refresher Training;
- GeoTITAN procedure design tool training; and
- Procedure design & Quality Assurance Support.

The presentation also provided information on the progress of COSCAP training in the following areas:

- PBN Operational Approval training programmes; and
- PBN Implementation Workshops.

Performance-Based Navigation: Area Navigation (RNAV) and Required Navigation Performance (RNP) Program
This was presented by Mr. Joe McCarthy, Federal Aviation Administration (FAA).

Key focal areas of this presentation included:

- Integrated Procedures Development/Airspace Optimization;
- Efficient SIDs (de-conflicting flights) and STAR (using OPD and merging with RNP ARs) implementation and T Routes for General Aviation;
- Process Improvements,
- Supporting Tools like Integrated Noise Modeling (INM);
- NAV Lean Project 2010 and International Harmonization;
- Airport Site Package Content -
    i. Airport Operational Overview;
    ii. PBN Capability;
    iii. Arrival Flow Analysis;
    iv. Departure Flow Analysis;
    v. Adjacent Airport Interaction (de-confliction); and
    vi. Metrics – fuel, time, delay, distance.

PBN Implementation Barriers and Solutions for Small States
Presented by Mr. Ilaitia Tabakaucoro, Fiji and Mr. James Tuguru, Papua New Guinea.

Fiji advised that their Regulatory PBN Ops Approval training had been completed (by CASA), and the Fiji PBN Team had been established in 2010. Five of the eight International instrument runways listed in Fiji were already served with Approach Vertical Guidance (APV) capability. The challenge was the remaining instrument runway and the two non-instrument runways to be served with APV by 2016.

Fiji listed the following as barriers to effective PBN implementation:

- Insufficient PBN Knowledge:
    i. PBN remains a foreign topic and encounter opposition or diversions;
    ii. Noncommittal stance by key stakeholders;
    iii. Confusion in navigation aid and airspace planning, Operations Approval process, Goal setting;
- Funding - PBN Team
    i. Scarce funding for Regulator/ANSP/Airline to attend forums;
    ii. Regulatory Operations Approval and RNP AR Training;
- Mixed Fleet Equipage
    i. Legacy aircraft equipage without any plans for upgrades until after 2013;
    ii. Domestic re-fleeting without considering PBN initiatives;
- Maps and Charts Updates
    i. Lack of local charting equipment and PBN expertise to update AIP;
- Government Policy Conflicts
    i. Influence and divergence of funding at federal level; and
    ii. Opponents to Safety Assessments.

Papua New Guinea advised the following key PBN milestones:

- RNP 10 (RNAV 10) and RNP 4 in Oceanic Airspace;
- 22 National Airports with GPS NPA;
- RNAV (GNSS) SID/STAR at selected regional aerodromes;
- 45% Aircraft with PBN (BRANV 1) capability as of 1 January 2010; and
- Establishment of local PBN Task Force in 2010.

Papua New Guinea also noted the following PBN implementation barriers:

- Indifferent management will and commitment;
- Leadership unclear – due structural reforms;
- Contact Point for ICAO Not Identified due Bureaucratic Channels
- Insufficient flow-on Information from ICAO;
- Lack of Awareness/Knowledge;
- ICAO Model PBN Plan resources unclear; and
- Lack of Expertise to develop Regulations.

8.8 From the Fiji and Papua New Guinea presentations, it was clear that there was a need for the development of high-level educational material for political leaders and senior decision-makers regarding PBN merits, so individuals did not have to make a case for PBN resources and commitment.

The IATA PBN Experience

Mr. Anthony Houston of IATA, Singapore presented the following key aspects:

- States must recognizing the benefits in order for decision makers to invest;
- Stakeholder buy-in must be at the working level (working groups);
- Coordination and collaboration between Stakeholders is required;
- Cost-Benefit Analysis can be important;
- States need to understand internal limitations and be willing to accept assistance;
- There was a need to transition from planning to implementation (GO Teams, etc);
- APAC stands at risk of not meeting ICAO implementation targets;
- Prompt action is required to accelerate the pace of implementation; and
- A comprehensive Regional Support Strategy was required (REDI Initiatives).

Moreover, IATA noted the following 'Lessons Learnt':

- Airworthiness certification & Ops Approval process considered a weak link;
    i. Limited understanding of the requirements
    ii. Lack of a useful approvals process;
- Common regulator responses to PBN approvals
    i. Lack of oversight – "Rubber Stamp";
    ii. Unreasonable oversight – require more than the minimum; and
    iii. Impeding oversight – refuse approval due to lack of confidence.

Enhancing Airspace Safety and Capacity using PBN
Presented by Mr. Noppadol Pringvanich, Aerothai.

