**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**ASIA AND PACIFIC OFFICE**

# REPORT OF THE FIRST MEETING OF THE BAY OF BENGAL REDUCED HORIZONTAL SEPARATION IMPLEMENTATION TASK FORCE (BOB-RHS/TF/1)

BANGKOK, THAILAND

2 – 6 November 2009

The views expressed in this Report should be taken as those of the Task Force and not of the Organization

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Page

**History of the Meeting**



**Report of BOB-RHS/TF/1**



**Appendices**

## 1.1 Introduction

1.1.1 The First Meeting of the Bay of Bengal Reduced Horizontal Separation Task Force (BOB-RHS/TF/1) was held at the ICAO Asia and Pacific Regional Office, Bangkok, Thailand from 2 to 6 November 2009.

## 1.2 Attendance

1.2.1 BOB-RHS/TF/1 was attended by 30 participants from India, Indonesia, Malaysia, Nepal, Oman, Pakistan, Singapore, Thailand, United States, IATA and BOEING. A complete list of participants is at **Appendix A** to this Report.

## 1.3 Officers and Secretariat

1.3.1 The meeting was moderated by Mr. John E. Richardson, ATM Expert, ICAO Asia and Pacific Office.

## 1.4 Opening of BOB-RHS/TF/1

1.4.1 Mr. John Richardson welcomed all the participants on behalf of Mr. Mokhtar A. Awan, Regional Director, ICAO Asia and Pacific Office. Mr. Richardson advised the meeting that aviation challenges in this large region of the Asia and Pacific area are mainly due to the expansion in economic terms of many of the APAC States. Although the economic crisis which has caused a severe downturn in the aviation industry, including the resultant effect on air navigation service providers, positive signs have lately shown a reverse upwards trend towards continued growth in the region. The meeting was advised that the subject of 50NM longitudinal separation in the Bay of Bengal area and beyond has been discussed at several meetings for a considerable amount of time. This dedicated Task Force to introduce 50NM longitudinal separation in the area is an avenue to move forward and complete the task to the benefit of all States concerned as well as the users.

1.4.2 Mr. Richardson also thanked the Sultanate of Oman for their attendance at this meeting. It is well recognized that implementation of 50NM longitudinal separation in the Mumbai FIR will alleviate many of the issues faced by the Muscat FIR, especially regarding eastbound flights.

## 1.5 Documentation and Working Language

1.5.1 The working language of the meeting as well as all documentation was in English.

1.5.2 Eleven (11) Working Papers and Two (2) Information Papers were presented to BOB-RHS/TF/1. A list of papers is included at **Appendix B** to this Report.

**Agenda Item 1: Adoption of Agenda**

1.1 The meeting reviewed the provisional agenda proposed by the Secretariat for BOB-RHS/TF/1, and adopted the following agenda:

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Review Outcomes of Related Meetings

Agenda Item 3: Operational Issues

Agenda Item 4: Safety Analysis and Airspace Monitoring Issues

Agenda Item 5: Post-Implementation Management Considerations

Agenda Item 6: Future Direction and Arrangements

Agenda Item 7: Preparation of BOB-RHS/TF Task List

Agenda Item 8: Any Other Business

Agenda Item 9: Date and Venue for BOB-RHS/TF/2

**Agenda Item 2: Review Outcomes of Related Meetings**

**Proposed Terms of Reference for the Bay of Bengal reduced Horizontal Separation Task Force (BOB-RHS/TF)**

2.1 The meeting was advised that the revised route structure implemented by the EMARSSH Task Force in the Bay of Bengal and beyond on 28 November 2002, took advantage of advanced satellite technology using RNP and RNAV aircraft capability which was designed to support RNP 10 operations.

2.2 The meeting noted however that, although RNP 10 operations include the capability to also reduce longitudinal separation to 50NM, the Bay of Bengal presently remains essentially a 10 minute MNT longitudinal airspace. This has long been recognized by the BBACG and, acknowledging the increasing FANS data link capability, BBACG/19 (January 2008) in conjunction with FIT-BOB set a target date of 2009 for implementation of 50NM longitudinal separations using CPDLC communications.

2.3 The meeting noted that BBACG/19 also observed that the potential exists for a reduction to 50/50 NM with DCPC and to 30/30 NM when full data-link services are available. It was also BBACGs view that a Task Force should be established as a matter of priority, to assist the States to plan for the implementation of 50/50 NM longitudinal separation and at the same time, conduct the associated safety assessments as an immediate outcome of the CRA work, with the objective of 30/30 NM reduced separations in the medium term.

2.4 During the BBACG/20 meeting, Oman expressed strong support for the concept of a simultaneous implementation of 50 NM longitudinal separation in the Arabian Sea at the same time as any implementation in the Bay of Bengal. Oman requested that the studies for 50 NM longitudinal which would be conducted in the Bay of Bengal be extended to adequately consider the Arabian Sea. India gave in principle support to this concept as both Oman and India recognised that this will

enhance overall capacity and a simultaneous implementation in Arabian Sea and Bay of Bengal appeared to be a very efficient way to proceed.

2.5 Recognising that Oman was not technically a member of the Bay of Bengal ATS coordination Group, the meeting agreed to Oman's request to be included in all activities relating to the 50 NM longitudinal implementation. As India and Oman were the two States materially affected by an Arabian Sea implementation, it would be feasible to simultaneously conduct a bi-lateral implementation based on the experiences and knowledge gained during the BOB-RHS/TF meetings.

2.6 The BBACG/20 meeting endorsed the establishment of the ICAO Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF), noting that final Terms of Reference (TOR) and initial action plans would be agreed by the first meeting of the Task Force.

2.7 Noting the discussions made in the Report of the BBACG/20, the meeting decided to amend the Terms of Reference of the BOB-RHS/TF to include those portions of the Arabian Sea within the Mumbai FIR to ensure a harmonized approach to implementation of 50NM horizontal separation in both the Bay of Bengal and the Mumbai FIR. The agreed Terms of Reference are described in **Appendix C.**

**Ongoing Changes to the Bay of Bengal and Arabian Sea Route Structures**

2.8 The meeting recalled that the EMARSSH project provided an RNP10 environment only in the lateral plane of 50NM due to most FIRs within the Bay of Bengal and beyond area being unable to provide Direct/Controller/Pilot/Communications (DCPC) in accordance with PANS-ATM (Doc4444) provisions. As a result, the longitudinal spacing between aircraft remained at 10 minutes (80NM RNAV). It was now considered timely that this matter was revisited, taking into account ATC system improvements over the past few years as well as planned implementation of suitable equipment to satisfy 50NM longitudinal spacing in the very near future.

2.9 The meeting was also presented with information on significant changes to the route structure, including the Bay of Bengal, mainly as a result of the implementation of ATFM/BOBCAT procedures.

2.10 In an effort to reduce delays and enhance the operation of the ATFM/BOBCAT system for westbound flights operating through the Kabul FIR, the meeting noted that several States have collaborated together in adding additional routes or realigning present routes over the past few years. Notable amongst these achievements are:

a) implementation of M875 from BUTOP – GUGAL (Bdy VIDF/OPLR FIRs) – JHANG (OPLR FIR)

b) implementation of L510 from GIVAL (Kuala Lumpur FIR) – IBANI (Bdy VABF/VIDF FIRs)

2.12 These positive achievements have shown a willingness by air navigation service providers (ANSPs) to move forward in route design where benefits and efficiencies would be achieved for both users and providers of the system. It was also advised that, since the introduction of the route BUTOP to JHANG about twelve months ago, as described in a) above, it has been estimated that there has been a saving of 70,000 tonnes of carbon emissions over the short time of opening this shortened airway.

2.13 Another important improvement in the ATS route structure which is presently on-going relates to the proposal to establish a like type parallel routes from Delhi FIR to Lahore FIR

between SAMAR – HANGU – LAJAK, which will be entirely separated with the revised route from BUTOP – GUGAL (Bdy VIDF/OPLR FIRs) – JHANG (OPLR FIR) – PAVLO. Once established, this ATS route will improve overall efficiency for aircraft as well as reduce the operational complexities for the Lahore ACC, especially during the ATFM/BOBCAT period. The Kabul ACC also advised that they strongly supports this proposal, together with the concurrent closing of entry point SITAX between Kabul and Lahore FIR. This will allow international civil aircraft to remain outside an area where military operations close to the Afghanistan/Pakistan border often frequent.

