



*International Civil Aviation Organization*

**THE THIRD MEETING OF PERFORMANCE BASED NAVIGATION  
IMPLEMENTATION COORDINATION GROUP (PBNICG/3)**

Bangkok, Thailand, 08 – 10 March 2016

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**Agenda Item 9: Regional and Sub-regional Implementation of PBN in En-route Airspace**  
**Agenda Item 11: Working Arrangements for PBN Region-wide Implementation**

**APAC ENROUTE PBN NETWORK OPTIMIZATION**

(Presented by the Secretariat)

**SUMMARY**

This paper presents a proposed Statement of Work for a task under PBNICG aiming at optimizing the Enroute PBN network under the PBNICG framework. Action by the meeting is in paragraph 3.1.

**1. INTRODUCTION**

1.1 During the First Meeting of ICAO Asia and Pacific PBN Implementation Coordination Group (PBNICG/1) which was held in Beijing, China from 10 to 12 March 2015, ICAO Asia and Pacific Regional Sub-office (APAC RSO) proposed to consider forming sub-regional groups to engage in the review of sub-regional ATS routes and the meeting asked APAC RSO to draft a Statement of Work (SOW) for sub-regional groups (see Action Item 1/21 of PBNICG/1).

1.2 During PBNICG/2 in Bangkok, Thailand from 11 to 12 June 2015, APAC RSO presented an example outcome of sub-regional coordination on PBN en-route enhancement through a design session process and an example Terms of Reference of the Sub-regional group (see Flimsy01 of PBNICG/2).

1.3 Current regional picture regarding the Seamless ATM implementation status show that the benefits to reap from a transition to PBNICG/3 and more generally from the quality of the CNS infrastructure are not there.

1.4 Besides, PBNICG/3 SP03 (Practical PBN Implementation - from an ATM perspective) notes that:

- A whole-of-system planning approach is required for PBN
- Many States have been too slow to take advantage of the new specifications or use the correct specifications to get the maximum safety and efficiency benefits
- Some States are still not understanding fundamental implementation measures and how it changes an operational environment

## 2. DISCUSSION

### **Formation of Sub-Regional Groups**

2.1 Currently, some sub-regional groups for en-route PBN implementation cooperation are already at work. They are namely:

- a) BIMT (Bangladesh, India, Myanmar, Thailand),
- b) Mekhong Delta (Myanmar, Thailand, Laos PDR, Cambodia, Vietnam); and
- c) South China Sea Major Traffic Flow Review Group (SCS-MTFRG) (China, Hong Kong China, Malaysia, Philippines, Singapore, Vietnam).

2.2 However more sub-regional groups would need to optimize their ATS route structure and traffic flows to improve efficiency and capacity of airspace:

- d) Myanmar-Bangladesh-Nepal-India-Bhutan-Pakistan (Himalaya routes)
- e) Maldives-Sri Lanka-India
- f) China-Mongolia-Russia;

And optionally:

- g) Singapore-Malaysia-Thailand; and
- h) Indonesia-Singapore-Malaysia.

2.3 For f) civil/military cooperation in China would need to be tackled first. For g) and h) airspace is mostly already seamless with multiple routes supporting high density systems. However a review of the issues/enhancements may be needed anyway. If no specific items are identified then the task would be completed.

2.4 The intention of the coordination and monitoring by a PBNICG task is to ensure that the work conducted by the different informal sub regional groups is well coordinated, relying on region-wide views, issues are identified and standard solutions are brought in compliance with the operational concept that is the Seamless ATM plan. The ICAO APAC Regional Sub Office can also bring in all necessary assistance as needed.

2.5 Based on the previous, it is proposed to structure the work of review and implementation of the optimized the APAC Enroute PBN network as a task under PBNICG. This task will coordinate and monitor the different sub-regional groups.

### **Statement of Work (SOW) of the Task Optimizing the APAC Enroute PBN network**

2.5 To achieve the APAC Seamless ATM plan expectations regarding PBN routes, the objectives of the task Optimizing the APAC Enroute PBN network are to:

- 1) Assist Realign existing routes and develop new PBN routes based on the available CNS infrastructure and possible PBN navigation specifications to improve efficiency and capacity of sub-regional airspaces; and
- 2) Review and change where appropriate, the current FLAS to enhance safety and efficiency of overall route structures and ensure that they meet the expectations of the Seamless ATM Plan.

2.6 In this aim, the first sub-task is to identify the main opportunities of optimization review traffic flows among entry/exit points and city pairs, existing and planned CNS infrastructure and the status of PBN approved aircraft and fleet readiness of the sub-region.

2.7 Based on initial opportunities above, the sub-regional groups jointly develop a proposal for optimized/realigned route structure and implement it. The different sub-regional groups coordinated by the Task Lead would all target:

- a) An application of suitable longitudinal separation on existing routes;
- b) An enhancement of traffic flow through realignment of current routes;
- c) An establishment of PBN parallel routes as appropriate;
- d) A revision of the current flight level allocation scheme as appropriate;
- e) If needed, a review of sectorization as necessary, which should involve involves AOM and ATM experts; and
- f) A review of Letters of Agreement between neighboring area control centers as necessary.

2.8 In line with the above, a draft a statement of work (SOW) is proposed at **Appendix A**.

2.9 Implementation should be based on Seamless ATM Implementation guidance, and in particular should include the following specific items:

- Initial performance and benefits assessment, including impact on existing procedures;
- Safety assessment;
- Airlines/Stakeholder consultation;
- Appropriate AIS/AIM publication;
- BANP and LOA updates as necessary;
- Appropriate involvement and training of affected ATC units;
- Upgrades to ATC Systems; and
- Post implementation review.