- National Working Group on PBN & GNSS Implementation since May 2007;
- RNP10, RNAV5 international en-route procedures were being developed; and
- Terminal efficiency project for Suvarnabhumi and Don Mueang Airports – assessment methodology described and options (Open-STAR and Point Merge) discussed, with EUROCONTROL Point Merge being preferred for greater capacity, less delay, and lower environmental impact.

Implementation of Terminal Area RNP – ITAR Project
Presented by Mr. Phil Owen, Airservices Australia.

- RNP AR procedures developed for major aerodromes since 2006;
- Brisbane AR trial (from 2007) data and monitoring to support regulatory change;
- RNP-AR Program (ITAR) from 2010 at 7 Airports – Multi Variant Designs (MVD) will replace trial procedures at these airports over the next 18 months;
- MVD are divided into four groups:
  i. MVDR - for regional
  ii. MVDN - for narrow body (jet)
  iii. MVD2 - for wide body twin engine
  iv. MVD4 - for wide body four engine aircraft;
- Forecast benefits were easier integration, surety of arrival significantly improved and savings over 1 year - ~ 200,000 approaches, 24.5 million Kg of fuel, 73.5 million Kg of CO2, A$26 million.

PBN Implementation in Hong Kong, China
Presented by Mr. Gabriel Cheng.

- PBN Planning & Implementation Team (PIT) established since November 2007;
- Implemented RNP AR APCH to 2 RWY ends on 3 June 2010 and will implement the RNP AR APCH to the other 2 RWY ends in 2012;
- Implemented RNP 1 SIDs in 2005 and will implement RNP 1 STARs in 2013 (will issue notification to airlines in 2011);
- RNP 10 air routes implemented and plans to implement RNP 4 air routes in 2014 (will issue mandate requirements to airlines in 2011);
- RNP AR approval requirements pose a significant cost to the industry;
- States were urged to give detailed considerations to the operational need, safety and efficiency cost benefits prior to deciding on RNP AR Approach implementation;
- Safety assessment process was unclear;
- Concurrently developing more RNP APCH procedures with a view to improving the overall operational efficiency;
- In support of the establishment of the APAC PBN FPP Office in Beijing, Hong Kong has participated as Active Participating States, and posted 2 procedures designers to the ICAO FPP Office in Beijing to assist in procedure design training; and
- Hong Kong PBN website www.pbninfo.gov.hk developed.

Application of the terminal PBN separation standard
This presentation was made by Mr. Len Wicks, Regional Officer, ATM, ICAO Asia and Pacific Office.

PANS ATM Amendment 3, 18 November 2010 were able to be implemented by States either using a 7NM spacing or if protected areas of tracks designed using obstacle clearance criteria do not overlap. Key issues from this presentation were:

- The quantitative standard was created using extremely conservative assumptions and modelling;
- 40 years ago, the ILS protection surfaces were created by analysis of empirical data from thousands of tracked flights.
- Today, we use RNAV or RNP protected airspace based to a large degree on an allowance of pilot/aircraft track-keeping performance in given situations (TSE), and the navigation specifications take into account the lowest common denominator such as VOR/DME sensing;
- In order to reap the full benefits of PBN States must understand the ultra conservative nature of the assumptions behind PBN so they can vary the PBN-based separation standard; and
- Modification of standards by States requires appropriate expert skill and data, using the Circular 324 tables or independent safety assessment.

GE Aviation – the Role of Commercial Organisations in developing State PBN Capability
Mr. Juergen Ruppert, PBN Director Australasia presented a view of PBN implementation from a commercial organization's perspective.

- For every nautical mile saved using RNP procedures, a typical 737 operator saves 25 lb of fuel and 80 lb of CO2;
- 4D Flight Management Integrated with ATM features:
    i. Continuous Descent Arrivals - reduce noise, fuel consumption and emissions;
    ii. 4D Trajectory Reporting - providing the user-preferred trajectory to ATM;
    iii. Precise Arrival Time Control - 5 second time control to any point in the flight;
    iv. Required Navigation Performance - precise lateral and vertical path definition and control reducing distance flown and providing increased predictability to ATM; and
- Commercial organizations can assist with the project management of PBN assessment, development and maintenance.

RNP Regional Interoperability
Presented by Mr. Dirk Noordewier, CASA.

- PBN is the global harmonisation of IFR navigation specifications, which vary as a function of the aircraft and ATM area navigation capability. However, in creating a one dimensional taxonomy "RNP value" that includes multiple sensors, this means a:
    i. non-hierarchal relationship between navigation specifications; and
    ii. change in RNP value requires a new navigation specification.

