INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

REPORT OF THE TWENTIETH MEETING OF THE BAY OF BENGAL ATS COORDINATION GROUP (BBACG/20)

Malé, Republic of Maldives, 27 to 29 January 2009

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

Approved by the Meeting
and Published by the ICAO Asia and Pacific Regional Office

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PART I – HISTORY OF THE MEETING

1. Introduction

1.1 The Combined Fourth Meeting of the Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG/4) and the Twentieth Meeting of the Bay of Bengal ATS Coordination Group (BBACG/20) were graciously hosted by the Maldives Airports Company Limited (MACL) in Malé, Republic of Maldives. The ASIOACG/4 meeting was held from 25 January to midday of 27 January 2009 and the BBACG/20 meeting was held from the afternoon of 27 January through 29 January 2009.

1.2 The ICAO Asia and Pacific Office, in consultation with the ASIOACG Secretariat, took the initiative of combining the periodic ICAO BBACG meeting with the ASIOACG meeting, with the objective of gaining efficiencies and economies for many of the participants with interests in both meetings.

1.3 This report provides a summary of the outcomes of the BBACG/20 meeting and is available from the website of the ICAO Asia/Pacific Regional Office at http://www.bangkok.icao.int/ The full report of the ASIOACG/4 meeting is available from the ASIOACG website at URL: www.mercator.com/raws User Name: raws Password: r@Ws123

2. Attendance

2.1 The meetings were attended by 26 participants from Australia, India, Oman, Malaysia, Maldives, Sri Lanka, Thailand, IATA, Emirates Airline and Etihad Airways. Late apologies were received from Indonesia, Mauritius, Seychelles, Singapore, UAE GCAA, United States, SITA, IFATCA and IFALPA. The list of participants is at **Appendix A**.

3. Officers and Secretariat

3.1 Mr. Andrew H. Tiede, Regional Officer, Air Traffic Management from the ICAO Asia and Pacific Regional Office, acted as the Moderator and Secretary for the BBACG/20 meeting.

4. Opening of the Meeting

4.1 ASIOACG Chairman, Mr. Abdullah Nassar Al-Harthy, of the Directorate General of Meteorology and Air Navigation, Sultanate of Oman, welcomed delegates to the combined meetings, thanking the Maldives Airports Company Limited (MACL) for their gracious hospitality in hosting the meetings and highlighting the busy work programme ahead. Mr. Al-Harthy foreshadowed fruitful meetings and acknowledged the close cooperation of the Civil Aviation Department, Ministry of Civil Aviation and Communication, Republic of the Maldives (CAD) and the Maldives Airports Company Limited (MACL) for their support of the meetings.

4.2 In his opening remarks, Mr. Ron Rigney, Emirates Airline and ASIOACG Secretary drew attention to the progress that had been made since the last ASIOACG meeting and the relationship of this work to the ICAO Global Air Navigation Plan.

4.3 On behalf of Mr. Mokhtar A. Awan, Regional Director, ICAO Asia and Pacific Regional Office, Mr. Andrew Tiede welcomed all participants to Male. He expressed his thanks and appreciation to the Managing Director of MACL, Mr. Mohamed Amir and to Mr. Ahmed Nazim (Director, Air Traffic Management and Rescue Services, MACL) for their special efforts in hosting the meetings. Mr. Tiede wished the meeting a Happy New Year and highlighted that the Bangkok Regional Office and the Maldives have enjoyed a long and mutually beneficial relationship in advancing the safe and sustainable development of civil aviation in this area. Recognizing that the sudden onset of the ‘global economic

crisis' and consequent impacts within the aviation industry had resulted in a number of apologies for non-attendance at the meetings, he commented that it was pleasing to see the good number of State participants who were present.

4.4 Mr. Tiede informed the meetings that the primary goal of the Regional Office from the BBACG meeting is to press forward with implementation strategies for 50NM longitudinal separation in the Bay of Bengal, in order to build on the 50NM lateral separation that became available with the EMARSHH routes implementation 7 or 8 years ago. He noted that wide implementations of FANS data link were necessary to achieve this and was pleased to note the progress being made by Indonesia, Malaysia, Maldives, Myanmar and Sri Lanka in this respect, as well as the excellent efforts of India to implement data link throughout the extensive oceanic airspaces of India.

5. Documentation and Working Language

5.1 The working language of the BBACG meeting and the language for all documentation was English. In addition to the papers presented by the ASIOACG/4 meeting, seventeen (17) Working Papers and twelve (12) Information Papers were considered by the BBACG/20 meeting. The list of BBACG/20 papers is shown at **Appendix B**.

REPORT OF THE BBACG/20 MEETING

Agenda Item 1: Adoption of Agenda

1.1 The meeting adopted the following agenda as the Agenda for the meeting:

Agenda Item 1: Adoption of Agenda

Agenda Item 2: Review outcomes of related meetings

Agenda Item 3: Review current operations across the Bay of Bengal and identify problem areas

Agenda Item 4: Implementation of the new CNS/ATM systems in the Region

Agenda Item 5: ATS route developments

Agenda Item 6: Development of State Contingency plans

Agenda Item 7: Civil Military Coordination

Agenda Item 8: Review and update BBACG Task List

Agenda Item 9: Any other business

Agenda Item 10: Date and venue for the BBACG/21 meeting

Agenda Item 2: Review outcomes of related meetings

Outcomes from APANPIRG/19

2.1 The nineteenth meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/19) was held from 1 - 5 September 2008. As well as reviewing progress on Conclusions and Decisions raised by previous APANPIRG meetings, APANPIRG/19 raised a total of 57 new Conclusions and Decisions for regional action. The meeting reviewed the Conclusions and Decisions from APANPIRG/19 related to ATM, AIS and SAR matters (**Appendix C** to this report refers).

Establishment of ICAO Flight Plan and ATS messages Task Force

2.2 APANPIRG/19 noted that Amendment No. 1 to the Fifteenth Edition of the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) was approved during May 2008 and calls for substantial changes to the ICAO flight plan and associated ATS messages to take effect from 15 November 2012. The new ICAO model flight plan form and related provisions are necessary to allow ATM systems to make optimum use of advanced aircraft capabilities as well as to meet the evolving requirements of automated ATM systems. The new flight plan addresses air navigation functionalities and technologies such as RVSM, PBN, RCP, ADS-B and GNSS, while maintaining a high degree of commonality with the existing flight plan format. The interim edition of the PANS-ATM amendment is available as an attachment to the electronic version of State letter AN 13/2.1-08/50 on the ICAO-NET (www.icao.int/icaonet).

2.3 APANPIRG/19 recognized that the flight plan changes will have widespread implications on automated systems, including ATM systems and airspace user systems. In view of the many implications affecting a wide range of automated flight plan processing systems and associated operating practices, the transitioning process needs to be carefully planned taking into account compatibility with existing systems, human factors, training, cost and transition aspects. Any incompatibility in the processing capability in a few States could have significant impact on operations in other States of the region. This has the potential to create a significant and global degradation of ATM services.

2.4 APANPIRG/19 was of the view that that a full and comprehensive assessment of the implications of the transition to the new FPL for ANSPs and airspace users is absolutely necessary. In this regard, APANPIRG/19 considered that ICAO global leadership is critical in addressing the issues to ensure a smooth transition. The APANPIRG/19 meeting agreed that there would be many actions necessary to ensure a streamlined regional implementation, including the development of a regional transition strategy and procedures for its implementation. In order to ensure that the matter would be appropriately addressed on a regional basis, APANPIRG/19 agreed to the following Decision establishing a Task Force and drafted preliminary Terms of Reference (see **Appendix D**) accordingly:

Decision 19/6 – Establishment of an ICAO Flight Plan & ATS Message Implementation Task Force

That, an Asia/Pacific ICAO Flight Plan & ATS Message Implementation Task Force (FPL&AM/TF), with terms of reference as outlined in Appendix C to the APANPIRG/19 Report on Agenda Item 3.2, be established to develop a regional transition strategy and procedures to ensure the streamlined implementation of the amended ICAO flight planning and associated ATS Message provisions.

2.5 Invitation to the first meeting of the Task Force have been issued (ref. State Letter Ref: T3/10.1.20 – AP009/09), to be held in Bangkok from 17 – 20 March 2009. In order to assist States in preparations for an orderly transition from the current flight plan to the new one, a basic checklist using the performance framework form (PFF) has been developed by ICAO HQs, along with additional guidance on transition to the new flight plan. This documentation has been included with the State Letter described above.

2.6 The meeting reviewed the draft Terms of Reference for the FPL&AM/TF, noting the transition complexities to be examined by the Task Force. States and Organisations would study the information available on this matter with a view to ensuring that relevant concerns were raised during the FPL&AM TF/1 meeting in March.

45th DGCA Conference

2.7 The 45th Conference of Directors General of Civil Aviation, Asia and Pacific Region (45th DGCAs) was held in Kuala Lumpur, Malaysia from 24 – 28 November 2008. The Conference was attended by 228 delegates from 34 States/Administrations and 5 International Organizations and raised 11 items for action by regional DGCAs.

2.8 In reviewing the outputs from the Conference, the meeting noted that the following two Action Items were pertinent to the activities of the BBACG:

DGCA/45 Action Item 45/2
Recognizing that ICAO Assembly Resolution A36-22 indicates the importance of ICAO to provide continuous leadership in the area of aviation environmental protection, the Conference:

a) reaffirmed ICAO's leadership in addressing international aviation emissions and climate change issues; and

b) requested ICAO to consider organizing a workshop in the Asia Pacific region to facilitate discussions and sharing of information on best practices in aviation environmental protection.

