Assembly Resolution A 36 – 23

a) States and planning and implementation regional groups (PIRGs) complete a PBN implementation plan by 2009 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) implementation of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS) 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
Assembly Resolution A 36 – 23 (Cont’d)

b) ICAO develop a coordinated action plan to assist States in the implementation of PBN and to ensure development and/or maintenance of globally harmonized SARPs, Procedures for Air Navigation Services (PANS) and guidance material including a global harmonized safety assessment methodology to keep pace with operational demands.

c) States include in their PBN implementation plan provisions for implementation of approach procedures with vertical guidance (APV) to all runway ends serving aircraft with a maximum certificated take-off mass of 5700 kg or more, according to established timelines and intermediate milestones.
Conclusion 18/52 – Establishment of a Regional Performance Based Navigation Task Force (PBN/TF)

That, an Asia/Pacific PBN Task Force, with terms of reference as outlined in Appendix A to the APANPIRG/18 Report on Agenda Item 3.5, be established to develop a PBN implementation plan for the Asia/Pacific Region and address related regional PBN implementation issues.
Conclusion 18/53 – Development of State PBN Implementation Plans

That, the Regional Office encourages States to begin development of their State PBN implementation plans in harmony with the development of the Asia/Pacific Regional PBN implementation plan being coordinated by the Asia/Pacific PBN Task Force for submission to APANPIRG/19 (2008).
Conclusion 18/55 – Designation of Contact Person for PBN Implementation

That, by 31 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.
The First Meeting of the Performance Based Navigation Task Force (PBN/TF) was held in Bangkok, Thailand from 9 to 11 January 2008.

The Meeting was attended by 50 participants from 16 States/Administrations and 3 International Organizations.

Chairman – Mr. Ian Mallett  (Australia)

Rapporteur Sub Group (Regional PBN Implementation Plan) – Mr. Noppadol Pringvanich (Thailand)

Rapporteur Sub Group (State PBN Implementation Plan) – Mr. Henrik Nielsen (Australia)
PBN IMPLEMENTATION ISSUES

PBN/TF/1 meeting developed a List of PBN Implementation Issues and Two Task Lists. These included:

• Establishing current levels of State operations and initial intent;
• Establishing list of local and general issues which should be addressed during implementation of PBN;
• Providing Training Framework and individual training packages for pilots, controllers, regulators etc;
• Establishing On-The-Job Training specifically with regard to PBN Procedure Design;
• *Establishing ability and intent of States to offer* participation and Provision of Model Operational and Air Worthiness Approval Documentation; and
• Table of Contents for the Regional PBN Implementation Plan and allocating tasks to respective TF members.
Subsequently, the PBN Task Force met four times as follows:

- **Second Meeting at Bangkok**: 1 - 3 April 2008  
  (57 participants/17 States and 3 International Organizations);

- **Third Meeting at Bangkok**: 14 – 17 July 2008  
  (72 participants/18 States and 6 International Organizations and Industry/Manufacturer);

- **Fourth Meeting at Japan**: 4 - 6 March 2009  
  (68 participants/20 States and 2 International Organizations);

- **Fifth Meeting at Bangkok**: 15 – 17 July 2009  
  (74 participants/21 States and 3 International Organizations).

**SIXTH MEETING AT HONG KONG**: 3 – 5 FEBRUARY 2010  
(100 participants/ 26 States and 6 International Organizations and Industry/Manufacturer)
APANPIRG/19 Meeting
(1-5 September 2008)

- Approved the Asia/Pacific Regional PBN Implementation Plan as an Interim Edition (Version V. 0) pending subsequent reviews by RASMAG, CNS/MET/SG and ATM/AIS/SAR/SG.

- Version V 0.2 of the Plan was finalized by PBN/TF/4 meeting; and

- Version V 0.3 by PBN/TF/5 meeting.
Appraisal of the PBN TF Outputs against the PBN TF TORs

Completed at PBN/TF/4 meeting and the following Conclusions and Actions were agreed:

- The APAC PBN TF to continue an annual review of the Asia-Pacific Regional PBN Implementation Plan

- Develop an up-to-date archive of all relevant guidance materials for each PBN implementation step as outlined in the PBN manual

- 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

- APAC PBN TF agreed to continue coordination with other regional PBN task forces and the Global PBN Task Force to ensure harmonization of PBN
Appraisal of the PBN TF Outputs against the PBN TF TORs (Cont’d)

- 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

- 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

- 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

- The APAC PBN Task Force considered itself a suitable forum to facilitate and harmonize terminal and en-route PBN implementation in the Asia Pacific Region.