2.14 While waiting for this proposed ATS route mentioned above to be approved, the meeting considered an alternative route as follows: SAMAR – Lahore J121 – INDEK – HANGU G796 – LAJAK. Although the distance for the diversion adds 2-3 minutes to the flight time, the benefits far outweigh this small diversion around the PRD area, which is on the direct track between SAMAR and HANGU.

2.15 Pakistan confirmed that a solution to this issue is nearing completion. They also advised that both options mentioned in para. 2.12 and 2.13 above will be seriously looked at in their deliberations. The meeting recognized that any changes to the present route structure in this area that will allow simultaneous operations entering/leaving Kabul FIR at PAVLO and LAJAK requires the ability for H24 two/way operations on either route

*Proposed implementation of RNP4 PBN*

2.16 The meeting was advised that, under the Objectives and the Terms of Reference, the Task Force shall adopt a phased implementation programme of work to be accomplished. The first phase is to implement widespread 50NM longitudinal separation using CPDLC communications in the Bay of Bengal and the Mumbai FIR.

2.17 Notwithstanding the present commitment to implement 50NM longitudinal separation,, the meeting was encouraged to analyse the area of the Bay of Bengal and the Mumbai FIR to see where it could also be rewarding to concentrate on RNP 4 PBN for future operations, taking into account the present and pending ADS/CPDLC programmes of States concerned. The meeting also recalled that in the Regional PBN Plan, RNP4 is the preferred solution in the short term (2009-2012).

## Agenda Item 3: Operational Issues

### Implementation of Longitudinal RNAV 10 RNP10 (50NM) in the Bay of Bengal and Mumbai FIR

3.1 The meeting recalled that the ATS route structure across the Bay of Bengal includes a main parallel route structure as well as some important crossing routes. For ease of operation, especially with regard to ACC management, it was agreed that these crossing routes should also be taken into consideration within the designated areas in the planning for 50NM longitudinal separation.

3.2 As an example, RNAV route P762 is a major route for aircraft operating to/from Bangkok/Colombo, as well as aircraft overflying Colombo to African destinations. It is considered that this route and other similar routes should also be examined for inclusion to 50NM longitudinal separation criteria.

*ATS routes linking India/Pakistan with the Middle East via the Arabian Sea*

3.3 The meeting noted that many of the ATS routes now present over the Bay of Bengal continue their journey into the Middle East region across the Arabian Sea through to the Muscat FIR and beyond. These routes are under Oman radar coverage within the Muscat FIR, as is most if not all of the Gulf Peninsular. The meeting therefore appreciated the difficulty for Oman in managing eastbound traffic from other Gulf States transiting the Muscat FIR. These flights are radar spaced at the same level entering the Muscat FIR which causes the Muscat ACC to either expand the separation to 80NM or to change aircraft levels or divert the aircraft on another available ATS route prior to entry into Mumbai FIR. When this separation requirement is reduced to 50NM, Muscat ACC would have far less workload to achieve a satisfactory solution at the Muscat/Mumbai FIR crossing point.

3.4 Information was advised to the meeting that the heavy traffic between Karachi and the Gulf States (including departures from Muscat) was managed under an agreement between Muscat and Karachi ACCs where continuous radar spacing is used on two one/way routes. This has proved to be very successful since this coordination agreement was introduced.

*Application of Direct Controller-Pilot Communications (DCPC)*

3.5 The meeting was reminded that ICAO PANS-ATM (Doc 4444) states that DCPC shall be maintained while applying distance-based separation minima. DCPC shall be by voice or Controller-Pilot Data Link Communications (CPDLC). The communications criteria necessary for CPDLC to satisfy the requirement for DCPC shall be established by an appropriate safety assessment.

3.6 It should also be noted that, prior to and during the application of a distance-based separation minimum, the controller would determine the adequacy of the available communication link, considering the time element required to receive replies from two or more aircraft, and the overall workload/traffic volume associated with the application of such minima.

3.7 PANS-ATM also mentions in part that, when aircraft are at or are expected to reduce to, the minimum separation applicable, speed control techniques, including assigning Mach number, shall be applied to ensure that the minimum distance exists throughout the period of application of the minima. The meeting is advised that further pertinent information on this subject can be found in *PANS-ATM (Doc 4444) Chapter 5 – Separation Methods and Minima.*

**Effect of 50NM Horizontal Separation in the Bay of Bengal on ATFM/BOBCAT Operations**

3.8 The meeting noted that, with respect to operations across the Bay of Bengal and India/Pakistan through Afghanistan during the westbound night-time ATFM/BOBCAT period, special arrangements have been devised and agreed to which strategically ensure that aircraft entering the Kabul FIR are adequately spaced by a minimum of 10 minutes during the stipulated 4 hour period of 2000 -2359UTC.

3.9 In order to introduce RNP10 50NM longitudinal minima into the Bay of Bengal area, it will be necessary to assess what effect this new initiative would have on the present ATFM/BOBCAT system and whether there may need to be some adjustments instituted so that both ATFM and RNP10 longitudinal of 50NM are able to operate in harmony.

3.10 The meeting understood that work will be required to ensure that no or little disruption will apply to either initiatives. AEROTHAI gave the meeting an assurance that they will work on any issues envisaged to maintain harmony between both procedures.

3.11 The meeting was advised that presently during ATFM/BOBCAT operations, bunching of aircraft frequently occur necessitating some aircraft to be re-routed from the original flight planned route to an alternative ATS route in the initial phase of flight over the Bay of Bengal. This causes additional workload on both the controller and aircrew and possibly additional expense to the airline concerned. When checking the monthly data supplied by States in respect to these operations, analysis has found that, by using the example of 50NM as a figure for spacing over the Bay of Bengal in a 3 month period from July to September 2009, the percentage of Bunching resolved would be in the order of 52%.

**RNAV 10 (RNP10) spacing in the Arabian Sea**

3.12 The Sultanate of Oman (Oman) advised the meeting that, since the introduction of EMARRSH route structure, traffic in the Arabian Sea within the Muscat FIR has continued to grow at a steady and consistent pace, especially in regard to flights between the Gulf area and South Asia. It was also noted that forecasts indicate a significant increase in air traffic on Arabian Sea routes over the next 6 years to the point that on current predictions, air traffic will double during this period.

3.13 Oman advised that meeting that their main concerns are with eastbound aircraft who enter the Muscat FIR from departure airports to the west separated by radar procedures (5 – 10NM spacing), which need to be either moved to another flight level or to another ATS route so as to spread the spacing to the present 80NM separation standard currently being used in Mumbai FIR. This latter option is mostly too difficult to manage, which then requires aircraft to be descended to inefficient flight levels.

**Reduced Horizontal Separation in the South China Sea (SCS) area**

3.14 The meeting found interest in noting that on 3 July 2008, 50NM Longitudinal Separation in the SCS was implemented on two of the important parallel routes, L642 and M771. In order to progress to this achievement, a fundamental requirement was to identify an En-route Monitoring Agency (EMA) to conduct the necessary safety assessment and to determine/monitor collision risk on the horizontal plane, arising from the reduced separation, on an ongoing basis.

3.15 The meeting was advised that, in this regard, the Civil Aviation Authority of Singapore (CAAS) elected to offer their services in the role of EMA for the South China Sea and adopted the name, South East Asia Safety Monitoring Agency (SEASMA) from July 1 2008. SEASMA has since completed the required safety assessments and ascertained that the target level of safety arising from the 50NM horizontal separation on the 6 parallel ATS routes in the SCS had been met.

3.16 This work was originally carried out under the Required Navigation Performance (RNP) Implementation Task Force (RNP/TF). The task force was later renamed as the South East Asia RNP Implementation Task Force (SEA-RNP/TF) to better reflect its objectives and focus within the Southeast Asia area. The RNP-SEA/TF has lately gone through another change been renamed to South East Asia Route Review Task Force (SEA-RR/TF) to include review of the route structure in South East Asia to meet future air traffic demands.

3.17 With the successful implementation of horizontal separation reduction on ATS routes L642 and M771, Singapore noted that the following elements are critical for the implementation of reduced horizontal separation in the South China Sea area.