DGCA/45 Action Item 45/9
Recognizing the need for human resource development the Conference:

a) supports the holding of a seminar in 2009 for Training Directors to discuss priorities in human resource development and training needs in the region;

b) urges States to participate in the Seminar; and

c) appreciates the offer by the Singapore Aviation Academy to host such a Seminar.

Regional Airspace Safety Monitoring advisory Group (RASMAG)

2.9 RASMAG/10 was held during December 2008. The first day of the RASMAG/10 meeting was conducted as a technical meeting for the five Asia/Pacific RVSM Regional Monitoring Agencies (RMAs) in order to identify technical issues, identify resolutions and standardize regional processes.

RVSM Minimum Monitoring Requirements

2.10 In reviewing the height monitoring requirements for airframes used in RVSM operations, RASMAG/10 understood that the Annex 6 provisions for global monitoring would take effect in about 2 years time, from November 2010, so were not presently applicable. Also, as the RMA Manual was further delayed, the status of the Minimum Monitoring Requirements (MMRs) in the RMA Manual was questionable. However, RASMAG/10 recognized that the MMRs promulgated by the Monitoring Agency for the Asia Region (MAAR) had only slight differences from the MMRs in the draft RMA Manual and were always at least equal to or more exacting than the Annex 6 requirements. Consequently, RASMAG/10 agreed that, in the interim, the MAAR MMRs that that been adopted by RASMAG/3 should continue as the basis of MMRs used by Asia/Pacific RMAs.

2.11 Recognizing that APANPIRG had not formally adopted MMRs and noting the extended delays in finalization of the RMA Manual and the interim period until the 2010 effective date for the Annex 6 provisions, RASMAG/10 drafted the following conclusion:

Draft Conclusion RASMAG 10/1 – Adopt RVSM Minimum Monitoring Requirements

That, recognising that publication of the ICAO RMA Manual had been further delayed and that the Annex 6 provisions for the global long term monitoring of airframes used in RVSM operations would not take effect until November 2010, the Asia RVSM Minimum Monitoring Requirements adopted by RASMAG and promulgated by the Monitoring Agency for Asia Region (MAAR) be adopted by Asia/Pacific RMAs as the basis for RVSM monitoring requirements in the Asia and Pacific Region.

Global Long Term Height Monitoring

2.12 APANPIRG/18 had recognized that the 2010 implementation of Annex 6 global long term monitoring requirements for airframes used in RVSM operations would have significant impacts in the way regional monitoring was managed, including the need for widespread regional height monitoring infrastructure capability to be made available. Under the terms of Conclusion 18/4, APANPIRG had tasked Asia/Pacific RMAs in conjunction with RASMAG to prepare a regional impact statement summarizing the estimated consequences for the Region, including consideration of the numbers of airframes required to be monitored and ground infrastructure required. RASMAG/11 in June 2009 would prepare a suitable draft of this documentation for consideration by the ATM/AIS/SAR/SG and APANPIRG.

RVSM Non - Approved Operators Using RVSM Airspace

2.13 APANPIRG/19 expressed serious concern in relation to flights that were apparently using RVSM airspace when they did not have the State approvals to do so. In agreeing that this issue ultimately required regulatory intervention, the meeting requested RASMAG to continue its investigations in this regard with the objective of providing a more comprehensive briefing to APANPIRG/20 (2009) in relation to this matter**.**

Establishment of Singapore EMA – SEASMA

2.14 APANPIRG/19 was informed that, recognizing that safety assessment and monitoring capability was urgently necessary to enable the implementation of 50NM lateral/50NM longitudinal reduced separations on RNAV routes L642 and M771 in the South China Sea (SCS), Singapore (in coordination via RASMAG) committed to establishing an En-route Monitoring Agency (EMA) for the South China Sea. Singapore has adopted the title "South East Asia Safety Monitoring Agency" (SEASMA) as the name for the EMA and established the SEASMA website at www.seasma.com.

2.15 Following finalization of implementation safety assessments by the RNP-SEA/TF, successful implementation of reduced horizontal separations on L642 and M771 in the SCS occurred in conjunction with the 3 July 2008 AIRAC. The EMA capability provided by Singapore was welcomed by APANPIRG/19 and Singapore was invited by APANPIRG/19 to consider expanding the provision of EMA services beyond the SCS in due course.

2.16 The BBACG/20 meeting recognised that En-route Monitoring Agency (EMA) capability was essential to support the RNP 10 and RNP 4 implementations that would occur over the next few years. The Secretariat invited India to consider establishing horizontal plane safety assessment and monitoring capability for the Bay of Bengal and Arabian Sea airspaces and would be pleased to provide additional information to India in this respect.

RVSM Safety Performance - Bay of Bengal Airspace

2.17 In providing updated safety assessment reports for the Bay of Bengal and Western Pacific/South China Sea areas, the Monitoring Agency for the Asia Region (MAAR) placed on record its appreciation for the effort and cooperation from those BOB States providing safety related data for analysis. However, noting that some data was still missing, late, and/or presented in the wrong format, MAAR encouraged States to use the most updated traffic sample data and large height deviation templates to facilitate analysis. The most updated forms and templates are available for download on the website at http://www.aerothai.co.th/maar. Also, the meeting was advised that MAAR would be appreciative if States could strictly follow the instructions provided for the traffic sample data collection and large height deviation report. Any questions or comments should be directed to MAAR at maar@aerothai.co.th.

2.18 MAAR provided a summary of airspace safety oversight for RVSM implementation in the Asia Region, focusing on the BOB airspace**.** The RVSM safety oversight had been conducted based on a one-month traffic sample data (TSD) collected in December 2007 and the most recent rolling 12 months of Large Height Deviation (LHD) reports between October 2007 and September 2008 submitted by relevant States in the BOB Region. LHD data provided by the neighbouring RMAs is also reviewed and used in the analysis where applicable.

2.19 MAAR advised that annual flight hours, calculated based on the December 2007 TSD, were 1,001,073 hours for the BOB airspace and that LHD occurrences in the BOB RVSM airspace could be summarized as follows:

- Compared to the last 6 monthly assessment, the number of LHD occurrences has increased from 5 to 10 occurrences while total LHD duration increased from 28 to 76 minutes

- Average duration of large height deviation occurrence is 7.6 minutes with maximum of 38 minutes

- Significant portion of large height deviation occurrence (4 of 10 occurrences) as well as duration (54 of 76 minutes) is attributable to coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues (Category E)

2.20 **Table 1** below summarizes the results of the airspace safety oversight as of May 2008 in terms of the technical, operational, and total risks for the RVSM implementation in the BOB airspace.

Bay of Bengal RVSM Airspace – estimated annual flying hours = 1 001 073 hours *(note: estimated hours based on December 2007 traffic sample data)*			
Source of Risk	**Risk Estimation**	**TLS**	**Remarks**
Technical Risk	0.84×10^{-9}	2.5×10^{-9}	Satisfies Technical TLS
Operational Risk	2.40×10^{-9}	-	-
Total Risk	**3.24×10^{-9}**	**5.0×10^{-9}**	**Satisfies Overall TLS**

Table 1: Risk Estimates for the RVSM Implementation in BOB Airspace

2.21 In addition, **Figure 1** below presents the graphical trends of collision risk estimates for each month using the appropriate cumulative 12-months of LHD reports since October 2007.

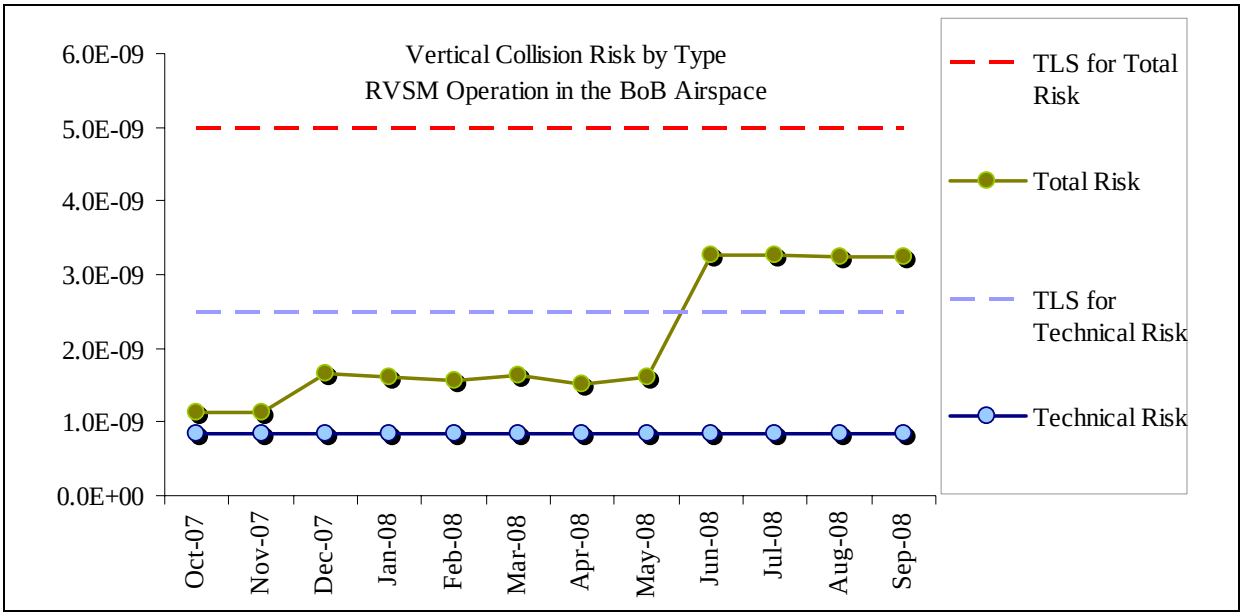

Figure 1: Trends of Risk Estimates for the RVSM Implementation in BOB Airspace

2.22 Based on these collision risk estimates, both technical and total risks for the Bay of Bengal area based on the available TSD and LHD reports, satisfy the agreed TLS value of no more than 2.5 x 10^{-9} and 5.0 x 10^{-9} fatal accidents per flight hour due to the loss of a correctly established vertical separation standard of 1,000 ft and to all causes, respectively.

