International Civil Aviation Organization

Fourth Meeting of the Bay of Bengal Traffic Flow Review Group (BOBTFRG/4)

Video Teleconference, 6 – 8 December 2022

Agenda Item 2: Updates from States and IATA on ADS-C/CPDLC and PBCS Implementation Status

Congestion in the Bay of Bengal (BoB) and IATA Survey Data

(Presented by IATA)

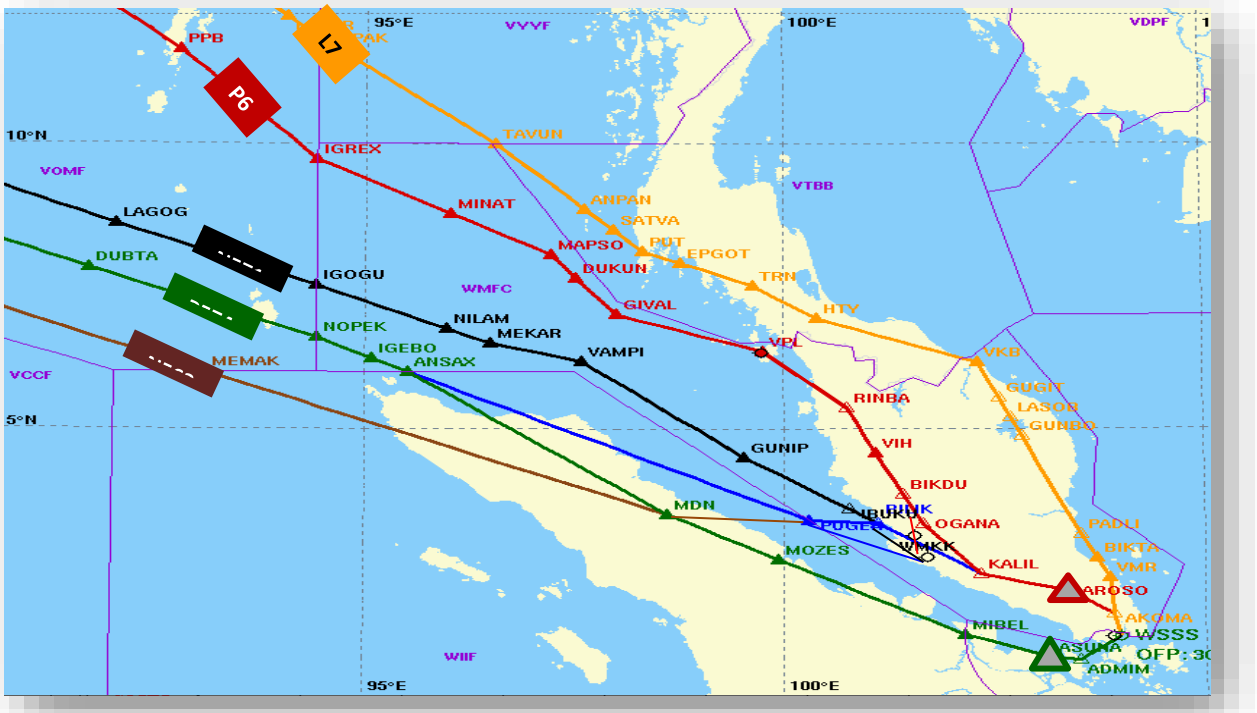
SUMMARY

This paper presents options for reducing separation standards in the Bay of Bengal and supporting PBCS non-exclusive mandate trials with airline equipage and capability data.

1. INTRODUCTION

1.1 As aviation continues to recover from the COVID-19 pandemic, air-routes connecting regional pairs are quickly reaching traffic levels that are creating congestion and delays, particularly for traffic transiting from Asia to Europe.

1.2 The graphical example below illustrates how airlines are required to flight plan for flights departing Singapore and Kuala Lumpur that have similar ETDs – generally less than fifteen minutes between them. These flights are planned on longer (non-optimal) routes as delaying them to achieve required procedural separation (i.e., as little as just four flights per hour on that en-route airway) would result in missing destination slots and onward connections. Based on one of the IATA member airline reports, it affects almost half of their nightly flights to Europe. Flight planning on longer alternate routes results in approximately 271 tons of additional fuel and 850 tons of extra CO2 emissions per year. Likewise, several other airlines are also facing similar challenges every night.



1.3 Previous discussions to alleviate the congestion have included the possible reactivation of AeroThai's effective BoBCAT traffic metering program. However, as ATS remains suspended in the Kabul FIR, the BoBCAT program would require significant modification and coordination in order to design and calculate for new metering points.

