International Civil Aviation Organization

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

Bangkok, Thailand, 20 – 24 May 2013

Agenda Item 5: ATM Coordination (Meetings, Route Development, Contingency Planning)

ENROUTE PBN IMPLEMENTATION BETWEEN HIGH-DENSITY CITY PAIRS

(Presented by Singapore)

SUMMARY

This paper presents a potential collaborative concept to enhance the route network based on the surveillance and communication capabilities to effectively serve the air traffic movements in areas where high volume of air traffic operates between the major hubs in the South East Asia region. A harmonized en-route PBN implementation to enhance air traffic management aims to meet the growing demand of air traffic in the region which also contributes to safety, efficiency and reduction of fuel burn and carbon emission.

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-8 Collaborative airspace design and management

1. INTRODUCTION

1.1 South East Asia is steadily becoming the focal point of global aviation. It is estimated that for the next 20 years, nearly half of the world's air traffic growth will be driven by travel to, from, or within the Asia Pacific region. Total traffic for the Asia Pacific region will grow 6.4% per year[1]. The fleet of aircraft operated by Asia-Pacific carriers is expected to more than double in the next 20 years, from 4,300 aircraft today to a total of 10,440 jets, based on higher than average annual traffic growth of 5.8 per cent and replacement of nearly 3,500 aircraft in service today[2].

1.2 The recent years have seen strong growth of air traffic especially at four of the hubs in the South East Region which have seen growth ranging from 5% to 9% increase in air traffic

[1] Boeing Long Term Market (Current Market Outlook). http://www.boeing.com/boeing/commercial/cmo/asia-pacific.page

[2] Airbus. (2013, Feb 25). Asia-Pacific to drive demand for bigger and more efficient aircraft. Retrieved from http://www.airbus.com/presscentre/pressreleases/press-release-detail/detail/asia-pacific-to-drive-demand-for-bigger-and-more-efficient-aircraft/

movements for 2012. Bangkok (VTBS), Jakarta (WII), Kuala Lumpur (WMKK) and Singapore (WSSS) are 4 major international airports in South East Asia, each handling more than 320,000 movements in 2012. Air traffic movements between these hubs have also grown in tandem with more than 1,800 weekly scheduled flights between VTBS, WIII, WMKK and WSSS.

2. DISCUSSION

RNAV 5 Route Network

2.1 One of the enabler to enhance en-route capacity and efficiency would be the implementation of the appropriate Performance Navigation Based (PBN) specification. Where overlapping and seamless surveillance and communication coverage exists, the appropriate PBN specification could be implemented. An excellent example of such approach to enhance en-route capacity between high-density city pair was the implementation of the Japan's "Sky Highway" in 2007. With more than 16,000 scheduled flights per week[3] within domestic Japan, the network of RNAV 5 routes in Japan's "Sky Highway" has served the air traffic movements well for the last half decade.

2.2 Similar efforts could also be carried out between high-density city pairs in this region by harmonizing en-route PBN implementation to reap the benefits of enhanced safety, capacity and efficiency. For instance, the ATS routes between Singapore and Kuala Lumpur FIRs handle more that 500 scheduled air traffic movements per week for just flights between WMKK and WSSS. In addition, the ATS route also serves flights that depart from WSSS heading beyond WMKK and vice versa. The total flight movements amount to about 2,500 air traffic movements per week.

2.3 Recognizing the high volume of air traffic on the ATS route between Singapore and Kuala Lumpur FIRs, Singapore and Malaysia restructure the ATS route and implemented pairs of RNAV 5 routes. The pairs of RNAV 5 routes segregate traffic between the WMKK and WSSS city pair against the other flights with destination beyond WMKK and WSSS. This allows the air traffic controllers to manage the flights more efficiently with enhanced safety. The restructured routes were implemented in Aug 2012 and have since benefitted flights that operate in that area (See Figure 1).