2.23 MAAR reported that, based on available data from States and RMAs, it could be inferred that States may not entirely comprehend the significance and meaning of Large Height Deviation occurrences. In preparing this assessment, MAAR had experienced a number of situations where relevant data had been provided by neighbouring Australian Airspace Monitoring Agency (AAMA) about risk bearing incidents in the MAAR area of responsibility that had not been reported to MAAR. This clearly supported the concerns previously expressed by RASMAG in relation to under reporting of LHDs by Bay of Bengal States.

2.24 The meeting strongly recommended that Bay of Bengal States review the definition and reporting requirements and categories for Large Height Deviations (**Appendix E** refers) and faithfully provide relevant information to MAAR in order to facilitate a statistically reliable safety assessment for this area.

Expand December TSD for airspace planning

2.25 After considering the proposal from the ATFM Seminar/Workshop that use of the annual December Traffic Sample Data (TSD) be expanded for airspace planning purposes (refer paragraph 3.25 – Recommendation 1), RASMAG/10 gave in-principle agreement to the concept. However, beyond agreeing to a standardized template for the annual December traffic sample data gathering that also included a column to record the en-route PBN approvals status of each flight, regional RMAs were not able to accommodate extra workload or responsibilities in gathering and managing data. Additionally, release of data would need to be authorized by an appropriate oversight body, such as the Regional Office. RMAs also preferred that wherever possible implementing agencies obtained data directly from the States or parties involved in each implementation. RASMAG/10 agreed to the following draft Decision in this respect:

Draft Decision RASMAG/10-3– Expand use of safety monitoring data

That the arrangements for annual month of December traffic sampling by all States to satisfy airspace safety monitoring analysis as called for by APANPIRG Conclusion 16/4 be expanded to enable this data to also be used for airspace planning and implementation purposes. This will apply only where such data is not otherwise available to regional or State implementing bodies and only with specific authority of the ICAO Asia/Pacific Regional Office.

2.26 The meeting endorsed the initiative proposed by RASMAG to make the annual December TSD available for airspace planning purposes. The meeting recognized the strong preference of States to ensure the data was only made available in appropriate circumstances and to appropriate parties and endorsed the involvement of the Region Office in this respect.

2.27 In order to ensure that the data was useful for implementation planning, the meeting requested that in addition to the PBN approvals status noted in paragraph 2.25 above, RASMAG ensure that the aircraft registration/tail number was one of the parameters included in the annual TSD.

FANS Implementation Team for the Bay of Bengal (FIT-BOB)

2.28 Two meetings of the FIT-BOB were held during 2008:

- FIT-BOB/9 (Bangkok, 21 - 25 January 2008, with BBACG/19)
- FIT-BOB/10 (Mumbai, 7 − 11 July 2008, with ASIOACG/3)

2.29 FIT-BOB recalled that matters regarding establishment and funding of CRA services for the Bay of Bengal and Arabian Sea operational ADS/CPDLC trials were discussed in earlier BBACG and FIT-BOB meetings. It had been agreed that Boeing would provide CRA services and that IATA would provide a mechanism under which a levy would be collected by IATA and paid to the Boeing CRA. Accordingly an agreement was required to be executed between the Airports Authority of India and IATA for collection of the charges for operations in the Indian FIRs and an additional agreement executed between IATA and Boeing to enable payment to Boeing.

2.30 IATA was pleased to inform the FIT-BOB/10 meeting that they have now formally entered into an agreement with the Boeing Company to establish and operate a CRA facility with a view to investigate and resolve data-link problems. IATA has also simultaneously entered into a formal agreement with the Airports Authority of India (AAI) to enable Boeing Company to establish and operate CRA facility and will collate air traffic data for the purposes of levying a CRA charge. In summary, the two agreements authorize IATA to collect a CRA charge on a per flight basis, based on traffic data to be provided by AAI, and to pay Boeing Company for the CRA service. The scope of work for the establishment and operation of CRA service is established in accordance with ICAO guidelines and details of the establishment of the CRA have been published in India AIP Supplement 40/2008. The CRA was activated with effect from 1 September 2008 in accordance with India NOTAM G0155.

Review of RVSM/TF activities (RVSM/TF)

2.31 The 34th meeting of ICAO RVSM Implementation Task Force (RVSM/TF/34, December 2008) conducted the one year post-implementation review of China RVSM. China presented the China RMA's periodic safety report which is submitted twice a year to CAAC and ICAO. The report contained a summary of large height deviation (LHD) reports received by the China RMA for that time period and an update of the vertical collision risk for sovereign Chinese airspace. All the analyses conducted were based on one month traffic sample data (TSD) collected in December 2007 and the latest 12-month LHD reports. The periodic report from the China RMA demonstrated that RVSM operations in the sovereign airspace of China continued to satisfy the regional target level of safety.

2.32 RVSM/TF/34 noted that all the tasks to introduce RVSM in China have been fully and successfully completed and the TOR assigned by APANPIRG had been fully met. With the exception of the Pyongyang FIR of DPRK and Ulaan Bataar FIR of Mongolia, all airspaces of the Asia/Pacific region have implemented RVSM. Consequently, in accordance with APANPIRG Decision 19/5 (below), the RVSM/TF was dissolved.

Decision 19/5 – Dissolution of the RVSM/TF

That, following the widespread and safe implementation of RVSM throughout the Asia/Pacific Regions over a 10 year period, the Asia/Pacific RVSM Implementation Task Force (RVSM/TF) be dissolved, with effect from the close of the RVSM/TF/34 meeting (one year review of China RVSM) in late 2008, and any residual work items be allocated to the ATM/AIS/SAR Sub-Group.

Note: *In dissolving the RVSM/TF, APANPIRG places on the record its highest commendation and appreciation to all parties associated with the RVSM/TF for the continuous implementation of RVSM and the very positive and quantifiable beneficial effects on safety, efficiency and the environment that have resulted directly from the work of the RVSM/TF.*

WPAC/SCS RVSM Scrutiny Working Group (WPAC/SCS RSG)

2.33 The Fifth meeting of the Western Pacific/South China Sea (WPAC/SCS) RVSM Scrutiny Working Group (WPAC/SCS RSG/5, October 2008) conducted a 90 day post implementation review of the revised flight level arrangements ion the Western Pacific/South China Sea area. The revised flight level arrangements had been implemented in early July 2008 and included, amongst other things, a single alternate FLOS (i.e. 'east odd flight levels, west even flight levels') in compliance with the Table "RVSM-FEET" of Appendix 3 of Annex 2 to replace the modified single alternate FLOS that was previously in place. This was anticipated to normalise the flight level interface between the Bay of Bengal and the South China Sea.

2.34 WPAC/SCS RSG/5 noted that in general terms, the implementation had proceeded smoothly without major problem. The meeting attributed this to the thorough preparations made by States and operators, and commended all involved for their careful and comprehensive work in this regard.

2.35 Most of the affected States reported positive outcomes following the implementation, notably that availability of additional levels for both east and west bound traffic and the reduction or elimination of non-radar flight level transition requirements had significantly improved the traffic flow and enhanced ATC flexibility. Planning was in progress with some States to further enhance procedures and take advantage of the improvements available as a result of the new FLOS.

2.36 Thailand reported to WPAC/SCS RSG/5 that the revised FLOS had eliminated all the transitions along the eastern boundary of the Bangkok FIR, therefore harmonizing the single alternate FLOS covering all airspace under the responsibility of Thailand with the standard FLOS of the Bay of Bengal and the Southeast Asia regions.

2.37 Singapore informed WPAC/SCS RSG/5 that some operators had advised, because of the changed flight levels on the parallel routes, that there was an impact to aircraft operations as flights that were not able to be displaced by 1000ft were not able to operate at or close to optimum flight level due to the 3,000ft vertical separation instead of 2,000ft previously. This was also reported by IATA, who would continue to study this issue and provide follow up information to the next meeting.

Inter Regional Afghanistan Interface Meeting (IRAI)

2.38 BBACG Task List item 19/6 calls for an ATS routes regional coordination meeting with Afghanistan, India, Iran, Kazakhstan, Pakistan, Uzbekistan and IATA. From 13-17 July, 2008 the Inter Regional Afghanistan Interface Meeting (IRAI) meeting was held in conjunction with the ATFM/TF/12 meeting in Cairo, Egypt. Twenty-two (22) participants from Afghanistan, Malaysia, Pakistan, Singapore, Thailand, Uzbekistan, ICAO, IATA and IACA attended the meeting. Apologies were received from Iran, India, United States and the European Office of ICAO.

2.39 Topics discussed by IRAI included enhancements to ATS routes in this area, progress with implementation of RVSM, air traffic flow management matters, and coordination arrangements between ACCs including updating of ATS operational letters of agreements. Over recent months the Kabul ACC had taken the initiative to draft updates to many of the operational Letters of Agreement (LOAs) with the ACCs surrounding Afghanistan. Iran, Pakistan and Uzbekistan provided updated information to the meeting regarding their interface circumstances with Afghanistan.

2.40 To assist in the process of preparing for return of airspace management responsibilities, Afghanistan has engaged the ICAO Technical Cooperation Bureau (TCB) to provide a project team in Kabul to manage and implement the project for Transition of Civil Aviation responsibilities. The TCB team includes technical experts in Air Traffic and Airspace Management and the many other disciplines necessary for transition of responsibilities. As part of this work, specific advice is being provided in respect to the implementation of RVSM, however current planning indicates that RVSM implementation is unlikely to occur prior to 2010.