- No common area navigation system results in uncertainty of performance:
  i. inconsistent performance;
  ii. unpredictable performance;
- These limitations result in:
  i. lack of technical, operational and regulatory interoperability;
  ii. inability to apply systems-based ATM regionally and globally; and
  iii. complexity and difficulty in comprehending, educating and implementing PBN concepts; and
- APAC, as a region, should consider moving to a hierarchical based, GNSS enabled RNP framework in order to create a hierarchy supporting consistent and predictable performance.

State PBN Updates

Cambodia

8.9 The State Secretariat of Civil Aviation (SSCA), Cambodia has set up a working team for studying, planning and implementing PBN. After adopting the Indochina CNS/ATM master plan in 14 December 2010, the implementation plan has commenced as a project assisted by Japan. Cambodia continued to work with other neighbouring States to improve skills in the PBN field. Cambodia will support a new Flight Procedure Design Office in Hanoi, Viet Nam.

Indonesia

8.10 Indonesia was working on Part 91 regulations to support PBN. There was cooperation with Jespersen in the aeronautical data management field. ATC PBN training was on-going. RNP2 and 4 routes were to be implemented domestically in 2012, with safety assessment of matters such as communications compatibility being considered.

Republic of Korea

8.11 An updated PBN Plan had been submitted to the Regional Office. A PBN project for Incheon and Kimpo Airports was underway, and also for en-route between Japan and Korea.

Malaysia

8.12 PBN implementation at Kuala Lumpur International Airport was being held up by the third runway project but PBN planning discussions continued.

Maldives

8.13 The Maldives plan to implement RNAV 10 in the en-route sector was in progress, supporting a concept that allows aircraft to proceed directly from designated FIR entry points to exit points. RNAV 1 implementation with surveillance provided by radar in the Male TMA (Terminal Control Area) had been implemented, and RNP APCH – LNAV/VNAV for all international runways, either as a primary or back up approach.

Nepal

8.14 Nepal had reviewed comments made by the Assessment Team on Nepal's PBN Plan. Nepal was working with COSCAP, FPP, and Quovadis to implement Kathmandu RNP AR procedures.

Philippines

8.15 The Philippines were studying other State PBN implementations, and had completed the APV procedures such as Baro-VNAV, and RNAV SID/STARs procedures for Manila International Airport. The regulator had signed a cooperation agreement with France to assist the Philippines in developing PBN procedures for 11 airports.

8.16 A PBN Task Force had been established, and procedure design software was being purchased for use. Flight validation is becoming a cost issue with 24 airports to be checked (AEROTHAI would provide flight validation services for the procedures that had already been developed). The Philippines were having trouble with the mixed environment of PBN and non-PBN aircraft, although 90% of aircraft operators were happy, but general aviation (GA) was not happy, feeling that they were excluded.

8.17 Seminar delegates were highly appreciative of the quality and depth of the material presented by the speakers. IATA commented that the State updates demonstrated measurable progress in APAC PBN implementation.

Agenda Item 9: Date and venue for the next meeting

9.1 It was proposed that the next meeting will be from 17 to 20 October 2011 at a venue to be advised. States were invited to consider hosting the meeting and to advise the Regional Office accordingly.

Closing of the Meeting

9.2 The Acting Chairman thanked the meeting participants for their contributions and wished everyone a safe journey home.

9.3 Secretariat took the opportunity to once again extend his appreciation to participants for the work undertaken and was looking forward to seeing continued progress at the next Task Force meeting.

9.4 In closing the meeting, Mr. Atale thanked the delegates for the work undertaken and wished everyone a safe journey home.

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LIST OF WORKING PAPERS (WPs) AND INFORMATION PAPERS (IPs)

WORKING PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
WP/1	1	Provisional Agenda	Secretariat
WP/2	3	State PBN Implementation Progress	Secretariat
WP/3	3	Proposed Amendments to the Asia/Pacific Regional PBN Implementation Plan	IATA
WP/4	4	PBN Regional Development and Implementation (REDI) Initiatives	IATA
WP/5	4	Status of APANPIRG Conclusions	Secretariat
WP/6	4	RNP4 Survey	Secretariat
WP/7	6	Future of the PBN TF	Australia
WP/8	4	Progress on the Establishment of APAC Regional RAIM Prediction System	Thailand
WP/9	7	Review of PBN TF Task List	Secretariat
WP/10	4	RNP Regional Interoperability	Australia
WP/11	2	PBN Update	Secretariat

INFORMATION PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
IP/1	-	List of Working Papers (WPs) and Information Papers (IPs)	Secretariat
IP/2	4	FPP/COSCAP PBN Update	FPP/COSCAPs
IP/3	5	Thailand PBN Implementation Update	Thailand
IP/4	6	APANPIRG Contributory Bodies Structure Review Task Force	Secretariat
IP/5	5	The Current Status of the MTSAT Services	Japan

