



International Civil Aviation Organization

The Ninth Meeting of the ICAO Asia/Pacific Performance-Based Navigation Task Force (PBN/TF/9)

Bangkok, Thailand, 27-30 March 2012

Agenda Item 5: State/Industry Updates

PBN IMPLEMENTATION STATUS AND FUTURE PLAN

(Presented by the Republic of Korea)

SUMMARY

This paper provides information on the progress of PBN implementation following the PBN Implementation Plan of the Republic of Korea.

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-10 Terminal area design and management

GPI-11 RNP and RNAV SIDs and STARs

1. INTRODUCTION

1.1 The 36th ICAO General Assembly resolved to develop Performance Based Navigation (PBN) implementation plan by 2009 and to implement RNAV and RNP air traffic services (ATS) routes and procedures by 2016 (A36-23) and this was confirmed by the 37th ICAO General Assembly (A37-11).

1.2 In this regard, the 18th Meeting of Asia and Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/18) concluded that each State to develop a national PBN implementation plan by 2009 in harmony with the Asia and Pacific PBN Implementation Plan which would be developed by Regional PBN Task Force (PBN TF) (C18/53).

1.3 In line with the above, the Republic of Korea (hereafter refer to as ROK) developed its own PBN Implementation Plan in December 2009. The plan was presented to the ICAO Asia and Pacific Regional Office and reviewed by the ICAO Asia and Pacific Region PBN Task Force.

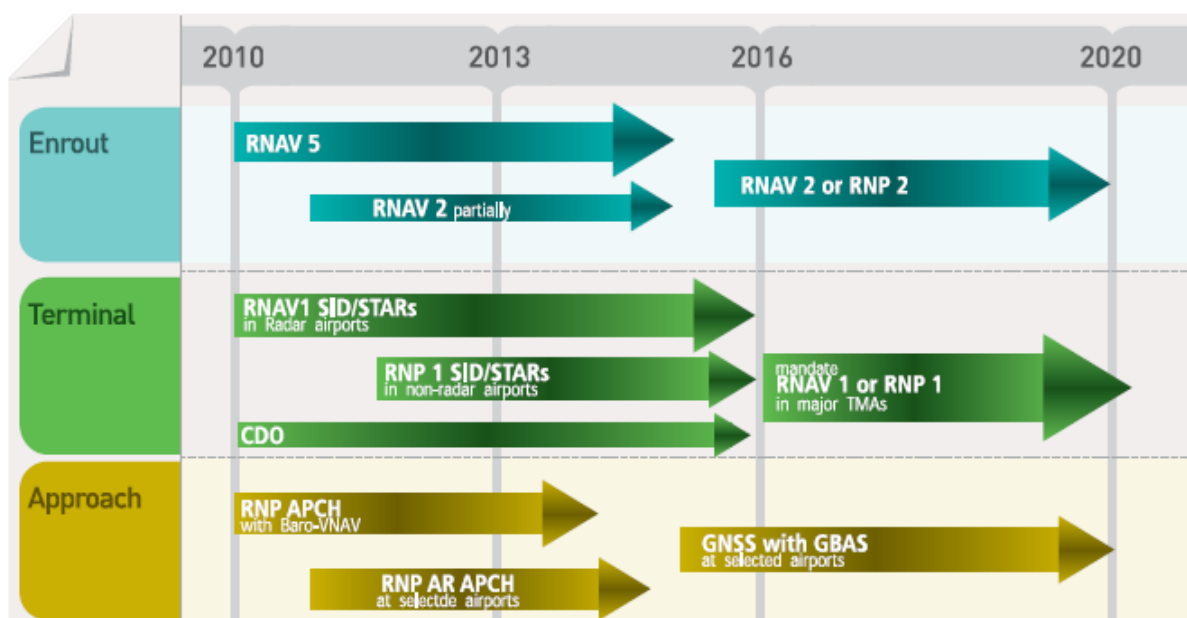
2. PBN IMPLEMENTATION PLAN OF THE REPUBLIC OF KOREA

2.1 The PBN Implementation Plan of the ROK comprises 3 stages; short Term (2010~2012), medium Term (2013~2016) and long Term (2017~).

2.3.1 Short Term (2010~2012): Current RNAV routes will be adjusted to meet ICAO's RNAV 5 specification and RNAV 2 will be introduced on heavily congested routes such as B576 to establish unidirectional parallel routes. The parallel routes for B576 will be effective by 2012. In terms of terminal areas, current RNAV STAR and SID will be switched over to RNAV 1 specification which will also be applied to new STARs and SIDs. And continuous descent operations (CDO) will be applied to all major airports including Incheon and Jeju. In addition, APV-Baro VNAV will be introduced to all international airports and domestic airports with high traffic volume as back-ups for ILS approaches or primary means for non-precision approaches.