2.41 Although recognized as being in excess of ICAO provisions, in light of the complex traffic circumstances in Kabul FIR Afghanistan has adopted the provision of adequate electronic surveillance of those air routes to be used by RVSM traffic as one of the major requirements for RVSM implementation.

2.42 The IRAI reviewed many ATS route related matters, noting the positive developments in terms of route implementations in Afghanistan and Pakistan, and the enhanced interface arrangements between the two States. Arising from the previous work of the ATFM/TF, Afghanistan had agreed to implement an ATS route segment across the southern portion of the Kabul FIR connecting Pakistan and Iran FIRs. According, Afghanistan had published AIP Supplement 01/08 which implemented route SERKA - SOKAM as an extension to UL333 with effect from AIRAC 28 August 2008.

2.43 In order to provide more efficient coordination about contingency airspace closures, IRAI considered that having H24 AIS capability available to the Kabul ACC so that NOTAMs could be issued immediately would be an extremely valuable step in mitigating the effects of sudden changes on civilian airspace users. The IRAI meeting urged Afghanistan to explore avenues by which such H24 capability could be made reliably available and to issue NOTAMS wherever possible for ATC and airline AOC usage.

Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG)

2.44 Recent meetings of ASIOACG are as follows:

- ASIOACG/2 (Dubai, 15-17 January 2008)
- ASIOACG/3 (Mumbai, 7 – 11 July 2008, with FIT-BOB/10)
- ASIOACG/4 (Male, 25 - 27 January 2009, with BBACG/20)

2.45 The reports of these ASIOACG meetings are available from the ASIOACG website at URL: www.mercator.com/raws User Name: raws Password: r@Ws123 A copy of the current ASIOACG Task list has been included as **Appendix F.**

South East Asia RNP Implementation Task Force (RNP-SEA/TF)

2.46 The RNP-SEA/TF/4 meeting (November 2008) conducted the 90-day post implementation review for the implementation of 50 NM Lateral and Longitudinal Separations Based on RNP 10 Operations on RNAV Routes L642 and M771 in the SCS. Singapore reported that, based on a 2-month sample period, the maximum movement rate on M771 increased by 7% and L642 by 18%. Average delay had reduced by 15%.

2.47 With the implementation of 50 NM lateral separation for flights operating on M771 and L642, weather deviations of up to 10 NM could be permitted because the 60 NM route spacing had been retained.

AIS-AIM Implementation Task Force (AAITF) & Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG)

2.48 The meeting reviewed a summary of outcomes from the Asia/Pacific AAITF (AAITF/3, June 2008) and the AIS-AIMSG (December 2008), noting the very significant work programmes that were being progressed by both groups. States present at the meeting were strongly encouraged to bring this information to the attention of their respective AIS colleagues for review and action.

2.49 A combined AIS/AIM workshop/seminar for States in the Asia/Pacific Regions will be held in early 2009 to address issues related to AIS automation and eTOD implementation. The workshop/seminar will be held on 23 and 24 February 2009 in Narita, Japan, with the assistance from Australia, the Japan Civil Aviation Bureau (JCAB) and EUROCONTROL.

Agenda Item 3: Review current operations across the Bay of Bengal and identify problem areas

ATFM Task Force – BOBCAT Update

3.1 Thailand presented an update in relation to the BOBCAT ATFM operations, with analysis based on the monthly traffic data collection in samples of seven consecutive days each month submitted by States involved in the ATFM procedures.

3.2 Throughout the eighteen months since operational implementation of the ATFM procedures between AIRAC Date 5 July 2007 and 5 January 2009, approximately 28,716 aircraft submitted slot request, with 94 percent (26,991 aircraft) accepting slot allocation. This represents an average annual traffic demand of 19,144 aircraft. Non acceptance of slots is attributed to reasons such as delay factor, route availability and sometimes adverse weather which led to eventual selection of a route outside the Kabul FIR.

3.3 The data analysis shows that there are up to three flights each week accepting slot allocation at FL390, but many of these flights were able to transit the Kabul FIR at FL350 as a result of efficient tactical ATM by en-route ACCs.

3.4 The number of flights transiting the Kabul FIR without obtaining a slot allocation remains low at about 1or 2 flights per night. Nonetheless, efficient tactical ATM has also been able to accommodate these flights without affecting flights with BOBCAT slot allocation.

3.5 Overall traffic demand distribution based on BOBCAT Slot Request is shown in **Figure 2** below, with analysis by Departure Airport shown in **Figure 3** below. Peak nightly traffic achieved a new record of 67 aircraft/night in December 2008.

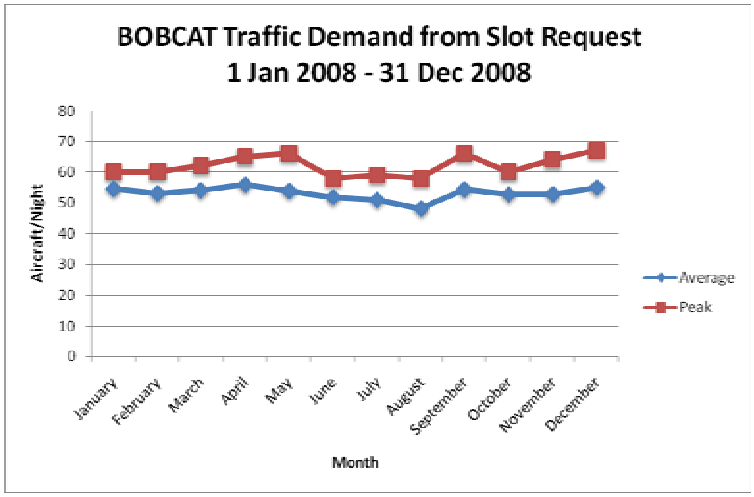

Figure 2: BOBCAT Traffic Demand from Slot Request Information (January 2008 – December 2008)

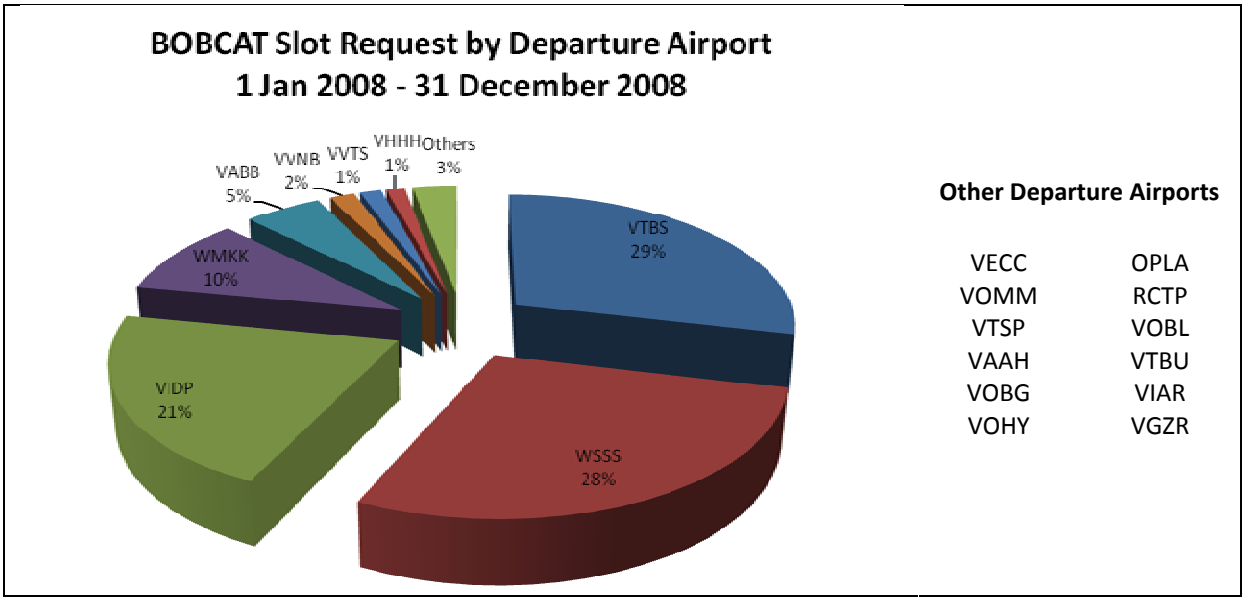

Figure 3: BOBCAT Traffic Demand from Slot Request Information organized by Departure Airport (January 2008 – December 2008

3.6 The meeting noted that the top-7 airports providing most traffic to the BOBCAT system are:

a) **VTBS:** Bangkok, Thailand
b) **WSSS:** Singapore
c) **VIDP:** Delhi, India
d) **WMKK:** Kuala Lumpur, Malaysia
e) **VABB:** Mumbai, India
f) **VVNB:** Ha Noi, Viet Nam

g) **VVTS:** Ho Chi Minh, Viet Nam

3.7 The meeting noted that the percentage of flights transiting the Kabul FIR at a same or higher preferred flight level according to collected ATFM data remained close to 90% for most months with some days that all aircraft were able to transit the Kabul FIR at a same or higher preferred flight level.