FLIMSY

NUMBER	AGENDA	TITLE	PRESENTED BY
1	3	PBN Implementation Progress Report Template	Secretariat
2	8	Annex 11, Appendix 2, para 1.2	Nepal

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PBN IMPLEMENTATION PROGRESS REPORT

State: (Name of State) Date: (DD/MM/YY)

Designation of PBN Focal Point

Reference: APANPIRG Conclusion 18/55 –Designation of Contact Person for PBN Implementation
"That, by31 December 2007, States designate a focal contact person responsible for performance based navigation implementation and provide details of the contact person to ICAO Asia/Pacific Regional Office accordingly."

Status: (Nominated/ To be Nominated)

Focal Point: (Name, Designation, Mailing Address, Email, Phone, Fax)

State PBN Implementation Plan

Reference: APANPIRG Conclusion 21/32 – Development of State PBN Implementation Plan
"That, the States, which have not developed their State PBN Implementation Plans so far, be urged to develop the plan in accordance with the Asia/Pacific Regional PBN Implementation Plan at the earliest and advise the Regional Office of the impediments they are facing in the implementation of PBN."

Status: (Adopted / To be adopted) by (name of a national body) and (Reviewed / To be reviewed) by ICAO APAC PBN TF

Note(s): (States may include information on publication date and location for State PBN Implementation Plan and other relevant information.)

Approach Operations

Reference: ICAO 37th General Assembly Resolution A37/11 which supersedes Resolution A36-23

"…a) States complete a PBN implementation plan as a matter of urgency to achieve:…

2) implementation of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS), including LNAV only minima, for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 per cent by 2010, 70 per cent by 2014; and

3) implementation of straight-in LNAV only procedures, as an exception to 2) above, for instrument runways at aerodromes where there is no local altimeter setting available and where there are no aircraft suitably equipped for APV operations with a maximum certificated take-off mass of 5 700 kg or more;"

Status:

Implementation Targets (# of RWY Ends)			**Completed** (# of RWY Ends)		**In Progress** (# of RWY Ends)	
Y2010	Y2014	Y2016	LNAV	LNAV/VNAV	LNAV	LNAV/VNAV

Note(s): (States may include information on recent publications of new PBN approach procedures.)

Arrival and Departure Operations

Reference: 1) ICAO 37th General Assembly Resolution A37/11 which supersedes Resolution A36-23

"…a) States complete a PBN implementation plan as a matter of urgency to achieve:…

1) implementation of RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones;" and

2) Asia/Pacific PBN Regional Implementation Plan v 2.0

"Short-term Implementation Targets: RNAV 1 SID/STAR for 50% of international airports by 2010 and 75% by 2012 and priority should be given to airports with RNP Approach."

"Medium-term Implementation Targets: RNAV 1 or RNP 1 SID/STAR for 100% of international airports by 2016. RNAV 1 or RNP 1 SID/STAR for 70% of busy domestic airports where there are operational benefits."

Implementation Targets (# of Int'l Airports)			**Completed** (# of Int'l Airports)		**In Progress** (# of Int'l Airports)	
Y2010	Y2014	Y2016	Arrival	Departure	Arrival	Departure

Note(s): (States may include information on recent publications with new PBN arrival/departure procedures.)

En-route Operations

Reference: Asia/Pacific PBN Regional Implementation Plan v 2.0

"Short-term Implementation Targets: Re-defining existing RNAV/RNP routes into PBN navigation specification by 2012, Implementation of additional RNAV/RNP routes."

"Medium-term Implementation Targets: Implementation of additional RNAV/RNP routes"

Navigation Specification	**Completed (# of routes)**	**In Progress (# of routes)**
RNAV 10		
RNAV 5		
RNAV 2		
RNP 4		
RNP 2		

Note(s): (States may include information on recent publications with new PBN routes.)

Continuous Descent Operations

Reference: APAC PBN Task Force Action Item 6/1

"States are encouraged to consider implementing CDO in accordance with ICAO CDO Manual Doc 9331 on as many STARs as practicable to enhance fuel efficiency, ease pilot and ATC workloads, and reduce emission and noise."

Note(s): (States may include information on recent publications with new STARs with CDO.)