1.4 Under the present circumstances, other means of efficiency gains need to be explored and prioritised, particularly in the Bay of Bengal, in order to support smaller separation standards delivering improved traffic flow efficiencies without degrading safety levels.

2. DISCUSSION

PBN and PBCS Specifications

2.1 Separation standards in controlled airspace are determined by the technology available and the capabilities of ATC and the aircraft. Surveillance like ADS-B can provide for small separation standards while the range of PBN capabilities permits varying longitudinal and lateral standards.

2.2 The ICAO APAC Seamless ANS Plan V3.0 includes the note "*ATS routes should be designated with a navigation performance specification commensurate with the CNS/ATM operational environment (within Category S airspace, the PBN specification is not significant to ATC as it is used for track-keeping assurance, not ATC separation). The ATS route navigation performance specification selected should be harmonised and utilise the least stringent requirement needed to support the intended operation*."

2.3 Also, the ICAO APAC document *Establishing the Correct PBN Specifications for ATS Routes* (originally developed and presented as ATM/SG/6-Flimsy 7) includes comparison and guidance for PBN Specifications in different airspace types.

Category R (remote) airspace – served by ADS-C, CPDLC, HF and space-based ADS-B.	**Category S** (surveillance) airspace – served by ground-based radar or ADS-B or MLAT, and VHF.
• Optimal ATM Planning – no fixed ATS routes, Dynamic Airborne Reroute Procedures (DARP) or User Preferred Routes (UPR). • Acceptable ATM Planning – PBN fixed routes using RNP 2 (or less optimally, RNP 4), which had an ATC separation standard. *Note: RNAV 2, which had no on-board monitoring, may be used in the transition period with RNP 1 and GNSS as an equivalence (APANPIRG Conclusion).* • Poor ATM Planning – PBN fixed routes using the outdated, non-PBCS RNAV 10 (RNP 10) specification. • Unacceptable ATM Planning – use of the RNAV 5 specification, which requires VHF and ground-based navigation aid geometry coverage.	• Optimal ATM Planning – no fixed ATS routes, free route airspace (FRA). • Acceptable ATM Planning – PBN fixed routes using the RNP 2 or RNAV 2 specification. • Poor ATM Planning – PBN fixed routes using the RNAV 5 specification, or RNP 1, which was designed for terminal airspace (normally, within 40NM of an aerodrome). *Note: RNAV 5, which had no on-board monitoring, had no ICAO ATC separation standard, and no requirement for a database, GNSS input, or automated waypoint sequencing, as it was originally conceived as a low-end specification (Basic RNAV).* • Unacceptable ATM Planning – use of the oceanic RNAV 10 (RNP 10) or RNP 4 specifications, which were designed for oceanic airspace.

Table 1: Optimal PBN Implementation within Category R and S Airspace

2.4 Even though it is not the preferred specification, doc4444 (PANS-ATM) para 5.4.2.6.3 permits 50NM longitudinal separation to be applied between RNP10/RNAV10 capable aircraft without ADS-C. This may be implemented on completion of a relevant safety assessment.

5.4.2.6.3 *LONGITUDINAL DISTANCE-BASED SEPARATION MINIMA IN AN RNP RNAV ENVIRONMENT NOT USING ADS-C*

5.4.2.6.3.1 For aircraft cruising, climbing or descending on the same track, the following separation minimum may be used:

Separation minimum	*RNP type*	*Communication requirement*	*Surveillance requirement*	*Distance verification requirements*
93 km (50 NM)	10	Direct controller-pilot communications	Procedural position reports	At least every 24 minutes

2.5 Further efficiencies can be gained by applying a 30NM longitudinal separation standard under PBCS using RNP 2 or RNP 4 as described in para 5.4.2.9.2 of doc4444.

5.4.2.9.2 The following separation minima may be used for aircraft cruising, climbing or descending on:

a) the same track; or

b) crossing tracks provided that the relative angle between the tracks is less than 90 degrees.

Separation minima	*RNP*	*RCP*	*RSP*	*Maximum ADS-C periodic reporting interval*
93 km (50 NM)	10	240	180	27 minutes
	4	240	180	32 minutes
55.5 km (30 NM)	2 or 4	240	180	12 minutes
5 minutes	2 or 4 or 10	240	180	14 minutes

2.6 Note that if the VHF and SATCOM datalink meet PBCS performance requirements, they may be used to support the application of separation minimums that are dependent on PBCS, regardless of HF data link performance.