3.8 In respect to flights transiting the Kabul FIR at a flight level lower than slot allocation, the following causes are diagnosed, and shown graphically in **Figure 4** below:

a) Early or Late departures of the aircraft or other aircraft;
b) Flight planned EET inaccuracy;
c) Unknown reason due to insufficient data;
d) Eastern Bay of Bengal FL Orientation issue (tactical ATM); and,
e) VIDF FL Orientation issue (tactical ATM)

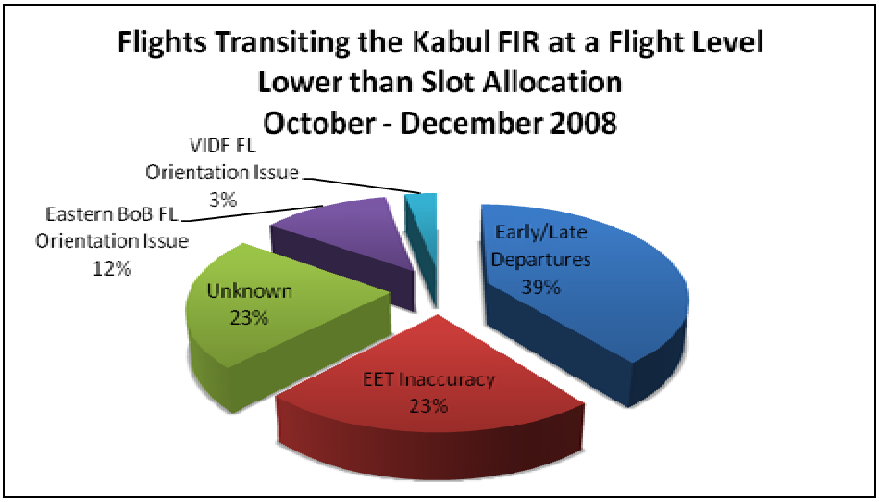

Figure 4: Flights Transiting the Kabul FIR at a Flight Level Lower than Slot Allocation (October – December 2008)

Early and Late Departures

3.9 The analysis demonstrated that, in the October – December 2008 data collection, of the flights entering Kabul FIR at flight level lower than slot allocation approximately 39% did not achieve their flight level due to the early or late departure of the aircraft itself, or the early or late departure of other aircraft. Accordingly, the poor on time performance continues to have a direct and undesirable relationship to flights not achieving slot allocated level or higher.

3.10 The statistics of aircraft analyzed to have potentially caused other aircraft to transit the Kabul FIR at flight level lower than slot allocation are shown in **Figures 5 and 6** below, organized by airline and departure airport respectively.

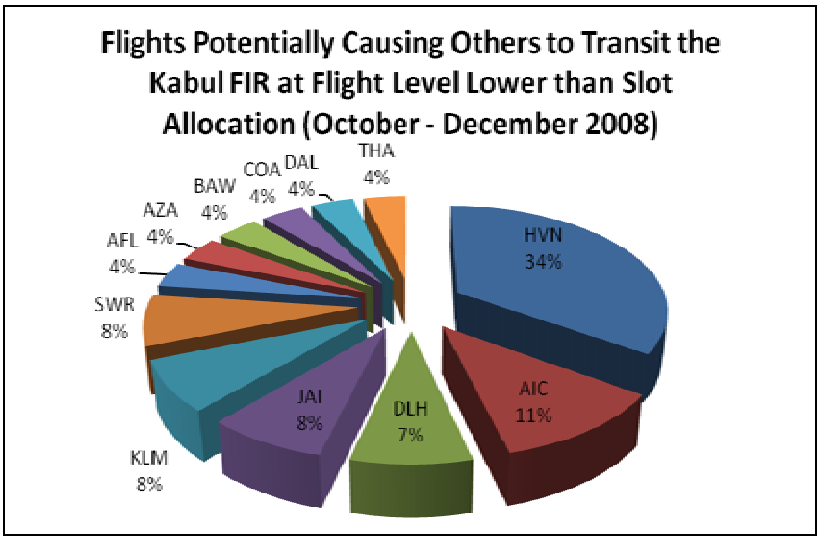

Figure 5: Flights Potentially Causing Others to Transit the Kabul FIR at a Flight Level Lower than Slot Allocation (October – December 2008) Organized by Airline Operator

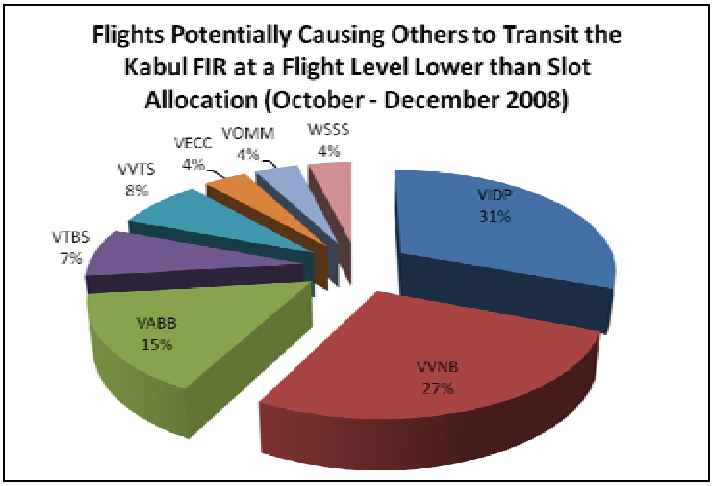

Figure 6: Flights Potentially Causing Others to Transit the Kabul FIR at a Flight Level Lower than Slot Allocation (October – December 2008) Organized by Departure Airport

Problems with data submission

3.11 In reviewing the submission of data by affected States As had been agreed by the ATFM/TF, the meeting noted results as shown in **Table 2** below:

	July 2008	August 2008	September 2008	October 2008	November 2008	December 2008
WSFC	7 days	7 days	7 days	7 days	7 days	7 days
WMKK	7 days	7 days	7 days	7 days	7 days	7 days
VTBB	7 days	7 days	7 days	7 days	7 days	7 days
VYYY	N/A	N/A	N/A	N/A	N/A	N/A
VOMF	N/A	N/A	7 days	N/A	7 days	N/A
VECF	N/A	N/A	7 days	N/A	7 days	N/A
VABF	N/A	N/A	7 days	N/A	7 days	N/A
VIDF	N/A	N/A	7 days	N/A	7 days	N/A
OPKR	7 days	7 days	7 days	7 days	7 days	7 days
OPLR	7 days	7 days	7 days	7 days	7 days	7 days
OAKX	7 days	7 days	7 days	7 days	7 days	7 days

Table 2: States' Participation in Data Collection by FIR

3.12 India informed the meeting that data had been collated for some airports and the data had been transmitted to the ATFMU. However, the data had clearly not been received by the ATFMU. India and AEROTHAI would undertake investigations into the submission and receipt of data to ensure that a reliable data submission system was established. An item was added to the Task list in this respect.

Operational Messages to be sent to the Bangkok ATFMU

3.13 The meeting recalled that, in accordance with the ATFM Users Handbook, "[aircraft] operators and/or the AIS offices involved shall also address flight plan and related ATS messages (e.g. DEP, DLA, CNL, CHG) to the Bangkok ATFMU." Nevertheless, some flight plans and ATS messages are still not transmitted to the Bangkok ATFMU.

3.14 The meeting learned that that these ATS messages can be used in future ATFM data analysis, namely in determining potential cause of aircraft transiting the Kabul FIR at flight level lower than slot allocation as well as alerting potential issues arising from aircraft departing early or late outside AWUT window. States involved and IATA agreed to follow up to ensure that flight plans and movement messages were being correctly addressed to include the ATFMU. An item was added to the Task list in this respect.

Inclusion & Removal of UL333 traffic in ATFM procedures

3.15 In accordance with agreements reached at the July 2008 ATFM/TF/12 meeting, the BOBCAT system was re-configured to accommodate additional traffic from SERKA-UL333-SOKAM and SERKA-B466-PAROD due to activation of UL333 and B466 in the Kabul FIR during August 2008. In order to efficiently feed traffic from South East Asia into this new route capacity in Afghanistan, Malaysia completed an extensive route realignment, including connector routes, in the Kula Lumpur FIR.

3.16 However, the inability to reach agreements on bypass arrangements to mitigate bunching concerns in the eastern Bay of Bengal eventually led the SCM ATFM SEA ROUTES in October 2008 to remove flow metering requirements for aircraft transiting SERKA-UL333-SOKAM during the BOBCAT period. ANSPs will take normal tactical traffic management measures (e.g. enroute holding) for these flights. This system change (removing UL333) took effect from AIRAC date 20 November 2008.

3.17 India was aware of these circumstances and would continue to study the situation in relation to approving use of one of the existing published routes west of Chennai as a connector route within Chennai FIR to facilitate bypass arrangements and enable the full use of the N571/N877 routes feeding UL333 in the ATFM procedures. India would advise the Regional Office of the outcomes in the near future. An item was added to the Task list in this respect.

ATCA Industrial Award

3.18 The meeting was informed that the United States Air Traffic Control Association (US ATCA) had awarded the Air Traffic Flow Management Task Force (ATFM/TF) the 2008 ATCA Industrial Award during November 2008 (see **Appendix G**). The ATCA Industrial Award is a medallion given to an industry or group of industries for an outstanding achievement or contribution which has added to the quality, safety or efficiency of air traffic control.

3.19 A small AEROTHAI delegation was sent to the ATCA Annual Conference and Exposition in Washington, D.C. to accept the award. In order to recognize the work of Core States involved in sorting ATFM/BOBCAT traffic each night, AEROTHAI has organized replicas of the Industrial Award to be presented to the Core States, IATA Asia-Pacific Regional Office and ICAO Asia-Pacific Regional Office. It is anticipated that presentation of the replicas will take place during the ATM/AIS/SAR/SG or APANPIRG meetings during 2009.