- Therefore, the Task Force requested 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”.
Implementation Task List

• General
  – Fleet readiness statistics for different navigation specification
  – General guidance on aircraft types and their configurations that have capability for different PBN navigation specifications
  – Prepare performance measuring methodology to assess success of PBN implementation
Implementation Task List

(Cont’d)

• En-route
  – Identify appropriate navigation specification for existing pre-PBN RNAV routes;
  – Identify and prioritize suitable city-pairs which can benefit from PBN implementation;
  – Develop a status report on areas of en-route harmonization gaps; and
  – Identify regional route structures for application of RNAV 10 and RNP 4 separation standards.
Implementation Task List
(Cont’d)

• Terminal Area & Approach
  – Create a status report of WGS-84 implementation within the APAC;
  – Create a status report of compliance with the Annex 15 Electronic Terrain and Obstacle Data (ETOD) requirements;
  – Identify proper strategies for PBN applications for helicopter in the Asia-Pacific; and
  – Identify and prioritize suitable airports and terminal areas which can benefit from PBN implementation.
• PBN/TF 5 meeting was held in Bangkok from 15 – 17 July 2009. TF meeting adopted 17 Draft Conclusions based on the review of various working papers.

• APANPIRG/20 meeting reviewed the outcomes of the work accomplished by the PBN TF over the course of two meetings.
Conclusions adopted by APANPIRG/20 on PBN include:

- 20/35  - Asia-Pacific Flight Procedure Programme
- 20/36  - Preparation for PBN Implementation
- 20/37  - Guidance Material for PBN Implementation
- 20/38  - Regional RAIM Prediction System
- 20/39  - RNAV Human Factors
- 20/40  - PBN Implementation Progress Report Template
- 20/41  - Asia/Pacific Regional PBN Implementation Plan
- 20/42  - PBN Safety Assessment Training
- 20/43  - RNP AR Approach Implementation
- 20/44  - PBN Task Force Activities
- 20/45  - Sharing Information on ICAO Panels /SGs
Follow-up on APANPIRG Conclusions

ICAO Action

- APANPIRG/20 Conclusions on PBN requiring action by ICAO have been forwarded to Headquarters through Issue Forms.

State Action

- Sixteen (16) States have submitted their PBN Implementation Progress Report on the PBN Template Form.

- Four (4) States have also submitted their PBN Implementation Plan and Four (4) States their Roadmap.

PBN/TF/6 will review the PBN Implementation Progress Report and the State Plans submitted.
## Summary of PBN Implementation Plan

### Short Term (2008-2012)*

<table>
<thead>
<tr>
<th>Airspace</th>
<th>Preferred Nav. Specifications</th>
<th>Acceptable Nav. Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Route – Oceanic</strong></td>
<td>RNP 4</td>
<td>RNAV 10</td>
</tr>
<tr>
<td><strong>Route – Remote continental</strong></td>
<td>RNP 4</td>
<td>RNAV 10</td>
</tr>
<tr>
<td><strong>Route – Continental en-route</strong></td>
<td></td>
<td>RNAV 2, RNAV 5</td>
</tr>
<tr>
<td><strong>TMA – Arrival</strong></td>
<td>RNAV 1 in radar environment and with adequate navigation infrastructure.</td>
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<tr>
<td></td>
<td>Basic-RNP 1 in non-radar environment</td>
<td></td>
</tr>
<tr>
<td><strong>TMA – Departure</strong></td>
<td>RNAV 1 in radar environment and with adequate navigation infrastructure.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Basic-RNP 1 in non-radar environment</td>
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Summary of PBN Implementation Plan (Cont’d)

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<tr>
<th>Short Term (2008-2012)*</th>
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<tbody>
<tr>
<td>Airspace</td>
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<tr>
<td>Approach</td>
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</tbody>
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**Implementation Targets**
- RNP APCH (with Baro-VNAV) in 30% of instrument runways by 2010 and 50% by 2012 and priority should be given to airports with operational benefits
- 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
- Re-defining existing RNAV/RNP routes into PBN navigation specification by 2012
- Implementation of additional RNAV/RNP routes

