



*International Civil Aviation Organization*

**The First Meeting of the APANPIRG ATM Sub-Group  
(ATM /SG/1)**

Bangkok, Thailand, 20 – 24 May 2013

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**Agenda Item 4: ATM Systems (Modernization, Seamless ATM, CNS, ATFM)**

**HARMONISING EN-ROUTE PBN IMPLEMENTATION  
TO ACHIEVE SEAMLESS ATM**

(Presented by Singapore)

**SUMMARY**

This paper presents the proposal for greater emphasis to harmonize en-route PBN implementation as a key enabler to progress seamless ATM in this region. The excellent works done by the ICAO APAC PBN/TF over that last few years have served the region well to chart the direction of PBN progress in this region. Furthermore, the development of the regional PBN implementation plan has provided States with invaluable guidance for PBN implementation. However, there's a growing need for this region to work closely to ensure that en-route PBN implementation is not fragmented. In this regard, a coordinated effort will be required to plan and implement a harmonized en-route PBN to cater for capacity growth in this region.

This paper relates to –

**Strategic Objectives:**

- A: *Safety – Enhance global civil aviation safety*
- C: *Environmental Protection and Sustainable Development of Air Transport – Foster harmonized and economically viable development of international civil aviation that does not unduly harm the environment*

**Global Plan Initiatives:**

- GPI-5 RNAV and RNP (Performance-based navigation)
- GPI-7 Dynamic and flexible ATS route management
- GPI-8 Collaborative airspace design and management
- GPI-21 Navigation systems
- GPI-22 Communication infrastructure

**1. INTRODUCTION**

1.1 The global aviation industry is facing significant challenges regarding eco-efficiency and airspace capacity optimization. The increase of demand on global airspace capacity emphasizes the need to optimize the utilization of available airspace. These solutions and services are an essential for Air Navigation Service Providers (ANSPs), aircraft operators and airport authorities to obtain immediate navigation benefits. Performance Based Navigation (PBN) offers significant advantages over the current sensor specific methods to develop airspace, ATS routes, instrument flight procedures and obstacle clearance criteria. PBN improves safety, enhance operational efficiency, reduce of navigation infrastructure and increases airspace capacity.

1.2 Recognizing the advantages and benefits that PBN brings, ICAO Assembly Resolution A36-23 urge ICAO to develop a coordinated action plan to assist States in the implementation of PBN and for Planning and Implementation Regional Groups (PIRGs) to include in their work program the review of status of implementation of PBN by States according to the defined implementation plans. Following this, APANPIRG/18 established the PBN Task Force (PBN/TF) in 2007. In his opening remarks, ICAO Asia/Pacific Regional Director highlighted the lack of harmonization in the implementation of PBN between different geographical areas, and that the PBN/TF would address the issue and expedite implementation of PBN in a harmonized manner in the Asia/Pacific region.

1.3 Under the leadership of ICAO and the APAC PBN/TF, there has been significant progress in PBN planning in this region and most States are progressing with the actual implementation of PBN especially in the terminal and approach segments. Unlike en-route PBN implementation, the efforts of rolling out PBN in terminal and approach would require minimal coordination and harmonization with adjacent States.

## 2. DISCUSSION

2.1 Efforts to progress with PBN have been focused widely on harmonizing the overall progress in accordance to the established regional implementation plan. There has been not much focus and emphasis on harmonizing the implementation of en-route PBN. Yet, en-route PBN is the key to achieving seamless ATM especially in addressing the capacity on major traffic flow routes.

2.2 There have been some efforts through ATM fora such as the former South East Asia Route Review Task Force (SEARR/TF) and the Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF) to progress with en-route PBN implementation. Similar efforts have been on-going at ATM Coordination Groups such as SEACG and SAIOACG. However, without a region-wide coordinated effort, it could result in a fragmented progress in PBN implementation which will hamper efforts to achieve seamless ATM.