L759 bypass arrangements using M770

3.20 To assist peak traffic flows on L759 during the BOBCAT period , India, Myanmar and Thailand had agreed to a three-month operational trial of a bypass procedure utilizing M770 to carry overload traffic from L759, with effect from AIRAC date 18 December 2008. A Letter of Agreement has been signed by the three States involved to enable the trial use of a re-route procedure, as follows:

> "Flights under ATFM procedure that are unable to maintain 80 NM longitudinal separation in relation to preceding traffic from PUT until BBS or accept lower levels on L759 shall be re-routed by Bangkok ACC to proceed on M770 via: "PUT L515 OBMOG M770 BUBKO N895 BBS then re-join L759"

3.21 During the 6 week period of the trial so far, data analysis by Thailand indicated that there were three (3) flights that had to utilize M770 in accordance with the above procedure. Two of the re-routed flights were able to maintain the same flight levels as assigned on L759 and one flight was able to climb to FL 300 from the previously assigned FL260 on L759.

3.22 Despite the low number of flights needing to be put on the bypass route, Thailand considered that the procedure proved very effective in alleviating the bunching of traffic which would be more evidence in a heavier traffic scenario. India had also found the bypass procedure to be effective and Malaysia gave strong support to the continuation of the arrangements. The States present agreed to a further 3-month extension of the trial procedure and Thailand would coordinate with Myanmar to advise of the intention to extend the trial and gain their concurrence

Outcomes from the regional ATFM Seminar/Workshop

3.23 The ICAO Asia/Pacific Air Traffic Flow Management (ATFM) Seminar/Workshop was held in Fukuoka, Japan from 7 to 9 October 2008. The event was attended by 48 participants from 14 States – Australia, Bangladesh, Brunei Darussalam, Hong Kong China, India, Indonesia, Japan, Philippines, Republic of Korea, Singapore, Sri Lanka, Thailand, United States, Viet Nam - and 3 international organizations – IATA, IFALPA and IFATCA.

3.24 The Seminar/Workshop was informed that, in response to the increasing ATFM activities regionally and the provisions of GPI- 6 *Air Traffic Flow Management*, the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/18, September 2007) had adopted Conclusion 18/7 for the conduct of a regional ATFM Seminar during 2008. APANPIRG/19 noted that the event would be tasked with identifying and recommending appropriate regional objectives, for example:

a) Development of a high level ATFM Concept of Operations for the Region;
b) Enhancement of the draft ATFM Communications Manual;
c) Develop mechanisms for data gathering, collation and sharing;
d) Review activities of the Bay of Bengal ATFM Task Force.

3.25 The ATFM Seminar/Workshop, in its review of the information provided to the Seminar and arising from the discussions held during the Workshop, reached outcomes and made recommendations as outlined below.

Outcomes

ATFM Seminar/Workshop Outcome 1:
That the preparation of an Asia/Pacific Regional ATFM Concept of Operations was a significant body of work that would need to be undertaken collaboratively between States over a period of time.

ATFM Seminar/Workshop Outcome 2:
The ATFM Seminar/Workshop recognized that there would be significant benefit in having a regional oversight capability of some kind, in the form of a high level ATFM Steering/Focus Group, to begin to analyze regional data and traffic flows and make recommendations with the objective of ensuring the harmonization/coordination of regional ATFM implementation plans.

ATFM Seminar/Workshop Outcome 3:
That accurate and timely static and dynamic data be continuously available to support ATFM implementation planning and ongoing ATFM operations.

ATFM Seminar/Workshop Outcome 4:
That the concept of a web based ‘virtual ATFMU’ along the lines of the US ATSCC example at <www.fly.faa.gov> showed merit for providing a ‘one-stop-shop’ of regional ATFM matters.

ATFM Seminar/Workshop Outcome 5:
That IATA clearly expressed their preference for accelerated implementation of recognized structural airspace capacity increasing measures (RVSM, PBN, flexible use of airspace, use of more effective ATC procedures) in preference to use of ATFM. However, IATA recognizes that structural improvements will take time and accepts that use of traffic management and ATFM procedures in some circumstances is warranted.

ATFM Seminar/Workshop Outcome 6:
That significant regional ATFM knowledge and experience lies with Australia, Japan, Thailand and United States and that access to and use of this expertise will be beneficial to other States of the Asia/Pacific region.

Recommendations

ATFM Seminar/Workshop Recommendation 1:
That the present arrangements for annual month of December traffic sampling by all States for airspace safety analysis enabled by APANPIRG Conclusion 16/4 be expanded to enable this data to also be used, under authority of the ICAO Asia/Pacific Regional Office, for airspace planning and implementation purposes.

ATFM Seminar/Workshop Recommendation 2:
Recognizing that the sharing of dynamic data between adjacent ANSPs on a continuous and real time basis was a key requirement in realizing ATFM benefits, regional strategies be developed with the objective of implementing formalized data sharing arrangements with relevant parties within, and between, States.

ATFM Seminar/Workshop Recommendation 3:
That guidance material in the ICAO ATS Planning Manual (Doc 9426) be reviewed and utilized as the basis for development of Sector capacity assessments.

ATFM Seminar/Workshop Recommendation 4:
That the draft ATFM Communications Handbook for the Asia/Pacific Region be advanced through the normal ICAO processes with the objective of gaining APANPIRG approval as a regional guidance material.

ATFM Seminar/Workshop Recommendation 5:
That the ICAO regional Secretariat provides all material associated with the ATFM Seminar/Workshop to the ICAO Headquarters Secretariat for consideration in the ICAO HQ ATFM work programme scheduled during 2009/2010.

3.26 The meeting expressed their support for Recommendation 1 expanding the use of the TSD and also supported Recommendation 4 in relation to advancing the draft ATFM Communications Handbook (**Appendix H** refers) to regional guidance material via the APANPIRG process. The meeting noted the remainder of the outcomes and recommendations from the ATFM Seminar/Workshop and would provide any comment to the ATM/AIS/SAR/SG/19 meeting in June 2009

Traffic Sample Data State Letter

3.27 The meeting recalled that in considering the requirements for routine safety assessment, RASMAG/2 (October 2004) agreed that an annual provision by States of Traffic Sample Data (TSD) as well as ongoing provision of Large Height Deviation (LHD) and Gross Navigational Error (GNE) reporting – including NIL reporting -was sufficient for vertical and horizontal safety analysis. Under Conclusion 16/4 APANPIRG agreed that the month of December every year be adopted as the standard sample period for vertical and horizontal traffic sample data collection, commencing from December 2005.

3.28 Regrettably, APANPIRG had found it necessary to include some States on the List of Deficiencies in the ATM/AIS/SAR Fields as a result of the non provision of safety data. In this regard the meeting reviewed Regional Office State Letter Ref.: T3/10.0, T3/10.1.17 – AP169/08 (ATM) dated 26 November 2008, noting that submission of December 2008 TSD to relevant regional monitoring agencies was required before the end of January 2009.

Update from IATA

3.29 IATA pointed out to the meeting the outcomes of the Intergovernmental Panel on Climate Change (IPCC) report on Aviation and the Global Atmosphere. The IPCC report states that *"Improvements in air traffic management (ATM) and other operational procedures could reduce aviation fuel burn by between 8 and 18%"*. The Report goes on to say that *"The large majority (6 to 12%) of these reductions comes from ATM improvements which it is anticipated will be fully implemented in the next 20 years."*

3.30 In this regard, IATA notes that the BBACG has been working towards achieving the improvements envisaged in the IPCC report. Several ATM improvements have been made over the past few years in regard to ATM in the Bay of Bengal area and over continental India. Among these are the implementation of ATFM procedures on 5 July 2007 and the introduction of several bypass routes such as L510 across the Bay of Bengal, and others within the Bangkok and Kuala Lumpur FIRS. However, IATA noted that as the long haul flights operating in the Bay of Bengal do not just end their flights within the Bay of Bengal but proceed across the Indian continent as well as through Pakistan and Afghanistan, route enhancements in these FIRS will also benefit the airlines and ATC directly.

3.31 The BOBCAT and ATFM procedures have been a resounding success in regulating the traffic flow over the Kabul FIR. Among the benefits to airlines and ATC are reduction of departure delays out of airports in South East Asia and improving the on- time performance, reducing the occasions of bunching, as well as providing greater certainty in level availability before an aircraft departs. As a consequence, the number of re-routes has been drastically reduced and technical stops eliminated.

SERKA UL333 SOKAM

3.32 As part of the BBACG efforts to enhance the route structure and improve traffic flow a new route UL333 from SERKA to SOKAM was implemented on 28th August 2008. This route serves as an alternative to B466 G792, and facilitates traffic flow between Pakistan and Iran across southern Afghanistan. IATA considers that this is extremely timely in view of the increased traffic movements between Mumbai and Europe. Additionally traffic departing South East Asia for western Europe can also flight plan N571/M877/UL333 as an alternative to an unacceptable ATFM slot for P628/ G792.

BUTOP/JHANG & SAMAR/KABUL

3.33 The ATFM TF/12 Meeting was informed by Pakistan that good progress has been made in regard to the implementation of the segment between SAMAR and KABUL via LAJAK and the route segment between JHANG and BUTOP within Lahore FIR. The implementation of these two route segments is not only logical from the viewpoint of the user airlines as they represent a reduction of track distances of 84 NM combined, they also reduce the complications to Lahore ATC of having to manage two busy traffic flows converging at DI and enhance safety. Given the large volumes of traffic using these routes, the savings in CO2 emissions will be in the order of at least 90 million kilograms annually. IATA hopes that this long awaited implementation will be completed soon.

Myanmar communications

3.34 IATA notes that the difficulties with Myanmar communications has been a long- standing issue. It is understood that Myanmar has taken remedial steps and there has been some noticeable improvement. However, communications for the purpose of providing air traffic services have to be available on a continuous basis before they can be regarded as meeting appropriate standards. Unfortunately, IATA continues to receive reports of no communications from flights from time to time. IATA urges Myanmar ATS as a matter of urgency to improve the communications service to the required ICAO standards as soon as possible.