*Availability of CRA service*

3.18 The meeting was advised that one of the essential requirements for the application of 50NM longitudinal separation is the availability of Direct Controller Pilot Communication (DCPC). ICAO PANS-ATM (Doc 4444) states that DCPC shall be by voice or Controller-Pilot Data Link Communications (CPDLC). A large portion of the airspace over the South China Sea area are considered to be remote and not within the coverage of VHF. Thus the use of CPDLC via data-link is deployed to meet the DCPC requirements.

3.19 In order to meet ICAO safety management provisions for the use of data-link, a Central Reporting Agency (CRA) is required to provide the airspace safety monitoring for ADS and CPDLC systems. In this respect, Japan has volunteered to provide CRA services over the South China Sea area. CRA performs the essential technical analysis of the performance of ADS/CPDLC systems and undertakes the investigation of system failures and other technical malfunctions. This is essential to trace the cause of problems whether in the aircraft or ground systems and to initiate remedial action by the responsible parties.

*RASMAG safety guidance*

3.20 After its establishment in 2004, the Regional Airspace Safety Monitoring Advisory Group (RASMAG) recognised the need to develop a handbook and/or guidance material for safety assessment and monitoring for implementation of reduced horizontal plane separations. Work on the development on the En-route Monitoring Agency (EMA) handbook had been ongoing for a considerable amount of time in RASMAG, and by participating in RASMAG, SEASMA had the opportunity to contribute in the development of this important document. Finally, the document was adopted by APANPIRG/20 held in September 2009. The Handbook also serves as guidance material for States in the region.

*Monitoring of horizontal navigation errors*

3.21 The meeting noted that an important aspect of the implementation of reduced horizontal plane separations is monitoring occurrences of navigational errors in lateral and longitudinal navigation. Termed the Gross Navigational Errors (GNEs), these must be identified and included in the collision risk models as part of the safety assessment and monitoring process.

3.22 Monitoring of lateral errors is often accomplished by radar controllers observing the lateral displacement from flight planned track as the aircraft enters radar coverage before coming into the coverage of ground based navigation aids at the end of an oceanic route segment.

3.23 Monitoring of longitudinal errors is accomplished by reporting occurrences where the observed longitudinal separation is either less or more than the expected longitudinal separation. This may be in situations where the separation standard is infringed, the expected time between two aircraft varies by 3 minutes or more (even if the applicable separation standard is not infringed) or when a pilot estimate varies by 3 minutes or more from that advised in a routine position report.

3.24 In the interests of standardisation and efficiency, arrangements for monitoring of GNEs are often agreed between affected States. A program to monitor the lateral and longitudinal deviations of aircraft assigned to the RNAV routes was implemented when the revised South China Sea routes first became operational in November 2001. Through a letter of agreement (LOA) signed by the ANSPs of the five South China Sea FIRs, there has been uninterrupted radar monitoring of both individual aircraft lateral and longitudinal errors, and also unexpected changes in longitudinal separation between aircraft pairs, at fixes near the end of flight on routes M771, L625, N884 and N892 since the introduction of the RNAV routes.

3.25 A revised LOA in June 2008, formally added Singapore's surveillance of L642 and M767 to the monitoring program. The most important point to consider is that monitoring of GNE should commence well before implementation of reduced horizontal separations in order to provide a benchmark and adequate data upon which to assess aircraft navigational performance in the specific airspace.

3.26 The meeting noted that the 4 remaining north/south routes which need to be included in the 50NM longitudinal programme pass through the Manila FIR which does not have DCPC capability. The meeting was advised that this airspace in under the responsibility of the Manila ACC. Information was given that the Philippines are expected to upgrade their ACC in Manila and provide CPDLC capability by a target date of 2012, which would allow full 50NM capability throughout the South China Sea area.

3.27 The meeting thanked Singapore for their presentation on the progressive work accomplished by the SEASMA and considered that a similar EMA was also required in the BOB and Mumbai FIR to accomplish the tasked required in meeting the target level of safety in these areas for introduction of RNAV 10 (RNP 10) longitudinal separation 50NM.

3.28 The meeting finally agreed that the formulation of an agreed monitoring program by means of a Letter of Agreement between States and the proposed EMA for the area under consideration was an acceptable way forward to implement reduced horizontal separation over the Bay of Bengal area as well as the Mumbai FIR.

**Indonesia 10 minutes MNT Separation and weekly traffic data**

3.29 Indonesia advised the meeting that EMARSSH routes were implemented in two phases within Indonesia airspace. Phase one was implemented in conjunction with the States of Australia, Malaysia and Singapore on 29 November 2001 and RNP 10 was implemented on these routes on 29 December 2001.

3.30 EMARSSH phase two was implemented within the western part of Jakarta FIR (Upper Medan Sector) on 28 November 2002 and included new routes between adjoining FIRs of Kuala Lumpur, Colombo, Chennai and Singapore for RNAV Equipped aircraft.

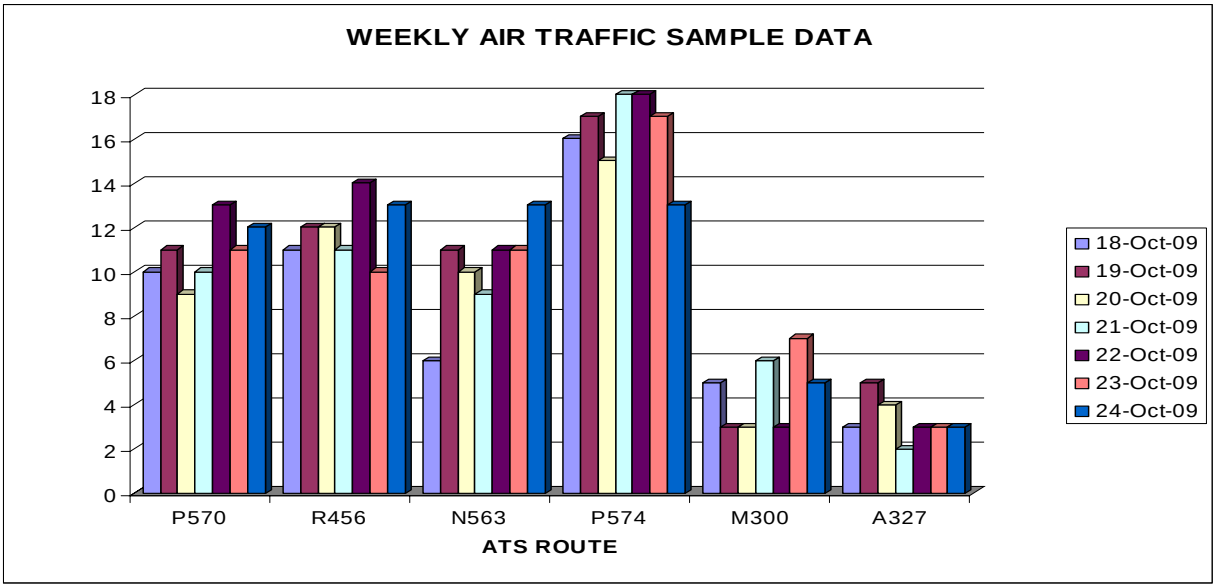
*Implementation*

3.31 Since the implementation of the EMARSSH, a review had been undertaken of traffic movement data, which showed that there had been increasing in movements on several routes in there airspace.

**TRAFFIC SAMPLE DATA**
EMARSSH ROUTE WITHIN JAKARTA FIR

| DATE | ROUTE | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|
| | P570 | R456 | N563 | P574 | M300 | A327 | |
| 18-Oct-09 | 10 | 11 | 6 | 16 | 5 | 3 | 51 |
| 19-Oct-09 | 11 | 12 | 11 | 17 | 3 | 5 | 59 |
| 20-Oct-09 | 9 | 12 | 10 | 15 | 3 | 4 | 53 |
| 21-Oct-09 | 10 | 11 | 9 | 18 | 6 | 2 | 56 |
| 22-Oct-09 | 13 | 14 | 11 | 18 | 3 | 3 | 62 |
| 23-Oct-09 | 11 | 10 | 11 | 17 | 7 | 3 | 59 |
| 24-Oct-09 | 12 | 13 | 13 | 13 | 5 | 3 | 59 |
| | | | | | | | |
| weekly | 76 | 83 | 71 | 114 | 32 | 23 | 399 |
| Percentage (%) | 19.05 | 20.80 | 17.79 | 28.57 | 8.02 | 5.76 | 100 |
| Average | | | | | | | 57 |

**The Statistic of weekly Traffic**




3.32 The meeting also noted that this traffic sample does not include increasing traffic on the Haj flight from Indonesia to Mecca. During the Haj period, aircraft depart from 11 airports within Indonesia. In 2009, 478 outbound additional flights within 2 weeks departed from Indonesian airports and a similar amount returned over the next two weeks at the end of Haj.