2.3 The recently concluded 12<sup>th</sup> Air Navigation Conference (AN-Conf/12) in November 2012 has put great emphasis on PBN implementation concluding with a recommendation as follows;

### AN-Conf/12

#### ***Recommendation 5/1 - Improved operations through enhanced airspace organization and routing***

*Considering that performance-based navigation (PBN) is one of ICAO's highest air navigation priorities and the potential benefits achievable through creation of additional capacity with PBN:*

*That States:*

- a) implement performance-based navigation in the en-route environment*
- b) fully assess the operational, safety, performance and cost implications of a harmonization of transition altitude and, if the benefits are proven to be appropriate, undertake further action on a national and (sub) regional basis;*
- c) take advantage of improved models for inter-regional coordination and collaboration to achieve seamless air traffic management and more optimum routes through the airspace;*

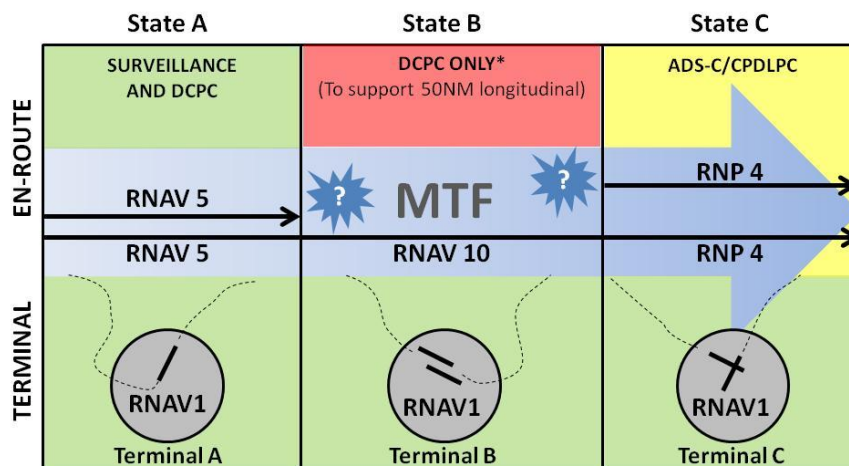
*d) through the planning and implementation regional groups improve their methods of coordination to increase implementation of en route performance-based navigation in order to achieve more optimum routes through the airspace;*

*That ICAO:*

*e) encourage the planning and implementation regional groups to support the early deployment of performance-based navigation.*

2.4 It is clear from the AN-Conf/12 recommendation above that States and ICAO should continue to put PBN as one of the highest air navigation priorities. While this region has established clear direction for PBN implementation in terminal and approach through the good work done by the APAC PBN/TF, there is a need to put equal emphasis on harmonizing PBN implementation in the en-route environment. This will require States and ICAO in this region to continue to work closely together through established platform and forums.

2.5 A harmonized en-route PBN implementation is key to unlock the capacity potential of the ATS route structure. Starting from the Major Traffic Flow Study, ATM enhancements should be planned to meet the anticipated traffic growth. Even without extensive studies, some of the ATS routes are well within adequate surveillance and communications coverage and ready for route upgrade to a higher PBN navigation specification. For such PBN en-route upgrades, relevant States could collaborate on smaller focused group(s) to capitalize on the opportunities to attain immediate significant ATM capacity and efficiency gains.



2.6 With the anticipated growth of air traffic in the Asia Pacific region for the next few decades, we cannot afford to have fragmented PBN routes. There will be an urgent need for States in this region to work closely to progress with a harmonized en-route PBN implementation, key to achieving seamless ATM in this region. PBN is a critical link in the entire aviation ecosystem and ATM technologies and solutions must be developed to provide greater capacity, enhance efficiency and maintain high safety standards in the region.

**3. ACTION BY THE MEETING**

3.1 The meeting is invited to:

- a) note the good work done by the ICAO APAC PBN/TF in charting a clear direction and guidance for PBN implementation in this region;
- b) recognize that harmonized en-route PBN implementation is a key element to achieving seamless ATM and to cater to capacity growth in this region
- c) focus on a region wide coordinated effort to plan and harmonize en-route PBN implementation;
- d) encourage collaboration between States to harmonize en-route PBN implementation where necessary; and
- e) discuss any relevant matters as appropriate.

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