2.3.2 Medium Term (2013~2016): RNAV2 or RNP 2 will be applied to new RNAV routes established during this period. Routes between the Republic of Korea and neighboring countries will be straightened out during this period and new route will be established exclusively for transition flights in an effort to diversify traffic. Also, the application of RNAV 1 or RNP 1 specification will be completed in international airports and be extended to major domestic airports. In addition, CDO will be extended to all domestic airports. In terms of approach procedures, the application of APV-Baro will be completed at all airports in Korea and trial operation of GBAS Landing System (GLS) will begin at the selected airports.

2.3.3 Long Term (2017~): All RNAV 5 routes will be switched over to RNAV 2 or RNP 2 and approach procedures using GBAS will be extended to other airports. VOR routes and RNAV routes will be completely separated at specific airports. In addition, ground NAVAIDs will be decommissioned gradually from 2021. As a result, conventional routes will be replaced with RNAV routes.



3. PROGRESS OF THE PBN IMPLEMENTATION

3.1 In accordance with the PBN Implementation Plan, the ROK decided Incheon and Gimpo airports as the starting point of PBN implementation because more than 70% of air traffic uses these airports causing congestion and delays regardless of jeopardizing safety.

3.2 The first thing what it did was to reconstruct traffic flows which comes in and out both airports because two airports are closely located each other (around 20NM) to serve the metropolitan area and use same ATS routes causing concentration on several specific points.

3.3 To do this, the ROK convened a study group composed of airspace experts, flight procedures designers, pilots as well as air traffic controllers working at aerodrome control, approach control and area control. After lengthy discussion and simulation tests, the group finalized the traffic flow of Incheon and Gimpo airport including the introduction of point merge method at the arrival procedures in Incheon airport. RNAV1 navigation specification was applied to all arrival and departure procedures serving both airports (see attachment A and B).

3.4 In addition, APV procedures with Baro VNAV were designed for all runway ends of both airports and all ILS approach procedures were connected to RNAV 1 arrival procedures. All arrival, departure and approach procedures will be effective from 3 May 2012.

3.5 In terms of ATS routes, the ROK redesigned all conventional RNAV ATS routes using RNAV 5 navigation specifications. Also it implemented a new RNAV 5 route, Y65, over Yellow Sea to connect between Jeju airport and airports located in north-eastern area of China including Beijing. RNAV 1 navigation specification was applied to arrival and departure procedures connecting between Y65 and Jeju airport (see attachment C and D). These procedures have been operating since January 2012.

3.6 Another big progress of PBN implementation in the ROK is the development of parallel routes on either side of B576. After the long negotiation with the military authorities regarding special use airspace adjustment on either sides of B576, new ATS routes, Y71 and Y72, were finalized using RNAV2 navigation specification on the north of Jeju VOR and RNAV 5 navigation specification on the south of Jeju VOR. The route spacing between Y71 and Y72 will be 8NM and 12 NM respectively due to the airspace conditions and safety assessment results for the route spacing proved that collision risks between two routes were below the ICAO's TLS, 5×10^{-9} . These routes will be effective either from June or July this year (see attachment C).

3.7 Currently, the ROK is planning to implement more PBN ATS routes and procedures for two international airports, Jeju (RKPC) and Muan (RJJB), and two domestic airports, Ulsan (RKPU) and Yeosu (RKJY), this year. Also, it considers developing more RNAV 5 routes on the current domestic VOR routes (override) and cooperates with military authorities to develop PBN procedures for civil-military joint use airports.