3.33 The meeting was also advised that, although the EMARSSH project stated that the RNP 10 operations include the capability to also reduce longitudinal separation to 50NM without affecting ATS operations on adjacent routes, the traffic operating within the Jakarta FIR presently operate using 10 minute MNT longitudinal separation.

3.34 Indonesia further advised the meeting that they have planned to eliminate some deficiencies in the communications capabilities throughout their FIRs, particularly in the western sector. The meeting noted that the concept of RNAV 10 (RNP 10) 50NM longitudinal separation is a

goal that Indonesia wishes to achieve as soon as possible once the programmed updates in their CNS capabilities are completed.

**Agenda Item 4: Safety Analysis and Airspace Monitoring Issues**

**Safety Assessments and Monitoring Requirements**

4.1 The meeting recalled that ICAO PANS/ATM (DOC4444), para. 2.6.1- *Need for Safety Assessments* lists details when a safety assessment will be carried out in respect of proposals for significant airspace reorganizations, for significant changes on the provision of ATS procedures applicable to an airspace or an aerodrome, and for the introduction of new equipment, systems or facilities.

4.2 Included in this list of requirements are items such as:

a) a reduced separation minimum to be applied within an airspace;

b) a new operating procedure;

c) a reorganization of the ATS route structure; and,

d) implementation of new communications, surveillance or other significant systems and equipment, including those providing new functionality and/or capability.

4.3 The meeting was advised that, to ensure that the introduction of PBN en-route applications within the Asia/Pacific Region is undertaken in a safe manner, in accordance with relevant ICAO provisions, implementation shall only take place following conduct of a safety assessment that has demonstrated that an acceptable level of safety will be met. This assessment may also need to demonstrate that levels of risk associated with specific PBN en-route implementations are acceptable. Additionally, ongoing periodic safety reviews shall be undertaken where required in order to establish that operations continue to meet the target levels of safety.

4.4 The meeting further noted that APANPIRG/16 reinforced this position in 2005 through the adoption of Conclusion 16/5 which reads:

**Conclusion 16/5 – No implementation of reduced separation unless compliant with Annex 11**

That, recognizing that some States had not adequately complied with safety management provisions, the Regional Office advise States of the Asia/Pacific Region that further regional implementation of reduced separation minima should only proceed in circumstances where implementing States can demonstrate an ability to comply with Annex 11, Chapter 2, safety management provisions for the continuous monitoring and regular assessment of the safety level achieved.

*Conducting Safety Assessments and Reporting Results*

4.5 The meeting was advised that, in order to conduct a safety assessment, an Enroute Monitoring Agency (EMA) will need to acquire an in-depth knowledge of the use of the airspace, typical aircraft types etc within which the reduced horizontal-plane separation will be implemented. Experience has shown that such knowledge can be gained through acquisition of charts and other material describing the airspace, and through periodic collection and analysis of samples of traffic movements within the airspace.

4.6 A safety assessment conducted by an EMA consists of estimating the risk of collision associated with the horizontal-plane separation standard and comparing this risk to the established Target Level of Safety (TLS). Further, RASMAG will determine the safety reporting requirements (e.g. format and periodicity) for the EMA.

*Establishing the Competence Necessary to Conduct a Safety Assessment*

4.7 The meeting recognized that conducting a safety assessment is a complex task requiring specialized skills which are not practiced widely. As a result, prior to receiving RASMAG approval to operate as an EMA, the organization will need to demonstrate to RASMAG the necessary competence to complete the required tasks.

4.8 Ideally, an EMA will have the internal competence to conduct a safety assessment. However, recognizing that personnel with the required skills may not be available internally, an EMA may find it necessary to augment its staff, either through arrangements with another EMA or with an external (i.e. non EMA) organization possessing the necessary competence.

4.9 The meeting was advised to note that, if it is necessary to use an external organization to conduct a safety assessment, an EMA must have the competence to judge that such an assessment is done properly. This competence could be acquired through an arrangement with an EMA which has conducted safety assessments.

4.10 An EMA will need to take into account that a safety assessment must reflect the factors which influence collision risk within the airspace where the reduced horizontal-plane separation will be applied. Thus, an EMA will need to establish a method to collect and organize pertinent data and other information descriptive of these airspace factors. As will be noted below, some data sources from other airspace where reduced horizontal-plane separation has been implemented may assist an EMA in conducting a safety assessment. However, an EMA may not use the safety assessment results from another portion of airspace as the sole justification for concluding that the TLS will be met in the airspace where the EMA has safety assessment responsibility.

*Assembling a sample of traffic movements from the airspace*

4.11 Samples of traffic movement data should be collected for the entire airspace where reduced horizontal-plane separation will be implemented. As a result, ANSPs providing services within the airspace are required to cooperate in providing this data.

4.12 In planning the timing and duration of a traffic movement data sample, the meeting was advised that an EMA should take into account the importance of capturing any periods of heavy traffic flow which might result from seasonal or other factors. The duration of any traffic sample should be at least 30 days, with a longer sample period left to the judgment of an EMA. By regional agreement, as recorded in APANPIRG Conclusion 16/4, traffic sample data within the Asia/Pacific Region is collected by all States for the month of December each year for purposes of RVSM monitoring. During 2009, APANPIRG 20 expanded the usage of this data under certain conditions to support regional implementations, including reduced horizontal plane separation minima.

4.13 The following information should be collected for each flight in the sample:

a) date of flight;

b) flight identification or aircraft call sign, in standard ICAO format;

c) aircraft registration mark, if available;

d) PBN approval type;

e) aircraft type conducting the flight, as listed in the applicable edition of ICAO Doc 8643, Aircraft Type Designators;

f) origin aerodrome, as listed in the applicable edition of ICAO Doc 7910, Location Indicators;

g) destination aerodrome, as listed in the applicable edition of ICAO Doc 7910, Location Indicators;

h) entry point (fix or latitude/longitude) into the airspace;

i) time (UTC) at entry point;

j) flight level (and assigned Mach number if available) at entry point;

k) route after entry point;

l) exit point from the airspace;

m) time (UTC)at exit point;

n) flight level (and assigned Mach number if available) at exit point;

o) route before exit fix; and

p) additional fix/time/flight-level/route combinations that the EMA judges are necessary to capture the traffic movement characteristics of the airspace.

*En-route Monitoring Agency (EMA) Handbook*

4.14 The meeting was informed that, recognizing the need for a common set of principles and practices for safety assessment and ongoing safety monitoring, RASMAG prepared a regional En-Route Monitoring Agency Handbook in connection with operational usage of reduced horizontal-plane separation minima based on the application of PBN. The handbook is expected to also help to promote an interchange of information among Asia/Pacific States in support of achieving common operational horizontal monitoring procedures, as well as supporting the acquisition and sharing of data resulting from the application of those procedures. The APANPIRG/20 meeting agreed to the following Conclusion:

**Conclusion 20/25 − Adopt En-route Monitoring Agency (EMA) Handbook**

That the *Asia/Pacific En-route Monitoring Agency (EMA) Handbook*, as shown in Appendix D to the APANPIRG/20 report on Agenda Item 3.3, be adopted and circulated as Asia/Pacific regional guidance material.

4.15 The **En-route Monitoring Agency (EMA) Handbook** is available on the ICAO website for States' information http://www.bangkok.icao.int/edocs/index.html.

4.16 The meeting was invited to note that, in order to work towards a successful implementation of 50NM longitudinal separation in areas where the present 80NM separations exists, action will be required to carry out a safety assessment over most of the area under consideration. In addition, an appropriate EMA will need to be responsible to continue the ongoing task of safety assessment across the whole area to ensure performance parameters continue to be met.

*Safety assessments in the Bay of Bengal area*

4.17 The meeting noted that other ATS route initiatives have previously taken place across both the Bay of Bengal and the oceanic area of the Mumbai FIR with the implementation of the EMARSSH route structure in 2002 followed by RVSM in 2003. Appropriate pre-implementation safety assessments were performed in each occasion.