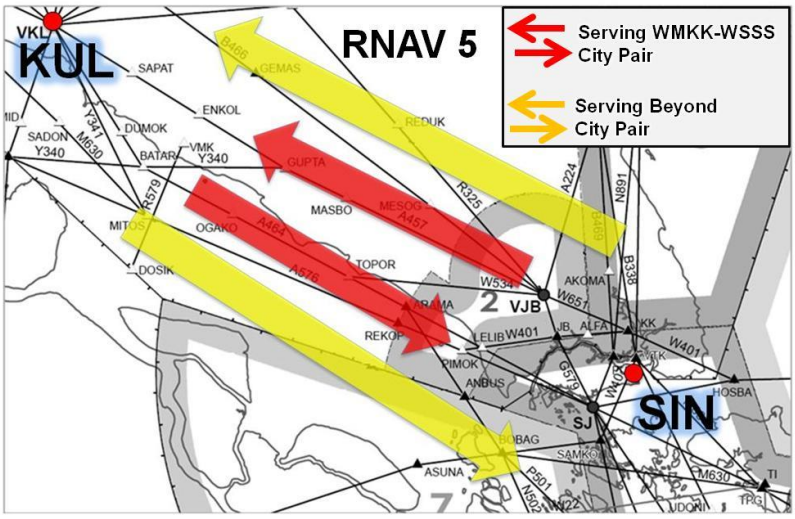

Figure 1. RNAV 5 Routes between Singapore and Kuala Lumpur FIRs

2.4 Beyond the Singapore – Kuala Lumpur city pair, the concept could be extended further to other high-density city pair routes such as Jakarta – Singapore and Bangkok – Kuala Lumpur. For

[3] CAPA Centre for Aviation. Schedule Analysis for Japan (week of 10 May 2013).

instance between Jakarta and Singapore FIRs, there are more that 450 scheduled flights per week operating between WSSS and WIII. On top of that, there are other flights that serve other airports in the Jakarta FIR and beyond to Australasia.

2.5 Given that there is seamless and overlapping surveillance coverage between Bangkok, Jakarta, Kuala Lumpur and Singapore FIRs, there is the potential to implement a network of RNAV 5 routes connecting VTBS, WMKK, WSSS and WIII (See Figure 2).

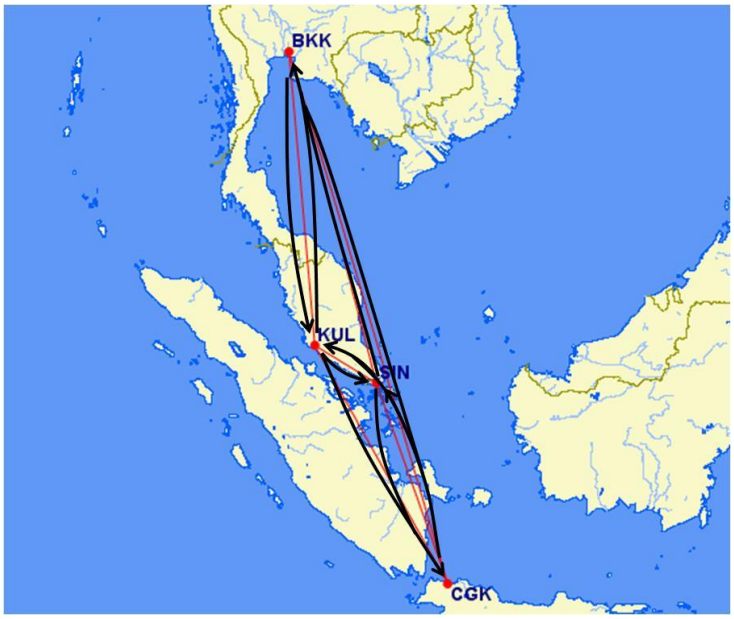

Figure 2. Proposed South East Asia RNAV 5 Route Network

2.6 To progress with the implementation, the States involved could collaborate both bilaterally and multilaterally at the appropriate forums. With the anticipated traffic growth in the coming years and the development of the ASEAN Single Aviation Market, there will be an urgent need for States to enhance ATM safety and capability by 2015.

2.7 RNAV5 PBN specification could be the start of a foundation to enhance en-route safety and capacity where surveillance and communication coverage permits. The States involved could also eventually explore implementation of RNAV 2 in line with the Phase I of the Preferred Aerodrome/Airspace and Route Specifications (PARS) and Preferred ATM Service Levels (PASL) of the proposed Asia Pacific Seamless ATM Plan.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the potential development of an RNAV 5 route network to serve areas where there are seamless surveillance and communication coverage;

b) note the potential alignment to the Asia Pacific Seamless ATM Plan;

c) explore other areas in the region where similar concept can enhance ATM; and

d) discuss any relevant matters as appropriate.

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