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TASKS LIST – PBN Task Force

No.	Tasks/Strategy	Category	Status
C4/1	The APAC PBN TF encourages States to consider the GO Team visit.	Implementation	**Closed.** States are encouraged to consider the GO Team visit as required.
C4/2	The APAC PBN TF requests the Global PBN Task Force to consider providing assistance to States which currently are at the early stage of PBN implementation.	-	**Closed.**
C4/3	The APAC PBN TF agrees to provide progress report of PBN implementation in the Asia-Pacific to the Global PBN Task Force	-	**Closed.** The PBN TF has provided progress report to the Global PBN Task Force.
C4/4	The APAC PBN Task Force requested that the Interim Edition (V '0.2') of the Regional PBN Implementation Plan be presented at theATM/AIS/SAR/SG/19 Meeting (June 22-26, 2009) for review as required by APANPIRG/19.	-	**Closed.**
C4/5	The APAC PBN TF agrees to continue an annual review of the Asia-Pacific Regional PBN Implementation Plan	Reporting	**Open.** TF/8 agrees on reviewing the regional plan based on new nav. Specifications becoming available and new appendices being developed.
A4/6	Develop an up-to-date archive of all relevant guidance materials for each PBN implementation step as outlined in the PBN manual	-	**Closed.** Information on relevant guidance materials is currently available and can be downloaded from ICAO PBN web site. (http://www.icao.int/pbn) The Secretariat also provides a comprehensive CD containing important PBN guidance and resource materials.

No.	Tasks/Strategy	Category	Status
A4/7	Arrange future annual PBN implementation seminars to serve as a forum for exchanging expertise and implementation experiences and invite interested States who would like to host future seminar to make a formal proposal at the next PBN TF meeting and to invite industry representatives to attend the seminar	Education	**Closed.** The PBN TF/5 accepted Hong Kong's offer to host the second PBN Seminar, planned for Feb 2010, subjected to APANPIRG approval. Vietnam and Thailand also offer to host future PBN seminars. TF/8 agrees to include this action into the TORs.
C4/8	In respect to the request by COSCAPs regarding the development of guidance material for APV, the APAC PBN TF recognized the work currently being conducted by the Global PBN TF to develop and review materials on the issues of APV and Non-Precision Approach as related to PBN	-	**Closed.**
C4/9	The ICAO APAC PBN TF recommends that the PBNSG continue to review and revise the PBN Manual to achieve a more hierarchical and easily used structure to minimize the number and complexity of the airworthiness approvals required for PBN operations. The GPBNTF is considered to be an organization well placed to advise ICAO Regions on harmonization and the development of common standards	-	**Closed.** PBNSG noted the request from the APAC PBN TF. Materials and suggestions on structure of the PBN manual have been forwarded to PBN SG. Updated version of the PBN manual would be available in the second quarter of 2010.
C4/10	The APAC PBN TF agrees to continue coordination with other regional PBN task forces and the Global PBN Task Force to ensure harmonization of PBN implementation	Planning	**Closed.** Report on Global PBN Task Force activities are presented and noted by PBN TF/5.
A4/11	States are requested to provide progress report regarding PBN implementation at each Task Force meeting	-	**Closed.** Transferred to Action Item 5/08

No.	Tasks/Strategy	Category	Status
A4/12	Mandate States to present their PBN Implementation Plan and to provide progress reports on the development of the State Plan at the next PBN TF meeting	Planning	**Closed.** States are requested to provide report on the developments of State PBN Implementation Plans. Superseded by APANPIRG conclusion.
A4/13	Request the Task Force Chairperson and Rapporteurs to develop a common template for State PBN Implementation Progress Report to be reviewed by the next PBN TF meeting	-	**Closed**. The TF/5 agreed on the report template.
C4/14	The APAC PBN TF agreed to develop a regional PBN progress report to be reported annually to CNS/MET and APANPIRG and to be posted on ICAO APAC and ICAO Global PBN web site	Reporting	**Closed.** ICAO Secretariat will provide report at each of the TF meeting.
A4/15	Request ICAO Headquarter to provide a presentation on the requirement for safety assessment for PBN implementation and overview of how to conduct proper safety assessment at future PBN TF meetings	Education	**Open**. The TF referred to the PBN SG for the development of safety assessment criteria.
C4/16	The APAC PBN Task Force considers itself a suitable forum to facilitate and harmonize terminal and en-route PBN implementation in the Asia Pacific Region. Therefore, the Task Force requests APANPIRG to consider adding the following task into the Task Force's TOR. "*Facilitate and coordinate the harmonized implementation of PBN for terminal and en-route applications in the Asia Pacific Region*"	-	**Closed.** APANPIRG/20 has a decision to establish a Route Review Task Force.
A4/17	Recognizing that the PBN planning activities for the Asia-Pacific are nearing completion and acknowledging the Task Force's willingness to support actual PBN implementation, the APAC PBN Task Force request working papers regarding revision of the Task Force's work structure to be submitted for consideration at PBN TF/5. Members of the PBN TF are encouraged to coordinate intersessionally to prepare the working papers.	Implementation	**Closed.**
A4/18	Request ICAO to provide status report of the work by PBNSG, SASP and IFPP	-	**Closed.**