4.18 By definition in safety assessments mentioned earlier in the Report, a further safety assessment would now be required as part of the implementation programme to introduce 50NM from the present 80NM longitudinal separation within the Bay of Bengal and Mumbai FIR.

*Horizontal Enroute Monitoring Agency for the Bay of Bengal and Mumbai FIR*

4.19 The meeting was advised that presently, there is no dedicated safety monitoring agency established to perform the important task of processing traffic data analysis in this area to ensure that the Target Level of Safety (TLS) in the longitudinal-plane could be met. In addition, it would appear that, notwithstanding the implementation of lateral separation implementation of 50NM in EMARSSH, safety monitoring has not been continuous. Both of these matters need to be addressed to ensure that ICAO safety requirements are in place prior to proposed implementation of 50NM longitudinal separation in the Bay of Bengal and Mumbai FIR as well as ongoing safety monitoring for lateral separation of 50NM in these areas.

4.20 India advised the meeting that, taking into consideration the amount of airspace within their FIRs in both the Bay of Bengal and the Arabian Sea, they are prepared to establish an Enroute Monitoring Agency in accordance with ICAO provisions. Recognizing the importance of this task, they further advised that work has already commenced on this matter and should be completed in time for the introduction of 50NM longitudinal separation in the mentioned area. Singapore, who is responsible for the EMA service for the South China Sea area, offered to share their experience on the setting up of SEASMA with India in the establishment of an EMA service for the Bay of Bengal and Mumbai FIR if required.

*Boeing assistance to States on Bench-testing of ADS/CPDLC equipage*

4.21 Boeing advised the meeting that they would coordinate with States to arrange "virtual test flights" on selected routes using avionics test benches. The purpose to these tests is to confirm necessary CPDLC and ADS capability along the routes selected for RNP 10 trials. Since these are "virtual flights" non normal operating conditions can be simulated allowing ANSPs to confirm necessary triggers and alerts are working as designed.

4.22 Boeing also advised that they will coordinate with States over the coming weeks with a goal of having initial test flights completed, initial test reports written before the end of the year and additional tests as required by States. The meeting agreed that successful completion of these tests would be a prerequisite to proceeding to live operational trials.

4.23 The meeting also agreed that strong support by airlines flying in this prescribed area is also recommended to assist in gathering data during this trial period, by logons to satellite communications and passing position data to the relevant ACCs concerned.

**Agenda Item 5: Post-Implementation Management Considerations**

5.1 No items were identified at this time for discussion under this agenda item.

**Agenda Item 6: Future Direction and Arrangements**

**User Expectations**

6.1 IATA strongly endorsed the objectives of this Task Force and gave a commitment to support the initiative to implement RNAV 10 (RNP 10) operations of 50NM longitudinal separation in the Bay of Bengal and Mumbai FIR. The meeting also noted that the IATA User Expectations had been incorporated in the Regional Performance Objectives (RPOs) adopted by APANPIRG/20.

6.2 The meeting was advised that the preferred navigation specification in Oceanic/ Remote continental is RNP4 enabling 30/30 separations; although consistent availability of RNAV10 (RNP10) separations should be applied in the first instance. IATA understands that the introduction of reduced standards may lead in the future to certain areas of "exclusive" airspace being established. It is vital that appropriate consultation and timely notification be given if this is required.

6.3 IATA proposed the following phases needed to be considered (not necessarily in order):

a) Availability of 50nm longitudinal separations

b) Availability of RNP4 separations

c) Requirement of RNAV 10 (RNP 10) capability; and,

d) Requirement of RNP 4 capability

6.4 The meeting noted that IATA also strongly supports ICAO GPI-7 which identifies User Preferred Routes as the preferred navigation means, particularly for Oceanic/Remote Continental airspace.

6.5 It was mentioned that in IATA’s view during the planning process, efforts should be made to use currently available techniques, procedures and processes to deliver the appropriate benefits. Planning for future technological solutions should also include phased migration plans from the current status to ensure full benefits are available when technological solutions are implemented.

6.6 IATA requested the meeting to consider the User Requirements as an integral part of planning and implementation, to ensure timely communication takes place with key stakeholders and to establish plans to enable:

a) Consistent application of RNAV 10 (RNP 10) 50/50 separations

b) Planned migration to RNP 4 30/30 separation

c) Planned availability for UPR and DARP where appropriate

6.7 The meeting agreed that collaboration was vital to enable the successful implementation of any operational enhancement. India shared with the meeting their PBN plan which had been developed and was available for viewing on the AAI’s website: <http://www.aai.aero/menu_inc/PBN_Imp.pdf>.

6.8 The meeting recognised that while PBN enhancements were important, they were simply one part of the process and had to be implemented in conjunction with route enhancements and separations to deliver full benefits.

**Formation of Small Working Group to develop future work schedule**

6.9 The meeting agreed to form a small working group to develop future work schedule including timelines for further task force meeting. The report is at **Appendix D**.

## Agenda Item 7: Preparation of BOB-RHS/TF Task List

7.1 The meeting reviewed the draft Task List as shown in **Appendix E**.

## Agenda Item 8: Any Other Business

8.1 No items were identified for discussion under this agenda item.

## Agenda Item 9: Date and Venue for BOB-RHS/TF/2

9.1 The meeting agreed that, in order to continue progress in the implementation of RNAV 10 (RNP 10) 50Nm longitudinal Separation in the area under consideration, The next meeting should be held as soon as practible.

9.2 Two options were put forward; the first option was in late February and the second in early April. The meeting finally agreed to the first option and it is proposed that the dates will be 22 – 26 February and to include the FITBOB meeting on the last two days (25-26 February) of this period. FITBOB is an integral part of moving the initiative forward. Option 1: (preference) late February 2010 or Option 2: early April 2010 / Coordinate and combine with FIT-BOB

**Closing of the Meeting**

9.3 In closing the meeting, the Moderator Mr. John Richardson sincerely thanked all participants for their valuable input to the task at hand and to the positive discussions which took place during the meeting. He re-emphasized the importance that this project will have on both the providers of ATS and the airlines in better use of available airspace, by developing a robust plan to introduce 50NM longitudinal separation. He also mentioned that this was the first step in the Bay of Bengal and the Mumbai FIR in the provision of air traffic management using data-link as a communications and separation tool. This is not new and has been in use in several other parts of the Asia and Pacific region for some time. It is also in accordance with the Regional PBN plan and should lead to other initiatives in the not to distant future.

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## List of Participants

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| 1. | **INDIA** | | | |
| | 1. | Mr. A.K. Dutta | GM (ATM)<br>Airports Authority of India<br>India | Tel: +91-11-2461 0776<br>Fax: +91-11-2461 0776<br>E-mail: akdutta@aai.aero<br>akdutt0907@yahoo.com |
| | 2. | Mr. Sylvester Israel | Jt. GM (ATM)<br>Chennai Airport<br>Airports Authority of India<br>India | Tel: +91-44-2256 1538<br>Fax: +91-44-2256 1740<br>E-mail: sylvy197@yahoo.co.in<br>gmatmchennai@gmail.com |
| 2. | **INDONESIA** | | | |
| | 3. | Mr. Indra Gunawan | Staff of Air Traffic Service<br>DGCA Indonesia<br>Gedung Karya Building 23rd Fl.<br>Jl. Merdeka Barat No. 8,<br>Jakarta 10110<br>Indonesia | Tel: 62-21-350 7569/350 6451<br>Fax: 62-21-350 7569<br>E-mail: eechoex@yahoo.com |
| | 4. | Ms. Arifa Nur Cahyani | Staff of Air Navigation Standardization and Certification<br>DGCA Indonesia<br>Gedung Karya Building 23rd Fl.<br>Jl. Merdeka Barat No. 8,<br>Jakarta 10110<br>Indonesia | Tel: 62-21-350 7569<br>Fax: 62-21-350 7569<br>E-mail: arifa.cahyani@gmail.com |