2.7 Despite available capabilities, some States are still applying larger standards than available, contributing to the growing congestion. This paper asks that all States prioritise implementing the most efficient standards according to capabilities before congestion in the region grows further.

2.8 IATA supports previous discussions on the initiation of a non-exclusive PBCS mandate trial in the Bay of Bengal (and adjoining areas where relevant) based on a similar trial in the NOPAC.

IATA Survey

2.9 The collection and collation of airline data was an action item to assist discussion and decision on a date for initiation of the non-exclusive PBCS mandate trial in the Bay of Bengal.

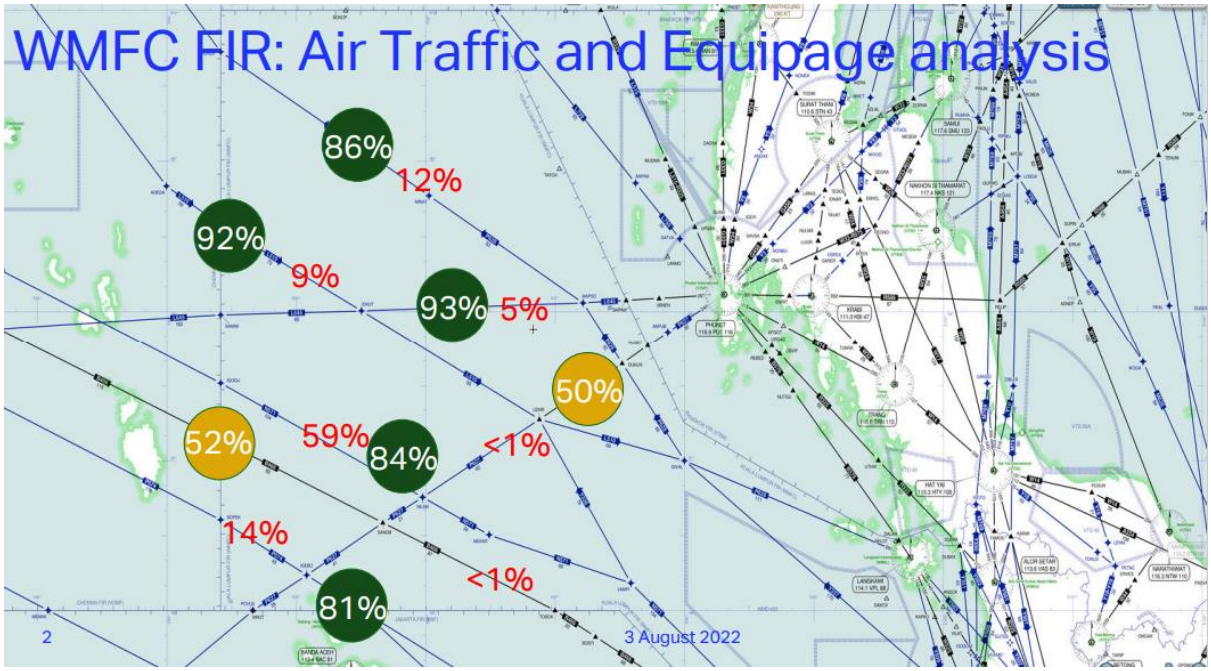
2.10 At ATM/SG/10 IATA submitted IP/06 *IATA Equipage and Capability Survey*. The paper presented the progress analysis of airline responses to IATA's Aircraft Equipage and Capability Survey

for the IATA Asia-Pacific and North Asia regions (~ ICAO APAC region) conducted in Quarters 1 and 2 of 2022 and which is ongoing.

2.11 The survey results showed for the region a large majority of the fleets of airlines that responded reported capability and regulator approval to operate under PBCS. Most also reported PBN capability of RNP4 or better.

2.12 IATA has already worked with Malaysia to combine further traffic data and refine the analysis to demonstrate equipage and capability that supports immediate moves towards implementation of more efficient standards under PBCS. IATA remains available to work with other States to conduct similar refined analyses if required to assist in finalising a date for the non-exclusive PBCS mandate trial.

2.13 Graphics illustrating equipage analysis for April 2022 air traffic on Oceanic airways clearly indicates higher percentage of air traffic with ADS-C/CPDLC equipage.



2.14 Notwithstanding the IATA survey data, it is noted that ICAO doc 9869 PBCS Manual paragraph 4.2.3.1 states: "*Annex 6, Parts I, II and III requires States to ensure that an aircraft operator meets the requirements prescribed in the RCP and RSP specifications for PBCS operations*."

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) discuss any relevant matters as appropriate; and,

c) prioritise implementation of most efficient standards according to demonstrated performance capabilities.