*Note: Early completion of an implementation is encouraged within the timeframe on the basis of coordination between affected States and airspace users*
## Summary of PBN Implementation Plan

**(Cont’d)**

<table>
<thead>
<tr>
<th>Medium Term (2013-2016)*</th>
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<tbody>
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<td><strong>Airspace</strong></td>
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**Summary of PBN Implementation Plan**

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<tr>
<th>Medium Term (2013-2016)*</th>
<th>(Cont’d)</th>
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<tr>
<td><strong>Airspace</strong></td>
<td><strong>Preferred Nav. Specifications</strong></td>
</tr>
<tr>
<td><strong>Approach</strong></td>
<td>Expansion of RNP APCH (with Baro-VNAV) and APV</td>
</tr>
<tr>
<td></td>
<td>Expansion of RNP AR APCH where there are operational benefits</td>
</tr>
<tr>
<td></td>
<td>Introduction of landing capability using GNSS and its augmentations</td>
</tr>
</tbody>
</table>

**Implementation Targets**
- RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016
- 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 of additional RNAV/RNP routes

* Note 1: In circumstances where affected States are agreeable to completing an implementation in advance of the timeline, early implementation is encouraged on the basis of coordination between affected States and airspace users.

** Note 2: Related CNS requirements and operational procedures for RNP 2 application in Oceanic Airspace are yet to be determined.
Summary of PBN Implementation Plan
(Cont’d)

Long Term Implementation Strategies
(2016 and beyond)

In this phase, GNSS is expected to be a primary navigation infrastructure for PBN implementation. States should work co-operatively on a multinational basis to implement GNSS in order to facilitate seamless and inter-operable systems and undertake coordinated research and development programmes on GNSS implementation and operation.
PBN EN ROUTE IMPLEMENTATION STATUS

Oceanic and Route Continental Airspace

➢ Pacific

• 50 NM lateral separation standard (RNP 10) implemented since 1998
• 50 NM longitudinal separation standard since 2005
• 30 NM lateral and longitudinal separation (30/30) have been implemented since 2007 in respective FIR; but application of 30/30 across FIR is currently pending because of concern about the availability of data link communication and unplanned outages reported by two data link service providers in Pacific Oceanic Region
• Current data link performance does not justify near-term planning for an expanded application of 30/30 including the operation of a 30 NM route structure
Oceanic and Route Continental Airspace (Cont’d)

South China Sea

- RNP 10 equipage has been required since 2001
- 50 NM lateral and longitudinal separation introduced since 2008 on L642 and M771
- For other routes applicable separation remain same
- Review of ATS routes in this area will be continued by SEA RRTF
Bay of Bengal

- EMARSSH route structure implemented in 2002 – support RNP 10
  - Routes established 50 NM apart
- A number of BoB and Arabian Sea/Indian Ocean States have been assisted to designate a number of existing routes as RNAV routes
- BoB RHS TF looking into application of 50 NM separation in the area

Indian Ocean

- Australia would extend RNAV 4 operations to Melbourne - support application of 30 NM / 30 NM separation
Continental Airspace

- Japan
  - Introduced parallel RNAV 5 routes between city pairs
  - Will Introduce RNAV preferential operations – Sky Highway
    Effective October 2010

- Republic of Korea
  - Planning to construct parallel air routes using RNAV 2
SUMMARY OF ACHIEVEMENT

APAC Regional PBN Implementation Plan (V1.0) adopted by APANPIRG/20.

Plan includes Short term, Medium term, and Long term strategies for PBN implementation including target dates.

Twenty-eight (28) States and three (3) International Organizations have nominated their PBN Focal Points.

PBN Task Force includes fifty-three (53) Members representing 28 States and 3 International Organizations.

PBN Seminar a regular feature:

- Japan - March 2009.
- Hong Kong - February 2010.

Asia Pacific Flight Procedure Programme Office being established in Beijing, China (expected to be operational in early 2010)

Model Operational and Airworthiness Approval Documentation have been provided to States.
PBN / TF / 6 MEETING
3 – 5 February 2010

AGENDA

- Global PBN Implementation
- APAC Region PBN Implementation
- PBN Implementation Issues
- State /Industry Presentations
- Task Lists Review
- Regional RAIM Prediction System
- Back up Requirements PBN
- Flight Planning 2012 – PBN Flight Planning Issues
- Extension of PBN/TF beyond PBN/TF/7 Meeting
THANK YOU