No.	Tasks/Strategy	Category	Status
C5/01	Confirmed the likely inability of many APAC states to meet the APV implementation goals of Assembly Resolution A 36-23 within the required timeframe. The PBN/TF/5 meeting requested that, APANPIRG while taking note of the limitation of many of the APAC States, consider conveying the same to ICAO with the recommendation that the Resolution be reviewed.	Planning	**Closed.** Noting Assembly Resolution A37-11 superseded A36-23.
C5/02	As the authorized GNSS Service Areas, in which SBAS based APVs may be implemented are very limited in coverage, the PBN/TF/5 meeting requests that APANPIRG consider the feasibility of establishing a regional SBAS capability to support all aircraft types.	-	**Closed.** CNS/MET will consider the feasibility of establishing a regional SBAS capability.
C5/03	That, the concern raised by the US GAO report was noted; and this concern be forwarded to APANPIRG and ICAO HQs.	-	**Closed**. US Government has guaranteed availability of minimum GPS constellation in writing to ICAO HQ.
C5/04	The PBN/TF/5 meeting recommends that the PBN Study Group review the current PBN GNSS reporting and prediction requirements with a view to establishing common implementation rules and technical standards for such requirements.	Implementation	**Open.** APANPIRG Conclusion 20/37invites ICAO to develop the guidance materials. ICAO NSP is now developing a revision of GNSS manual.
C5/05	That, APANPIRG consider tasking the PBN TF with examining the feasibility of establishing a regional RAIM prediction system.	-	**Closed.** APANPIRG Conclusion 20/38 tasks the PBN TF with examining the feasibility of establishing a regional RAIM prediction system.
C5/06	That, the PBNSG consider the proposal to develop Guidance Material that provides a means to assign PBN capability to GPS IFR aircraft in the first instance without the need for recertification.	Education	**Open.** APANPIRG Conclusion 20/37invites ICAO to develop the guidance materials. At the TF/8, Progress is being done at PBNSG.

No.	Tasks/Strategy	Category	Status
C5/07	That, States distribute the RNAV safety message and emphasize on all operators involved in RNAV to apply the lessons learnt on Human Factor issues, as discussed in the paper presented by New Zealand on RNAV Human Factors and System Safety.	-	**Closed.** APANPIRG Conclusion20/39 distributes the Report to the States for further distribution to all operators.
C5/08	That, States / Administrations be requested to use the PBN Implementation Progress Report Template for all future reporting on their status of PBN implementation. The Report should be submitted at each of the future PBN Task Force Meeting.	Reporting	**Closed.**
C5/09	That, States / Administrations be requested to submit their PBN Implementation Progress Report by 15 August 2009 for onward submission to APANPIRG/20 Meeting scheduled to be held from 7 – 11 September 2009.	-	**Closed.**
C5/10	That, the APAC Regional PBN Implementation Plan (Interim Edition Version 0.3) be presented at the APANPIRG/20 for approval.	-	**Closed.** APANPIRG Conclusion 20/41 adopted the APAC Regional PBN Implementation Plan (Interim Edition Version 0.3) as Version 1.0
C5/11	That, APANPIRG consider in conjunction with the proposal to establish a SEA RR/TF, acquiring the necessary resources to establish a Regional PBN Office or a dedicated Project to design PBN based regional air routes and facilitate their adoption by the States in the APAC region.	-	**Closed.**
C5/12	That, the PBNSG be requested to provide guidance on any PBN-specific aspects of en route safety assessment.	Education	**Open.**
C5/13	That, presentation(s) on Safety Assessment be included in the Agenda for the PBN Implementation Seminar to be held in Hong Kong in February 2010.	-	**Closed.**
C5/14	That, ICAO kindly assist with addressing the PBN safety assessment training needs in the region.	Education	**Open.** ICAO HQ is monitoring FPP plan to provide safety assessment training.