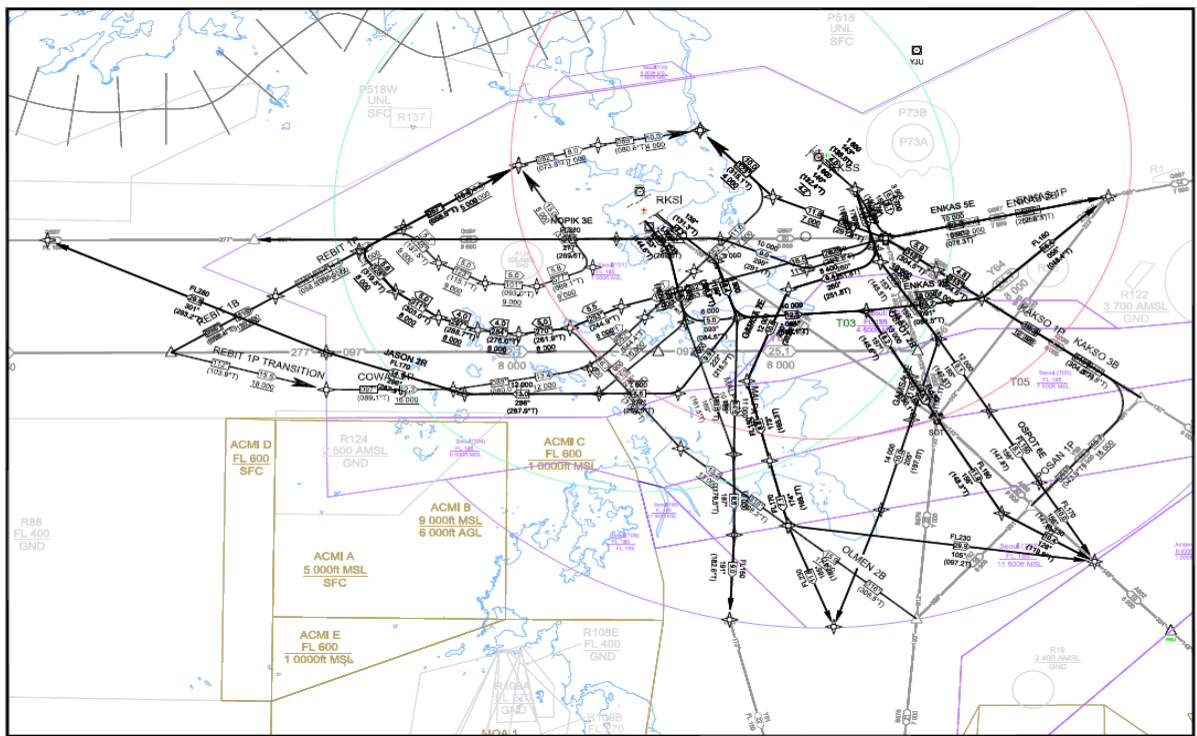
4. ACTION BY THE MEETING

4.1 The meeting is invited to note:

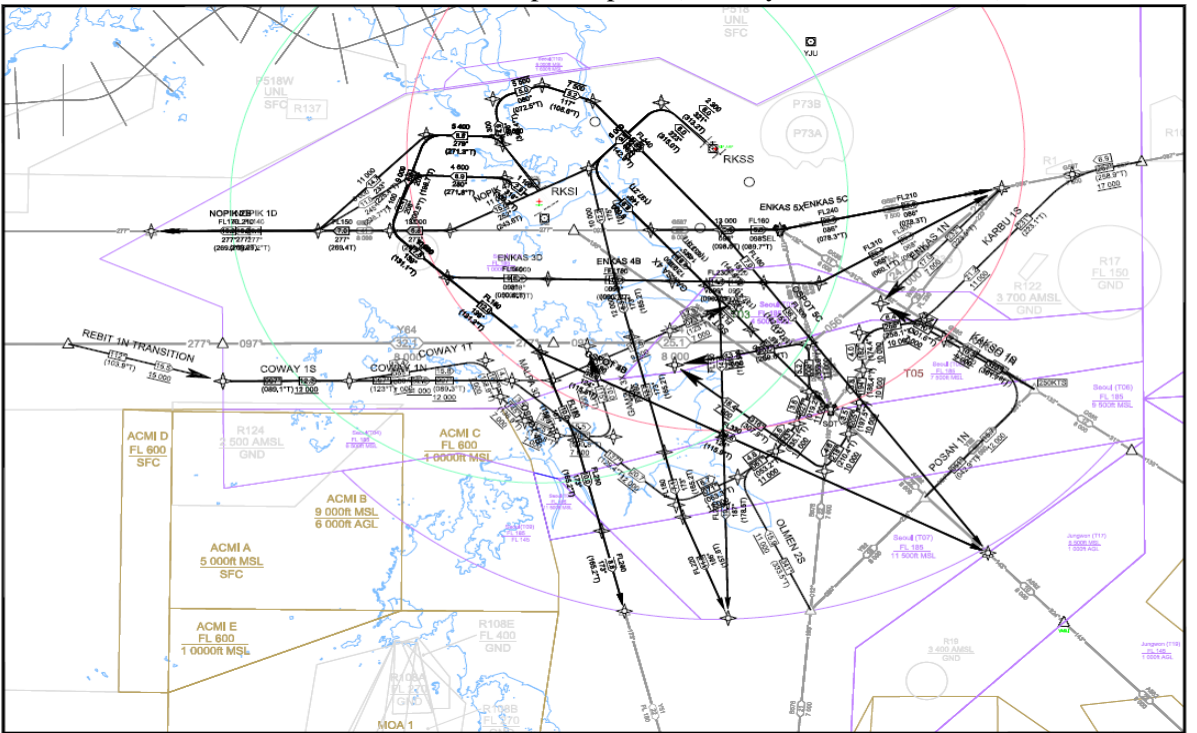
- a. The efforts of the ROK to progress the PBN implementation in line with ICAO General Assembly resolutions and APAC PBN Implementation Plan;
- b. The changes of all flight procedures at Incheon and Gimpo airports and the development of new RNAV 2 and RNAV 5 ATS routes, which are operating or will be effective this year.