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| | 5. | Mr. Agus Istiarno | PT. Angkasa Pura I<br>Kota Baru Bandar Kemayoran<br>Block B-12 Kav No.2<br>Jakarta 10610<br>Indonesia | Tel: +62-08889789828<br>E-mail: agis_maats@yahoo.com |
| | 6. | Mr. I. Gusti Made Adiyasa | PT. Angkasa Pura I<br>6D 611 Soekarno-Hatta<br>Jakarta 16120<br>Indonesia | Tel: +62-8129152090<br>Fax: +62-215506131<br>E-mail: igm_adiyasa@yahoo.com |
| | 7. | Mr. Sugiarto | MAATS<br>Indonesia | Tel: +62-8124274500<br>E-mail: sugiarto_matsc@yahoo.com |
| 3. | **MALAYSIA** | | | |
| | 8. | Mr. Syed Syahrill Bin Syed Salim | Air Traffic Controller<br>Air Traffic Control Centre Complex<br>Department of Civil Aviation<br>Sultan Abdul Aziz Shah Airport<br>47200 Subang<br>Selangor Darul Ehsan<br>Malaysia | Tel: +6019 2605175<br>Fax: +603-7847 3572<br>E-mail: syahrill@dca.gov.my |
| | 9. | Mr. Muddatstsir Mashor | ATS Department<br>Department of Civil Aviation<br>Putrajaya<br>Malaysia | Tel: +6012-2334540<br>E-mail: muddatstsir@dca.gov.my |

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| 4. | **NEPAL** | | | |
| | 10. | Mr. Rishikesh Sarma | Director (Flight Operations)<br>Civil Aviation Authority of Nepal<br>Flight Operation Department<br>Tribhuvan Int'l Airport<br>Kathmandu<br>Nepal | Tel: +977-9851059212<br>Fax: +977-1-4262516, 4218513<br>E-mail: cnsatm@mos.com.np |
| | 11. | Mr. Chandeshwar Pandey | Deputy Director ATS Division<br>Civil Aviation Authority of Nepal<br>Head Office<br>Babar Mahal<br>Kathmandu | Tel: +977-1-6638814<br>Fax: +977-1-4252516<br>E-mail: chandeshwarpandey@yahoo.com |
| 5. | **OMAN** | | | |
| | 12. | Mr. Abdullah Nasser Al-Harthy | SATO<br>CAA – Oman | Tel: +96899476806<br>E-mail: Abdullah_nasser@dgcam.gov.om |
| | 13. | Mr. Sabri Said Al-Busaidy | Chief Standard & Airspace<br>CAA – Oman | Tel: +96899359415<br>Fax: +96824518990<br>E-mail: sabri@dgcam.gov.om |
| | 14. | Mr. Taya Said Al-Mati | SATCO<br>Salalah Airport<br>CAA – Oman | Tel: +96899494904<br>Fax: +96823204104<br>E-mail: tasa41@hotmail.com |

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| 6. | **PAKISTAN** | | | |
| | 15. | Mr. Suhail Ahmed | Chief ATCO/General Manager (ATS)<br>Civil Aviation Authority<br>HQCAA, Terminal-1<br>Jinnah International Airport<br>Karachi<br>Pakistan | Tel: +92 (21) 99242044<br>Fax: +92 (21) 99242045<br>E-mail: gmats@caapakistan.com.pk |
| 7. | **SINGAPORE** | | | |
| | 16. | Mr. Hermizan M. Jumari | Air Traffic Control Manager (Air Traffic Management)<br>Civil Aviation Authority of Singapore<br>Singapore Changi Airport<br>P.O. Box 1<br>Singapore 918141 | Tel: 65-6595 6064<br>Fax: 65-6545 6516<br>E-mail: hermizan_jumari@caas.gov.sg |
| | 17. | Ms. Valerie Sim | Air Traffic Control Manager (Air Navigation Services Safety Office)<br>Civil Aviation Authority of Singapore<br>Singapore Changi Airport<br>P.O. Box 1<br>Singapore 918141 | Tel: 65-6541 2683<br>Fax: 65-6545 6516<br>E-mail: valerie_sim@caas.gov.sg |
| 8. | **THAILAND** | | | |
| | 18. | Mr. Nopadol Sang-Ngurn | ATC Expert<br>Airport Standards Bureau<br>Department of Civil Aviation<br>71 Soi Ngarmduplee, Rama IV Rd<br>Sathorn, Bangkok 10120<br>Thailand | Tel: 66-2-287 0322 ext 1399<br>E-mail: nopadol205@yahoo.com |

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| | 19. | Capt. Apiluk Permphol | Deputy Manager, International Flight Safety and Operations Development Department<br>Thai Airways International Public Company Limited<br>89 Vibhavadi Rangsit Road<br>Bangkok 10900, Thailand | Tel: +66-2-545 2665<br>Fax: +66-2-545 3849<br>E-mail : apiluk.p@thaiairways.com |
| | 20. | Capt. Choompol Soodla | Manager, Operations Specification Division<br>Operations Support Department<br>Thai Airways International Public Company Limited<br>89 Vibhavadi Rangsit Road<br>Bangkok 10900, Thailand | Tel: +66-2-545 2665<br>Fax: +66-2-545 3849<br>E-mail : choompol.s@thaiairways.com |
| | 21. | Mr. Aumphol Tuatulanon | Aircraft Engineer, Technical Department<br>Thai Airways International Public Company Limited<br>333/2 M.1 Nongpure, Bangphli<br>Samutprakarn 10540<br>Thailand | Tel: +66-2-137 6210<br>Fax: +66-2-137 6940<br>E-mail : aumphol.t @thaiairways.com |
| | 22. | Mr. Pob Boonyavej | Aircraft Engineer, Technical Department<br>Thai Airways International Public Company Limited<br>333/2 M.1 Nongpure, Bangphli<br>Samutprakarn 10540<br>Thailand | Tel: +66-2-137 5113<br>Fax: +66-2-137 6910<br>E-mail : pob.b@thaiairways.com |
| | 23. | Mrs. Sirikes Niemloy | Director, Area Control Centre 2<br>Aeronautical Radio of Thailand Ltd<br>102 Ngamduplee<br>Thungmahamek, Sathorn<br>Bangkok 10120, Thailand | Tel: +66-2-285 9465<br>Fax: +66-2-287 8835<br>E-mail: sirikes.ni@aerothai.co.th |

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| | 24. | Mr. Siwapong Boonsalee | Engineering Manager<br>Aeronautical Radio of Thailand Ltd<br>102 Ngamduplee<br>Thungmahamek, Sathorn<br>Bangkok 10120, Thailand | Tel: +66-2-287 8311<br>Fax: +66-2-287 8180<br>E-mail: boonsale@aerothai.co.th |
| | 25. | Mr. Piyawut Tantimekabut | Senior Systems Engineer<br>Aeronautical Radio of Thailand Ltd<br>102 Ngamduplee<br>Thungmahamek, Sathorn<br>Bangkok 10120, Thailand | Tel: +66-2-287 8616<br>Fax: +66-2-287 8620<br>E-mail: piyawut@aerothai.co.th<br>piyawut@gmail.com |
| | 26. | Mr. Kittipong Pongswasdi | Senior Administration Officer<br>Aeronautical Radio of Thailand Ltd<br>102 Ngamduplee<br>Thungmahamek, Sathorn<br>Bangkok 10120, Thailand | Tel: +66-2-287 8753<br>Fax: +66-2-287 8645<br>E-mail: |
| 9. | **UNITED STATES** | | | |
| | 27. | Mr. Dan Hanlon | ATO Senior Representative, Asia Pacific Group<br>Federal Aviation Administration<br>US Embassy<br>Singapore | Tel: 65-6476 9462<br>E-mail: dan.hanlon@faa.gov |
| 10. | **IATA** | | | |
| | 28. | Mr. Geoff Hounsell | Assistant Director – Safety, Operations & Infrastructure – Asia/Pacific<br>International Air Transport Association<br>Triple One Somerset Road, #14-05<br>Singapore 238164 | Tel: 65-6499 2253<br>Fax: 65-6233 9286<br>E-mail: hounsellg@iata.org |

| | Name | | Title/Organization | TEL/FAX/E-MAIL |
|---|---|---|---|---|
| | 29. | Capt. Aric Oh | Deputy Chief Pilot (Technical)<br>Singapore Airlines<br>Flight Operations Technical (SIN-STC 02-A)<br>SIA Training Centre 04-C<br>720 Upper Changi Road East<br>Singapore 486852 | Tel: 65-6540 3694<br>Fax: 65-6543 4053<br>E-mail: aric_oh@singaporeair.com.sg |
| 11. | **BOEING** | | | |
| | 30. | Mr. Brad Cornell | Associate Technical Fellow<br>Flight Crew Operations<br>Boeing Commercial Airplanes<br>U.S.A. | Tel: 1-425 280 5603<br>E-mail: bradley.d.cornell@boeing.com |
| 12. | **ICAO** | | | |
| | 31. | Mr. Kyotaro Harano | Regional Officer, ATM<br>ICAO Asia & Pacific Office<br>252/1 Vibhavadi Rangsit Road<br>Ladyao, Chatuchak<br>Bangkok 10900<br>Thailand | Tel: 66-2-5378189 ext 159<br>Fax: 66-2-5378199<br>E-mail: kharano@bangkok.icao.int |
| | 32. | Mr. John Richardson | ATM Expert<br>ICAO Asia & Pacific Office<br>252/1 Vibhavadi Rangsit Road<br>Ladyao, Chatuchak<br>Bangkok 10900<br>Thailand | Tel: 66-2-5378189 ext 151<br>Fax: 66-2-5378199<br>E-mail: jrichardson@bangkok.icao.int |