No.	Tasks/Strategy	Category	Status
C5/15	Urged States to give detailed considerations to the operational need, safety and cost benefits prior to deciding on RNP AR Approach implementation.	-	**Closed.**
C5/16	That, APANPIRG agree to the PBN Task Force activities continuing for two additional meetings in the first half of 2010 using the Task Force's current TORs.	-	**Closed.**
C5/17	That, ICAO be requested to consider providing an annual summary of panel and working group activities to allow proper coordination amongst different groups (PBN/TF/4 Action Item 4/18)	Reporting	**Closed.** ICAO will provide regular activity update for each TF meeting.
A6/1	States are encouraged to consider implementing CDO in accordance with ICAO CDO Manual Doc 9331 on as many STARs as practicable to enhance fuel efficiency, ease pilot and ATC workloads, and reduce emission and noise.	Implementation	**Closed.** State letter has been issued.
A6/2	States are encouraged to attend to ICAO PBN Airspace Design Workshop in 19-22 April 2010 to enhance their expertise with airspace design relating to implementation of PBN	Education	**Closed.**
A6/3	States are encouraged to attend CDO workshop to be hold in Bangkok on the week of March 15 in conjunction with IFPP meeting.	Education	**Closed.**
A6/4	IATA is requested to provide the progress on the development of global database for PBN approval at the PBN TF/7 Meeting.	Implementation	**Open.** At TF/8, IATA reports that the test database to become available August 2012.
A6/5	States are requested to list the challenges and impediments for PBN implementations to be reported at the PBN TF/7 Meeting.	Implementation	**Closed.**
A6/6	A harmonization analysis report on State PBN Implementation Plans to be developed by IATA and volunteering States (Australia, Hong Kong, New Zealand and Thailand) and reported to the PBN TF/7 Meeting.	Planning	**Closed.**

No.	Tasks/Strategy	Category	Status
A6/7	States are requested to review the draft PBN Operational Approval Handbook and provide feedback at future PBN TF meetings. States are also invited to contribute relevant material to be integrated into the Handbook.	Implementation	**Closed.**
A6/8	States are encouraged to participate in the PBN Operational Approval Training to be conducted under the auspices of COSCAPs in Singapore on during 26-30 April 2010. Invitation will be issued to select States by COSCAPs.	Education	**Closed.**
A6/9	ICAO Regional Office to inform IFPP, PBNSG and APANPIRG limitation of older FMS in inputting procedure identification within 6-digit alphanumeric. This limitation occurs when pilots attempt to select specific approach for an airport that has multiple runways and each of runways has multiple approach procedures of the same type of navigation system. ICAO is requested to provide guidance and standardized solution to the issue.	Implementation	**Closed.**
DC6/10	The proposed revision to the APAC Regional PBN Implementation Plan as shown in Appendix 'F' of the PBN TF/6 Meeting report be adopted.	Planning	**Closed.**
DC6/11	ICAO provides guidance on aircraft that do not have a lateral and vertical readout on the navigation display, but do display the lateral and vertical profile on the navigation equipment, could be considered as alternate means of compliance if supplemented by appropriate flight crew training for RNP value of 0.3 RNP or greater.	Implementation	**Open.**
DC6/12	Request CNS/MET SG, ATM/AIS/SAR SG, and APANPIRG to review and consider amending the APAC Performance Monitoring and Measurement Metrics 2 and 3 for PBN to include specific measurements that capture operational benefits in terms of PBN's ability to help fulfill strategic objectives (safety, efficiency, capacity, access, and the environment).	Planning	**Open.**

No.	Tasks/Strategy	Category	Status
A6/13	ICAO Secretariat to identify the appropriate office or forum that would be best suited to develop a standardized calculation and reporting method for States. This would include a mathematical model to ensure environmental benefit calculations are standardized.	Reporting	**Closed.** ICAO HQ is now developing the calculation tool.
D6/14	The PBN TF agrees to integrate its Implementation Task List into the PBN Task Force Task List and updates the PBN Task Force Task List as shown in an Appendix of the Meeting Report.	-	**Closed.**
A6/15	ICAO Secretariat to provide an update report on PBN TF activities to ICAO Route Review TF. The PBN TF also requested that activities of the RR TF to be reported to the PBN TF.	Coordination	**Open.** At TF/8, APANPIRG is considering restructuring.
A6/16	States / Administrations to submit their PBN Implementation Progress Report by 20 February 2010 for onward submission to APANPIRG/21 Meeting.	Reporting	**Closed.**
D6/17	The PBNTF agrees in principle to the establishment of a regional RAIM prediction system and cooperation between the ICAO PBN TF and the APEC GIT. Australia, India, Japan and USA also agreed to be part of the project team.	Implementation	**Closed.**
A6/18	The PBN TF requests AEROTHAI in conjunction with the project team to develop more detailed technical architecture, operational concepts, and administrative arrangements to be reviewed by the Task Force at the PBN TF/7.	Implementation	**Closed.** WPs are presented and reviewed at TF/7 and TF/8.
A6/19	States are requested to develop Working Papers on back up requirements for PBN to be discussed at the PBN TF/7 Meeting.	Planning	**Open.**