2.10 ICAO APAC Regional Office and Regional Sub-office, IATA, IFALPA and CANSO are important for regional sub-groups to get technical assistances which will be useful for harmonizing the operations and improving the capacity and efficiency of airspace within the region.

### **3 ACTION REQUIRED BY THE MEETING**

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) review and adopt the draft the Statement of Work for En-route PBN Implementation Cooperation; and
- c) discuss any other relevant matters as appropriate.

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<p><b>Statement of Work</b></p> <p><b>Task Optimizing the APAC Enroute PBN network</b></p> <p><b>Task Manager: To be defined</b></p>
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<b>Project: PBNICG</b>	
<b>Revision number: 1</b>	<b>Approved:</b> <a href="#">Click here to enter a date.</a>

**Objective and scope of the task**

Background: ICAO Assembly Resolution A37-11 urges all States to implement RNAV and RNP air traffic services (ATS) routes in accordance with the ICAO Performance-based Navigation (PBN) Manual (Doc 9613). PBN Implementation is the highest priority in the implementation of ICAO Global Air navigation Plan and APAC Region. PBN is a major enabler of air navigation development in Aviation System Block Upgrade (ASBU). Currently several sub-regional en-route PBN implementation cooperation groups are working in Asia and Pacific Region.

Objectives: To achieve the APAC Seamless ATM plan expectations regarding PBN routes, the objectives of the task Optimizing the APAC Enroute PBN network are to assist the informal sub regional groups to realign existing routes and develop new PBN routes based on the available CNS infrastructure and possible PBN navigation specifications to improve efficiency and capacity of APAC airspace.

**Deliverables**

- 1) Assist informal sub regional groups in preparing/identifying opportunities of optimization
  - a) Review of traffic flows among entry/exit points and city pairs, existing and planned CNS infrastructure and the status of PBN approved aircraft and fleet readiness by sub-region;
  - b) Proposal of appropriate PBN navigation specifications by sub-region;
  - c) Review of proposals from sub-regions and selection of opportunities with the highest benefits (efficiency – capacity – environment)
  - d) Proposal of realigned and new optimized ATS routes including PBN parallel routes and associated implementation work plan;
- 2) Assist informal sub regional groups with implementation
  - a) Adopt suitable longitudinal separation minima for each route, in line with the Seamless ATM plan;
  - b) Review the current flight level allocation scheme and recommend it as appropriate;
  - c) Review the current definition of area control center (ACC) sectors and make recommendations as necessary;
  - d) Review Letter of Agreement between ACCs and make recommendations as necessary;



- e) Implement the new route structure, whilst taking into account the need for harmonization with adjacent airspaces and inter-regional airspaces;
  - f) Conduct pre implementation safety assessment in cooperation with an appropriate Monitoring Agency in the region;
- 3) Report through the Task Lead to about progress, issues and benefits (safety/efficiency/capacity) realized;
- 4) Coordinate the work of the different sub-regional groups:
- BIMT (Bangladesh, India, Myanmar, Thailand),
  - Mekhong Delta (Myanmar, Thailand, Laos PDR, Cambodia, Vietnam); and
  - South China Sea Major Traffic Flow Review Group (SCS-MTFRG) (China, Hong Kong China, Malaysia, Philippines, Singapore, Vietnam).
  - Myanmar-Bangladesh-Nepal-India-Bhutan-Pakistan (Himalaya routes)
  - Maldives-Sri Lanka-India
  - China-Mongolia-Russia
- And optionally, if needed:
- Singapore-Malaysia-Thailand; and
  - Indonesia-Singapore-Malaysia.
- 5) Explore possibilities for further enhancements to operational efficiency of route structures through the implementation of CDM/ATFM and FUA

## Milestones

Indicate here the main milestones of the task or give a reference to a planning (Gantt chart etc)

- **T0:** adoption of SOW
- **T0+12 months:** Preparation/identification of opportunities completed and approved by PBNICG
- **T0+36 months:** Implementation of optimized route network completed
- **T0+36 months:** possibilities for further enhancements identified

## Dependencies

Dependencies with projects supervised by different SG (will be controlled by APANPIRG):

- Coordination needed with ATM/SG for route network and Civil/military cooperation in China

Dependencies with projects supervised by the SG (will be controlled by SG):

- None



Dependencies between tasks in the project (will be controlled by PBNICG):

- None

**Task participants**

- BIMT (Bangladesh, India, Myanmar, Thailand),

State/Organization	Name	Role/Responsibility	Email	Phone

- Mekhong Delta (Myanmar, Thailand, Laos PDR, Cambodia, Vietnam);

State/Organization	Name	Role/Responsibility	Email	Phone

- South China Sea Major Traffic Flow Review Group (SCS-MTFRG) (China, Hong Kong China, Malaysia, Philippines, Singapore, Vietnam).

State/Organization	Name	Role/Responsibility	Email	Phone

- Myanmar-Bangladesh-Nepal-India-Bhutan-Pakistan (Himalaya routes)



State/Organization	Name	Role/Responsibility	Email	Phone

- Maldives-Sri Lanka-India

State/Organization	Name	Role/Responsibility	Email	Phone

- China-Mongolia-Russia

State/Organization	Name	Role/Responsibility	Email	Phone

- Singapore-Malaysia-Thailand

State/Organization	Name	Role/Responsibility	Email	Phone



- Indonesia-Singapore-Malaysia.

State/Organization	Name	Role/Responsibility	Email	Phone

**Working arrangements**

- Face to face meetings
- Webconferences
- Needs an ICAO secured portal, name: [Click here to enter text.](#)
- Other: [Click here to enter text.](#)

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