## LIST OF WORKING PAPERS (WPs) AND INFORMATION PAPERS (IPs)

### WORKING PAPERS

| NUMBER | AGENDA | TITLE | PRESENTED BY |
|---|---|---|---|
| WP/1 | 1 | Provisional Agenda | Secretariat |
| WP/2 | 2 | Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF) Proposed Terms of Reference | Secretariat |
| WP/3 | 2 | On-going Changes to Bay of Bengal and Arabian Sea Route Structure | Secretariat |
| WP/4 | 3 | Implementation of RNP10 Longitudinal Spacing of 50NM in Bay of Bengal and Arabian Sea | Secretariat |
| WP/5 | 2 | Report on ATFM/TF/13 Meeting (22-25 September 2009) | Secretariat |
| WP/6 | 4 | Safety Assessments and Monitoring Requirements | Secretariat |
| WP/7 | 7 | Task List | Secretariat |
| WP/8 | 6 | User Expectations | IATA |
| WP/9 | 3 | Effect of 50NM Horizontal Separation in the Bay of Bengal on BOBCAT Traffic | Thailand |
| WP/10 | 3 | Implementation of Reduced Horizontal Separation in the South China Sea (SCS) Area | Singapore |
| WP/11 | 3 | RNP10 Longitudinal 50NM Spacing in the Arabian Sea | Oman |

### INFORMATION PAPERS

| NUMBER | AGENDA | TITLE | PRESENTED BY |
|---|---|---|---|
| IP/1 | - | List of Working Papers (WPs) and Information Papers (IPs) | Secretariat |
| IP/2 | 3 | 10 Minutes MNT Separation & Weekly Traffic Sample Data of EMARSSH Routes within Jakarta FIR | Indonesia |

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# Terms of Reference

**Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF)**

1) The objective of the ICAO BOB-RHS Task Force is:

In collaboration with affected stakeholders and ensuring inter-regional harmonization, develop and implement strategic, benefits-driven plans to improve en-route airspace efficiency by means of the implementation of reduced horizontal separation (lateral and longitudinal) based on the ICAO RNAV 10 (RNP 10) and RNP 4 PBN navigation specifications within the Bay of Bengal area and the Oceanic area of the Mumbai FIR.

2) To meet this objective the Task Force shall:

a) Review the existing Bay of Bengal and the Oceanic area of the Mumbai FIR route structures and examine suitability's for implementation of reduced horizontal separation.

b) Identify areas/routes where the implementation of reduced horizontal separation would bring immediate operational efficiency

c) Determine the reduced horizontal separation required, taking into account traffic volumes and disposition, approval status of the aircraft operating on the relevant routes, user expectations and the communication and surveillance capabilities of ATS providers involved.

d) Examine the possibility of a step-by-step or phased implementation of reduced horizontal separation and detail the phases required and the areas/routes concerned.

e) Develop and action the necessary strategic plans with appropriate timelines to implement reduced horizontal separations based on the APANPIRG Regional PBN Implementation Plan and ICAO Standards and Recommended Practices, whilst taking into account the need for inter-regional harmonization and user requirements.

f) Ensure the conduct of Annex 11 compliant pre-implementation safety assessments and make arrangements for States to conduct ongoing post-implementation safety monitoring in accordance with ICAO provisions.

g) Consider setting up appropriate teams/groups which might but not necessarily, include the entire Task Force, to address and implement specific agreed measures within specific airspaces.

h) Cooperate with other Task Forces and groups which are involved with similar work in adjacent airspaces in order to achieve harmonized inter-regional solutions.

i) Explore possibilities for further enhancements to operational efficiency of routes through reconfiguration and/or enhanced surveillance.

3) Scope of work:

The Task Force shall adopt a phased implementation programme, as follows:

**Phase One:** implement widespread 50NM longitudinal separation using CPDLC communications in the Bay of Bengal and the Oceanic area of the Mumbai FIR.

**Phase Two:** *To be determined*

**Phase Three:** *To be determined*

The Task Force reports via the ICAO Bay of Bengal ATS Coordination Group (BBACG) to the ATM/AIS/SAR Sub Group of APANPIRG.

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Report of the Small Working Group Meeting
November 3 & 4, 2009
ICAO Bangkok Regional Office

1. The BOB-RHS/TF/1 meeting decided to form a small working group (SWG) to define a project plan for an initial implementation of RNAV (RNP10) 50 NM Longitudinal Separation in the Bay of Bengal and the Mumbai FIR. Part of this plan was to develop a future work schedule including timelines for further task force meetings.

1.1 The following States and organizations contributed to the work of the SWG: India, Malaysia, Oman, Thailand, United States, ICAO, IATA and Boeing. Mr Dan Hanlon from FAA provided assistance as Rapporteur of the SMG

2. Discussion

2.1 It was decided that the goal of the project plan was to initiate operations of 50 NM Longitudinal separations along one or more routes in the area under discussion and to complete all preparatory activities so as to begin initial operations by Januray 2011. To reach this milestone, it may be necessary to hold be one or more follow up Working Group meetings this year.

2.2 The SWG was tasked to identify the scope of the project. The scope includes issues relating to the states involved, the specific routes to be considered for inclusion, the altitudes, and the airlines and aircraft to be considered. In addition to the scope of the project, the SWG was requested to identify preliminary activities required to prepare for the operational trial and to identify a draft schedule. Finally, the SWG would recommend tasks to be initiated.

2.3 In formulating an initial plan for an operational trial, several suggestions were put forward which included:

a) routes to be used for the trial;
b) aircraft involved;
c) limitations on other aircraft using the routes under trial;
d) FIRs involved.

2.4 Initial discussions looked at three suggested ATS routes to be involved in the trial. They were:

i) N571
ii) N571/N877
iii) P628

2.5 There was other discussions regarding the use of P575 in lieu of N571, however as that would restrict the amount of airspace within the Kuala Lumpur FIR to test the efficiency of the trial, the suggestion was discarded.

2.6 There was also mention of using L301 in the trial. This was also discarded at this stage as this route passes through the Yangon FIR which, at the moment has limitations on their data link capability.

2.7 After considerable discussion, it was decided that only one ATS route, N571 should be used for initial implementation of DCPC CPDLC and 50NM longitudinal separation. N571 was considered to better route in the initial stage 1 of the project. This route traversed the Kuala Lumpur FIR, followed by Chennai FIR and then onto the Mumbai FIR through to Muscat FIR. Not only will it test the CPDLC system in three FIRs but also the transition of aircraft from a radar environment within the Muscat FIR to the RNAV 10 airspace in Mumbai FIR in an easterly direction.

2.8 There was considerable discussion on whether during the initial stage phase 1 should be based on a 24 hours cycle or limited to a lesser time due to present staffing issues in the KL ACC. There was also discussion on what aircraft equipage was necessary to fly this route during phase 1 of the introductory period.

*Outcomes*

2.9 It was finally agreed that the project scope would be composed of:

a) **States**: India, Oman and Malaysia
b) **ATS Routes**:RNAV route: N571
c) **Altitudes**: all altitudes (initial proposal)
d) **Airlines and aircraft**:all appropriate FANS equipped and approved FANS aircraft; and,
e) **Time of operation**:24 Hours

2.10 Recognizing the current limitations of the Myanmar FIR's datalink capability, it was agreed that BOB routes transitioning through the Yangon FIR would not be considered In phase 1 of this project The meeting initially identified 4 candidate routes. These were P574, N571, N571 to N877, and P628.