No.	Tasks/Strategy	Category	Status
A6/20	Working Paper PBN/TF/6 – W/7 be forwarded to the Flight Plan and ATS Messages Implementation Task Force (meeting now to be held in July 2010).	Coordination	**Closed.**
A6/21	States be requested to review the requirements of the State Letter on the implementation of the interim 2012 flight plan format in the context of PBN implementation and report to the PBN TF 7 meeting issues noted.	Implementation	**Closed.**
A7/1	The meeting: a) urged States to provide annual updates on implementation issues and progress made; and b) encouraged States to complete the development of national plans and ensure compliance with the dates indicated in the plan.	Reporting	**Closed.**
DC7/2	States in the Asia-Pacific Region are encouraged to take part in the regional cooperative effort to achieve the safety, access, capacity, efficiency and environmental benefits that are possible with PBN implementation, by joining the Asia-Pacific Flight Procedure Programme (FPP).		**Closed.**
A7/3	All States with existing PBN implementation plans are requested to review and revise plans as necessary to ensure they are in alignment with the APAC Regional plan and ICAO PBN requirements.		**Closed.**
A7/4	States that are yet to develop their PBN implementation plan are requested to do so in an expeditious manner and submit the same to ICAO APAC Office at the earliest.		**Closed.**
A7/5	Developing States are encouraged to identify shortfalls and challenges to implementation and inform the APAC PBN Task Force accordingly.		**Closed.**

No.	Tasks/Strategy	Category	Status
A7/6	The Secretariat is requested to provide information to ICAO HQs on the review mechanism adopted by the review team, for use in other regions.		**Closed.**
A7/7	The Secretariat is requested to forward Appendix D [APAC Short Term Implementation Target for Continental, Oceanic and Remote Continental Airspace(s)] to PBN/TF/7 – WP/5 PBN State Plan Harmonization Analysis Report to ICAO HQs for information.		**Open.**
C7/8	States that are further advanced in PBN implementation are encouraged to contribute to regional efforts to accelerate implementation.		**Closed.**
C7/9	The meeting agreed that the principles of the proposed activities of the REDI teams are very beneficial and are in line with ICAO HQ concepts of the GO-TEAM visits that are executed in partnership with IATA and industry partners. It was however the opinion of the meeting that the work of the REDI teams may overlap the work of the Go-teams and it was decided that although in agreement with the principles, further work needs to be done on the management structure, and the relation to the Go-team efforts.		**Closed.**
A7/10	IATA to take the matter to the Airlines Electronics Engineering Committee (AEEC) to see if it can provide an answer/solution.		**Closed.**
DC7/11	That, the Minimum Technical and Operational Requirements for a Regional RAIM Prediction System for the APAC Region as shown in **Appendix 'E'** is endorsed.		**Closed.**
DC7/12	States in the Asia-Pacific Region are encouraged to take part in the Regional RAIM Prediction System for the APAC Region.		**Closed.**
A8/1	The Secretariat should request ICAO HQ to provide clarification on intent of the RNP 0.3 and 'Advanced RNP' Navigation Specifications by the next meeting.		**Open.**

No.	Tasks/Strategy	Category	Status
A8/2	The Secretariat should issue a State Letter to inform States regarding the revised PBN Implementation Progress Report, and remind States to submit the progress report prior to each Task Force meeting.		**Open.**
A8/3	The Secretariat should review the PBN State Updates that had been presented and develop a document that identified areas of implementation where additional support and guidance is needed.		**Open.**
A8/4	The Secretariat should consider a mechanism that ensures a more cohesive and coordinated effort to respond to State requests for PBN assistance. The meeting noted that there may be a need to form a steering committee to direct resources and set priorities regarding PBN REDI initiatives. The Steering Committee may include representatives from ICAO and International Organizations.		**Open.**
A8/5	The Secretariat should coordinate to clarify to the PBN Task Force whether ICAO was encouraging a coordinated regional SBAS programme.		**Open.**
A8/6	Before the next meeting, IATA, Australia, Fiji and Thailand should develop a draft amendment of the TORs, which includes monitoring, providing feedback and encouraging State PBN implementations. The amendment should also include coordinating with ICAO FPP and COSCAP in the training area.		**Open.**
A8/7	The Secretariat should consider the possibility of a full-time PBN project team supported by States, under the auspices of the Regional Office. The focus of the team would be technical policy advice on PBN oceanic and continental en-route implementations.		**Open.**
A8/8	The Secretariat should coordinate with the FPP or COSCAP to provide future Seminars on CDO procedure implementation.		**Open.**
A8/9	The Secretariat should clarify with ICAO HQ what safety assessment processes are required for implementation of PBN and draft an update to the Regional PBN Plan with this information as appropriate.		**Open.**

— END —