Next Steps

3.35 IATA considers that improvements in the route structure in the cruise phase are critical to ensuring greater capacity and more efficient handling, therefore allowing aircraft greater opportunity to operate at or near optimum levels. The EMARSHH routes were implemented in anticipation of the introduction of RNP 50/50 NM horizontal separation. This was in 2002. However, 7 years later, the current applicable longitudinal separation minimum is 10 minutes or 80 nm for aircraft with the same Mach number, in the Bay of Bengal area. The potential exists for a reduction to 50/50 NM with DCPC and to 30/30 NM when full data-link services are available. In IATA's view, 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 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.

Agenda Item 4: Implementation of the new CNS/ATM systems in the Region

Regional PBN Plan

4.1 The meeting recalled that under Conclusion 18/52, APANPIRG/18 (August 2007) had established the Performance Based Navigation Task Force (PBN/TF). The PBN/TF has met on 3 occasions - PBN/TF/1 in January 2008, PBN/TF/2 in April 2008 and PBN/TF/3 in July 2008. The next meeting of the Task Force (PBN/TF/4) has been scheduled in conjunction with a PBN seminar, to be held in Japan from 2-6 March 2009.

4.2 The CNS/MET/SG/12 meeting (July 2008), held immediately after the PBN/TF/3 meeting, reviewed the draft Regional PBN Plan that had been prepared by the PBN/TF and, noting the requirements and time pressures imposed by Assembly Resolution A36-23, recommended that APANPIRG adopt the plan.

4.3 APANPIRG/19 recognized that as the PBN/TF/3 meeting had been held in July 2008, after RASMAG/9 in May 2008 and ATM/AIS/SAR/SG/18 in June 2008, these two Sub-Groups had not had the opportunity to review the proposed Regional PBN Plan. Consequently, APANPIRG/19 considered it more appropriate to adopt the plan as an 'interim' edition, pending review by RASMAG and ATM/AIS/SAR/SG. APANPIRG/19 adopted the interim edition (Conclusion 19/25) and urged States to review the interim plan, provide feedback to ICAO Regional Office and use the interim plan (**Appendix I** refers) as a basis for developing national PBN Implementation Plans.

4.4 States would review the Regional PBN Plan and provide any feedback to the Regional Office or directly to the PBN/TF/4 meeting in Japan during March 2009. Development of national PN implementation plans would continue in accordance with the timelines established by the PBN/TF.

4.5 In this context, the meeting recognized that in circumstances where affected States are agreeable to completing an implementation in advance of the timelines specified in the regional PBN plan, early implementation is encouraged on the basis of coordination between affected States and airspace users. Similarly, in areas where operational benefits can be achieved and appropriate CNS/ATM capability exists or can be provided for a more accurate navigation specification than that specified in the regional PBN plan, States are encouraged to introduce the more accurate navigation specification on the basis of coordination with affected States and users.

Task Force for Implementation of Reduced Horizontal Separation in BOB

4.6 The meeting recalled that the revised route structure implemented by the EMARSSH Task Force in the Bay of Bengal and beyond during 2001/2002 took advantage of advanced satellite technology using RNP and RNAV aircraft capability and was designed to support RNP 10 operations. An immediate efficiency gain was derived from the fact that EMARSSH routes were able to be established 50 NM apart laterally without affecting ATS operations on adjacent routes, thus increasing airspace capacity.

4.7 However, although RNP 10 operations include the capability to also reduce longitudinal separation to 50NM (as well as 50NM lateral separation) the Bay of Bengal remains essentially a 10 minute MNT longitudinal airspace. This has long been recognized by the BBACG and, acknowledging the increasing FANS data link capability of the States of the BBACG, BBACG/19 (January 2008) in conjunction with FIT-BOB set a target date of 2009 for implementation of 50NM longitudinal separations using CPDLC communications. BBACG Task List Item 19/7 refers.

4.8 In a similar work effort, the ICAO South-East Asia Required Navigation Performance Implementation Task Force (RNP-SEA/TF) has been working on implementations of reduced horizontal separations in the South China Sea area for the past three years. During July 2008, the RNP-SEA/TF successfully implemented 50NM lateral and 50NM longitudinal separations on the heavily trafficked ATS routes L642 and M771 in the South China Sea. The RNP-SEA/TF will continue work towards implementing further 50/50 reduced separations and is also considering RNP 4 based 30/30 separations in some areas.

4.9 RASMAG has been supporting this work regionally and recognized the need to develop a handbook and/or guidance material for safety assessment and monitoring for implementation of reduced horizontal plane separations. Work on this matter has been on-going within RASMAG for a considerable time and RASMAG/10 (December 2008) considered an advanced draft of the En-route Monitoring Agency (EMA) Handbook. RASMAG work programmes will result in a final version of the EMA Handbook being advanced to APANPIRG/20 in September 2009 for adoption as regional guidance material.

4.10 The meeting recalled that one of the long term impediments to implementation of reduced longitudinal separation has been the non-availability of data link Central Reporting Agency (CRA) services for the Bay of Bengal area. Recently, FIT-BOB/10 (Mumbai, India, July 2008) was pleased to be informed that that the difficulties in establishing the BOB CRA had been overcome (refer paragraphs 2.29 to 2.30 above) and the BOB CRA had commenced operations from 1 September 2008 in accordance with India AIP Supplement 40/2008 and India NOTAM G0155.

4.11 More recently, pursuant to the work of the PBN/TF APANPIRG/19 agreed to adopt the interim Asia/Pacific Regional PBN Implementation Plan and States were also urged to develop national PBN implementation plans based on the interim Regional PBN Plan, in accordance with the related Assembly resolution. Importantly, the Regional PBN Plan establishes the RNP 4 navigation specification as ‘preferred’ on a regional basis for oceanic and remote continental airspace over the short term (2008-2012) and includes the RNAV 10/ RNP 10 specification as ‘acceptable'. In the medium term (2013-2016), the Regional PBN Plan notifies RNP 2 as ‘preferred’ and RNAV 2/RNP 4/ RNAV 10 as ‘acceptable’.

Establishment of BOB-RHS/TF

4.12 All participants at the 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. The BOB-RHS/TF would be based on the RNP-SEA/TF model and use a modified version of the Task List adopted by the RNP-SEA/TF (**Appendix J** refers). The proposed objectives of the BOB-RHS/TF are as

described in the draft TOR at **Appendix K**, with the scope of work commencing with a Phase 1 programme to implement widespread 50NM longitudinal separation using CPDLC communications in the Bay of Bengal during 2009.

4.13 In making the decision to establish this implementation group, the meeting recognised the benefits of conducting large implementations in contiguous airspaces, rather than a larger number of small ad-hoc implementations. Accordingly, the meeting recognised that implementation of 50 NM longitudinal separation along large sections of the EMARSHH route structure would be beneficial, and that such an implementation would involve the airspace of the Arabian Sea as well as the Bay of Bengal.

4.14 In this context, 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 ion 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. 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.

4.15 The Secretariat would coordinate arrangements, with the objective of holding the first meeting of the Task Force during the second quarter of 2009. Oman would be invited to attend this meeting and India was encouraged to also provide experts from Mumbai ACC as well as the Bay of Bengal ACCs to allow the Arabian Sea operations to be properly considered. The meeting commented that a combined meeting with the RNP-SEA/TF may allow the BOB-RHS/TF to gain insight into the methodologies adopted for the SCS implementation.

Safety Monitoring for Reduced Horizontal Separation in BOB

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

4.17 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.

4.18 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.

4.19 The meeting also learned that in the interests of standardization and efficiency, arrangements for monitoring of GNEs are often agreed between a group of affected States. One such example is shown in the GNE Monitoring LOA used in the South China Sea, included as **Appendix L.** 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.

4.20 Accordingly, the meeting recognised that implementation of a formal monitoring programme on a sub-regional basis for lateral and longitudinal navigation errors in the Bay of Bengal was necessary. States would study the SCS arrangements and take action to implement such a monitoring programme during the BOB-RHS meeting.

Myanmar Update

4.21 Myanmar had provided an information paper to the 45th DGCA Conference (Kuala Lumpur, Malaysia, November 2008) updating the status of CNS/ATM implementation in Myanmar. The meeting commended Myanmar's progress noting that:

a) Target date for transition to ATS Message Handling System (AMHS) using x.25 protocol is 2009;

b) Myanmar is considering development of existing Data Link application and to implement AIDC in accordance with APAC Interface Control Document(ICD).

4.22 During 2008 a VHF RCAG Monitoring Team with operators and Technicians was formed and detected a number of deficiencies through close monitoring and data collection. The findings resulted from a continuous H24 monitoring program. The following remedial actions have been implemented:

a) Getting rid of radio signal disturbances on RCAG link was successfully done by cooperating with the responsible teams of DCA personal and from Aerothai.

b) Renovation of communication facilities connected with VHF RCAG System in Yangon ACC is being carried out, and

c) Technical and financial support has been provided for H24 operations at remote site RCAG stations especially in Myeik Airport and Sittwe Airport.

4.23 With effect from 25th February 1999, ADS and CPDLC services were introduced in Yangon FIR. Trials have been conducted with the aircraft with FANS 1/A systems which prove successful. Yangon ACC will continue to conduct regional ADS/CPDLC trials for suitably equipped aircraft within Yangon FIR.

4.24 Myanmar notes the ICAO requirements for all states to implement RNAV and RNP ATS routes and approach procedures in accordance with the ICAO PBN Concept (Doc 9613). Myanmar decided to implement system improvements required to maximize efficiency and capacity. These improvements will include modification to approach and en-route airspace and revision of existing ATC procedures. Therefore Myanmar has established PBN Roadmap for initial planning according to Regional PBN implementation plan.