2.11 P574 was eliminated from consideration as the route transitioned the Jakarta FIR, the Kuala Lumpur FIR, and the Chennai FIR into the BOB.

2.12 In addition, India proposed route L301 for consideration, but it was discounted due to it passing through the Yangon FIR.

2.13 P574 was also eliminated due to the lack of surveillance in the Jakarta FIR at this time. In addition, the flight time in the Kuala Lumpur FIR is only approximately 9 minutes which gives a limited opportunity to transition procedurally separated aircraft to 50 NM longitudinal separations in the Kuala Lumpur FIR.

2.14 P628 was eliminated from consideration as it was felt that the large number of aircraft utilizing the route, and the number of aircraft that were not considered capable of using FANS equipage, did not make this route a good candidate for an initial trial.

2.15 N571-N877 was eliminated due to issues relating to the crossing of L301 in the Kolkata FIR.

2.16 Another consideration was the limitation of 24 hour datalink capability in the Kuala Lumpur FIR. Beginning in March 2010, datalink capability will only be available from 1400 to 2300 UTC. 24 hour datalink operations will commence in January of 2011. The meeting determined that operational and safety issues preclude using 50 NM Longitudinal across the BOB for a limited period of time each day. The meeting agreed that initial operations will begin when Malaysian 24 hour datalink operations are available.

2.17 Taking all issues into account the SWG suggested that the next phase of the implementation program may include one or more routes in addition to N571 or, depending on the results of the first phase and the capability of all involved States to equip with CPDLC capability, a full transition to 50NM longitudinal separation may be possible. This determination will be made at the Task Force/2 meeting.

2.18 Another consideration for the Task Force/2 meeting will be whether 50 NM Longitudinal separation will be restricted to a limited number of altitudes or all altitudes on N571.

2.19 Finally the SWG developed a notional schedule based on the agreement made on the project scope. The proposed schedule is:

| | | |
|---|---|---|
| Dec 2009 | Bench Testing | Boeing review of operations based on simulator testing |
| February 2010 | TF/2 | 1. Meeting will be scheduled to align with next scheduled ICAO FIT-BOB.<br>2. Finalize Phase 1 plan and schedule.<br>3. Draft AIP Supplement Tabled for discussion<br>4. Phase 2 initial plan. |
| Oct 2010 | TF/3 | 1.Go/No decision for Phase 1. AIP SUPP action<br>2. Finalize Phase 2 plan and schedule |
| Jan 2011 | Start 50 NM Longitudinal Separation | Begin Phase 1 operations N571 |
| Apr 2011 | 90 Day Review | Technical and safety review of operations |

| SN | Activity | Start | Complete | Present Status | Group Responsible |
|---|---|---|---|---|---|
| | **Identify Operational Need** | | | | |
| 1 | Agree that an operational needs for a 50 NM horizontal separation in the Bay of Bengal and Oceanic Area of the Mumbai FIR | BOB-RHS/TF/1 | Yes | | All delegates at the BOB-RHS/TF/1 |
| 2 | | | | | |
| | **Safety Assessment** | | | | |
| 3 | Appointment of a Bay of Bengal and Mumbai Enroute Monitoring Agency | BOB-RHS/TF/1 | | India will notify ICAO regarding responsibility to operate the BOB/Mumbai EMA | India |
| 4 | Recognizing the necessity for an EMA for Bay of Bengal and the Mumbai FIR before the implementation of 50NM longitudinal separation in the areas concerned, provide an update from India on the establishment of an EMA to provide safety assessments and monitoring requirements | BOB-RHS/TF/2 | | | |
| 5 | States to continue to collect and provide traffic data | BOB-RHS/TF/1 | Ongoing | | |
| 6 | States to provide additional data as required by the EMA | BOB-RHS/TF/1 | Ongoing | | |
| 7 | **Bench Testing** Boeing review of operations based on simulator testing | BOB-RHS/TF/1 | Ongoing | | |
| 8 | Examine history of navigational errors and assess possible impact on safety | BOB-RHS/TF/1 | Ongoing | | |
| 9 | Confirm collision risk model assumptions/parameters are consistent with airspace where the 50 NM horizontal separation is to be applied | BOB-RHS/TF/1 | Ongoing | | |
| 10 | Conduct simulations to predict occupancy after the 50 NM horizontal separation implementation | BOB-RHS/TF/1 | Ongoing | | |
| 11 | Collect weather and turbulence data for analysis | | | | |
| 12 | Provide data collection to AEROTHAI for analysis of all the route effected in the project and also for Safety Assessment and Monitoring Analysis | BOB-RHS/TF/1 | Ongoing | | |
| 13 | Report monthly navigational errors (including operational errors) to Monitoring Authority (India) | | Ongoing | | |
| 14 | Collect additional data if required by the Safety Assessment Expert for the safety assessment for the 50 NM horizontal separation implementation | BOB-RHS/TF | | | |
| | **Feasibility Analysis** | | | | |
| 15 | Examine the operational factors and workload associated with the 50 NM horizontal separation implementation in BOB/Mumbai FIR | BOB-RHS/TF | | | |

| SN | Activity | Start | Complete | Present Status | Group Responsible |
|---|---|---|---|---|---|
| 16 | Complete feasibility analysis on the 50NM horizontal separation implementation on N571 | BOB-RHS/TF | | | |
| | **Determination of Requirements (airborne & ground systems)** | | | | |
| 17 | States assess the impact of the 50 NM horizontal separation implementation on controller automation systems and plan for upgrades/modifications | BOB-RHS/TF/1 | | | |
| | **Aircraft & Operator Approval Requirements** | | | | |
| 18 | Promulgate the operational approval process of RNP 10 | BOB-RHS/TF | | | |
| | **Perform Rulemaking (if required)** | | | | |
| 19 | Recommend State airspace regulatory documentation | BOB-RHS/TF | | | |
| | **Perform Necessary Industry & International Co-ordination** | | | | |
| 20 | Establish target implementation date on the 50NM horizontal separation on N571 | BOB-RHS/TF/2 | | | |
| 21 | Report to BBACG | BOB-RHS/TF/1 | | | |
| 22 | Malaysia to coordinate with Boeing Lab for bench testing for Kuala Lumpur ADS/CPDLC system | BOB-RHS/TF/1 | | | |
| 23 | Malaysia to report the status and updates on Kuala Lumpur FIR ADS/CPDLC system and personnel training programme | BOB-RHS/TF/1 | | | |
| 24 | Malaysia to continue submitting ADS/CPDLC data collection and problem report to Boeing Lab | BOB-RHS/TF/1 | | | |
| 25 | Prepare draft amendment proposal to amend Doc 7030 | BOB-RHS/TF | | | |
| 26 | Submit draft amendment proposal to amend Doc 7030 to ICAO | | | | |
| 27 | Assess need to publish AIP Amendment/Supplement, if necessary, containing the 50 NM horizontal separation policy/procedures | BOB-RHS/TF/2 | | | |
| 28 | Assess need for NOTAM | BOB-RHS/TF/2 | | | |
| 29 | Review inter-facility coordination procedures | | | | |
| 30 | Finalize changes to Letters of Agreement | | | | |
| | **Approval of Aircraft & Operators** | | | | |
| 31 | Establish approved operations readiness targets | BOB-RHS/TF/2 | | | |

| SN | Activity | Start | Complete | Present Status | Group Responsible |
|---|---|---|---|---|---|
| 32 | Assess operator readiness | BOB-RHS/TF/2 | | | |
| | **Develop ATC Procedures** | | | | |
| 33 | Develop procedures for handling non-compliant aircraft in ATS documentation | | | | |
| | **ATC Training** | | | | |
| 34 | Complete training for air traffic controllers on the application of 50 NM horizontal separation | | | | |
| | **Complete Safety Assessment** | | | | |
| 35 | Review and accept safety assessment | | | | |
| | **Final Implementation Decision** | | | | |
| 36 | Go/No-Go Decision | | | | |
| 37 | Implementation | | | | |
| | **Post Implementation Review** | | | | |
| 38 | | | | | |
| 39 | | | | | |