Attachment

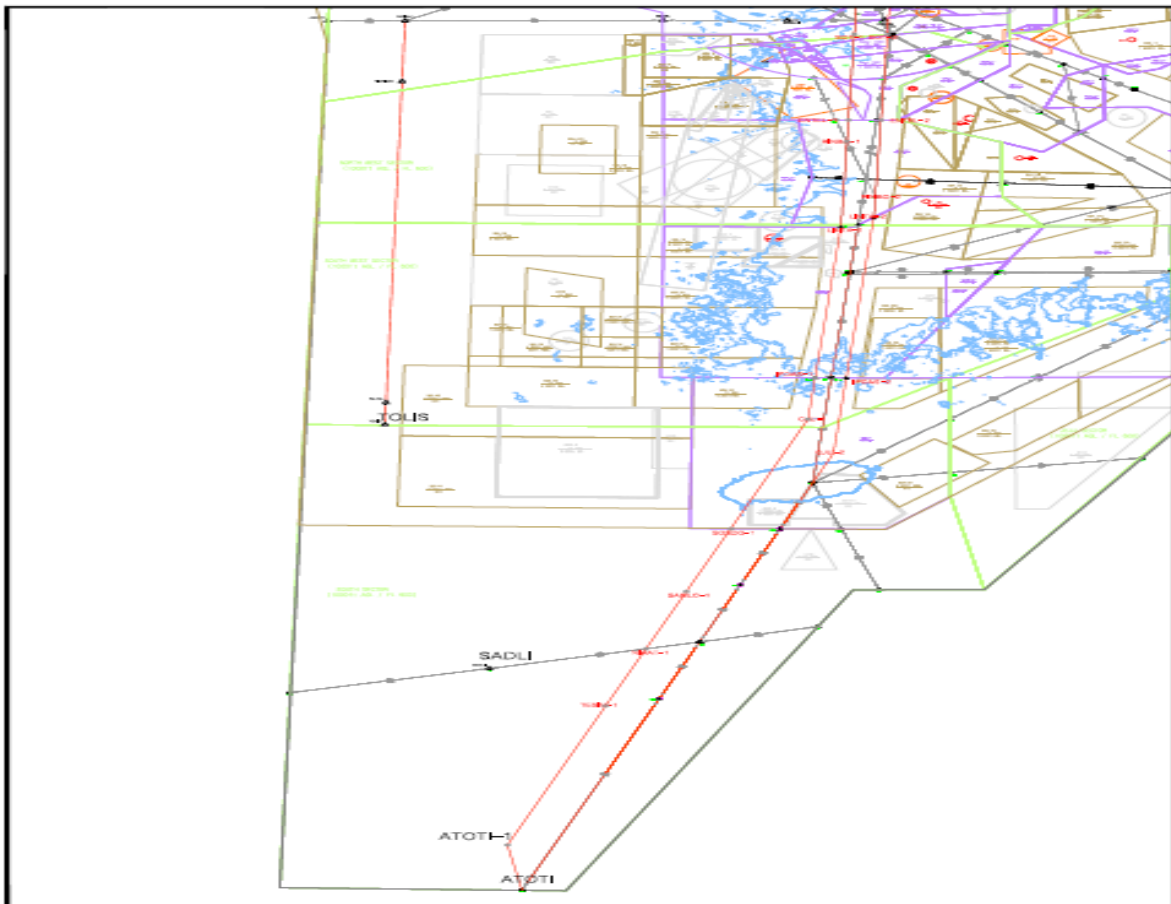
A. RNAV1 SIDs/STARs at Incheon and Gimpo Airports (Runway 14L/R, 15L/R, 16)



B. RNAV1 SIDs/STARs at Incheon and Gimpo Airports (Runway 32L/R, 33L/R, 34)



C. Establishment of RNAV2 and RNAV5 ATS routes (Y65, Y71, Y72)



D. Arrival and Departure procedures between Jeju and Y65