4.25 To enhance the surveillance coverage of Myanmar air space, Myanmar DCA also has contracted with THALES for three new MSSR radar systems RSM 970 S with Mode S capability, the ATC system EUROCAT-C and the billing system. Factory Acceptance Test was successfully done in March 2008 for two systems and in April 2008 for one system. Factory Acceptance Test for EUROCAT-C was also carried out in September, 2008. In 2009, one radar will be installed in Yangon International Airport, one in Mandalay International Airport and one in Myeik Airport. Myanmar is also considering the viability of using ADS-B as surveillance means for enhancing safety especially in Terminal Area and En route.

4.26 In Myanmar, there are approximately 80 air traffic controllers and 227 pilots involved in international aircraft operations. In order to comply with ICAO standards, language proficiency training is being conducted regularly. The target date for test program should be completed on 5 October 2008.

Agenda Item 5: ATS route developments

Re-designation of BBACG routes to RNAV

5.1 Recent ASIOACG and BBACG meetings had discussed the mix of separation minima (i.e. 15 minutes, 10 minutes with MNT, 100 NM - 50NM lateral etc) on routes through the Colombo/Jakarta/ Melbourne and adjacent FIRs. Following investigation, it was apparent that based on current aircraft navigation capabilities appropriate route re-designation from conventional to RNAV routes should be pursued.

5.2 Accordingly, the meeting prepared a draft Air Navigation Plan amendment proposal, as shown in **Appendix M**. In the APAC region, Australia, India, Indonesia, Malaysia, Maldives, Thailand and Sri Lanka are affected by the re-designation proposals. Additionally Mauritius and Seychelles in the AFI region are affected, as is Oman in the MID region. As a consequence, widespread coordination of the amendment proposal was necessary and the Regional Office would take responsibility and work towards a mutually acceptable implementation date. States present at the meeting agreed that AIRAC November 2009 was a suitable target date. An item was added to the Task list in this regard.

Pakistan ATS route implementations

5.3 Pakistan had provided an information paper to the 45th DGCA Conference (Kuala Lumpur, Malaysia, November 2008) updating the status of ATS route developments in Pakistan. The meeting noted that:

UL333 and B466

5.4 During Air Traffic Flow Management (ATFM) Operational Trials and ATFM Operational Implementation, airspace capacity limitations in Kabul FIR were observed particularly with reference to the long haul departures from Mumbai and Chennai. Arising from work of the ATFM Task Force, Afghanistan agreed to implement ATS route segment UL333 between SERKA and SOKAM across southern portion of Kabul FIR. Pakistan provided full support in the implementation of this route on 28 August 2008.

5.5 Pakistan also accepted additional responsibility to assist Kabul ACC by assuming responsibility of separation over PAROD between traffic converging on ATS routes G792 and B466 in Afghan airspace. This has resulted in removal of restriction on the use of ATS Route segment B466 between SERKA and PAROD by Afghanistan, effective 28 August 2008.

M875 BUTOP - JHANG

5.6 The traffic flow from Far East to Europe follows a zigzag track in Delhi and Lahore FIR between BUTOP and JHANG. In order to facilitate international operations, rationalization of the route was considered and India extended M875 from BUTOP to GUGAL on the Lahore-Delhi FIR boundary.

5.7 Pakistan has commenced work on the extension of a route from GUGAL direct to JHANG and onwards to DI Khan. This change in Pakistan will reduce air distance by 54 nautical miles between BUTOP and PAVLO.

SAMAR - LAJAK

5.8 Currently westbound traffic proceeding to Afghanistan on multiple routings (A466, N644 and M881) are squeezed into one single route in Lahore FIR between SAMAR and DI VOR. Similarly eastbound traffic entering from Kabul FIR on these routes converges over DI VOR resulting in traffic

conflictions. In order to resolve the issue a new ATS route between SAMAR (Pakistan/India boundary) and LAJAK (Pakistan/Afghanistan boundary) is under consideration. In addition, an extension to the route SAMAR-LAJAK via PS VOR to ALAMI is being considered to facilitate operation to/from Central Asian states. In this regard, joining BUTOP (India) with JHANG (Pakistan) as mentioned in paragraph 5.6 above would laterally separate the traffic flow proceeding to PAVLO from that proceeding to MURAD and increase the capacity of both routes. Pakistan has favorably considered these proposals and required work is in process. It is anticipated that both of these routes are likely to be available in near future.

SODEB – AAE/PRA

5.9 Pakistan also intends to improve/rationalize the ATS routes within Karachi FIR to support international operations between the Middle East and South East Asia. In this connection, proposal for a new bidirectional ATS route between SODEB (Oman) and PRA/AAE (India) via southern part of Karachi FIR has been initiated. The route will be implemented subject to the consent of concerned adjacent states.

ATS Route Catalogue

5.10 The ATS Route Network Review Task Force (ARNR/TF, disbanded) developed the draft *Asia/Pacific ATS Route Catalogue*, which was accepted by APANPIRG/16 as a regional planning tool, to be maintained and updated on regular basis. Version 1 of the Catalogue was published in August 2005. The most recent Version 5 is available from the ICAO Asia/Pacific web site (http://www.bangkok.icao.int/) under the menu "APAC eDocuments". On-going updates have been undertaken by the Regional Office based on the information made available by States and airspace users.

5.11 The Catalogue is an informal document that consolidates material from the BANP and related documents to serve as an aid to States and users for route planning purposes. As such, **the Catalogue does not replace the BANP** or provide a basis to be used in an operational context. All the requirements in respect to the BANP are developed and amended in accordance with established procedures.

5.12 States and international organisations are encouraged to review the ATS Route Catalogue regularly in accordance with APANPIRG Conclusion 16/10, take action on the route requests in the Catalogue and provide updated information to the Regional Office regularly for inclusion in the Catalogue.

Agenda Item 6: Development of State Contingency plans

6.1 The Secretariat drew the attention of the meeting to the provisions of APANPIRG Conclusion 17/11 that called for the ATM Contingency Plans for Jakarta and Ujung Pandang FIRs to be adopted as a model for Asia/Pacific States in the preparation of national ATM contingency plans. States were encouraged to continue preparation of contingency plans based on the Indonesian model.

Agenda Item 7: Civil Military Coordination

7.1 The meeting was informed that preparations for the Civil and Military Air Traffic Management Summit 2009 (CMAC 09) that would be held in Montreal, Canada during the northern summer of 2009 were progressing well. The CMAC is jointly sponsored by the Air Traffic Control Association (ATCA), the American Association of Airport Executives and the US Department of Defence, with support from the US FAA. The CMAC Summits are the largest forum of its kind where senior civil

and military leaders discuss visions, opportunities and plans for civil/military collaboration to meet the evolving needs of the worldwide aviation community.

7.2 The CMAC forums address civil/military airspace, air traffic and airport issues driven by evolving needs around the world and the conflict that arises in use of shared airspace. Efforts to increase capacity, especially in shared airspace, must fully integrate future civil and national air sovereignty needs. The meeting encouraged States to participate in the CMAC forums.

Agenda Item 8: Review and update BBACG Task List

8.1 While reviewing the BBACG Task List, the meeting was apprised of the status of items remaining open as well as items that were considered suitable for closure, noting the progress that had been made. The meeting considered that the updated Task List included as **Appendix N** adequately reflected the work programme of the group.

8.2 The meeting recognized that although FIT-BOB/9 had been held in conjunction with BBACG/19 in January 2008, FIT-BOB/10 had been held separate from the BBACG during July 2008 in Mumbai, India. In order to remain in touch with the work of the FIT-BOB, the meeting took the opportunity to study the FIT-BOB Task List, a copy of which is shown at **Appendix O**.

Agenda Item 9: Any other business

Forecasts of Asia/Pacific Traffic

9.1 ICAO Pacific Area Traffic Forecasting Group was formed in 1991 with the primary objective of developing forecasts of civil aviation activity in the transpacific market to support air navigation systems planning activity for ICAO and its Contracting States. The scope of the Group was subsequently broadened to include Intra-Asia/Pacific which is reflected in the current designation as Asia/Pacific Area Traffic Forecasting Group (APA TFG).

9.2 The meeting was provided with a copy of the draft report from the APA TFG/14 meeting (September 2008) as information, and noted:

a) For the period 2007-2015, the gross domestic product (GDP) for Asia/Pacific regions is expected to increase at average annual rates of 4.7 per cent and for the period 2015-2025, at 4.0 per cent per annum.

b) Average transPacific airline passenger yield is expected to increase in real terms by 0.3 per cent per annum for the period 2007-2015 and to decline at about 0.5 per cent annually during the period 2015-2025. Average Intra-Asia/Pacific yield is expected to decline only marginally over the forecast horizon, at a rate similar to that for transPacific yield.

c) Intra-Asia passenger aircraft movements are forecast to increase from 950 thousand in 2007 to some 1.4 million in 2015, at an average annual growth rate of 4.8 per cent. For the period 2007 to 2025, aircraft movements are forecast to increase at an average annual growth rate of 4.4 per cent and reach some 2.1 million by 2025.

d) The selected top 45 city-pairs in terms of numbers of passengers in the Asia/Pacific and transpacific are expected to show traffic increases in aggregate

terms of passenger flow at an average annual growth rate of 4.5 per cent from 2007 to 2012. This growth will result in an increase in passenger traffic on the routes concerned from some 53.3 million passengers in 2007 to some 66.4 million passengers in the year 2012.

FANS 1/A Operations Manual (FOM)

9.3 The Asia/Pacific region maintains the *FANS-1/A Operations Manual (FOM),* as the data link operational procedures document. The FOM has been officially adopted by 47 FIRs throughout the Asia/Pacific Region. The meeting was provided with a copy of the most recent edition of the FOM – Version 6 which became effective on 25 September 2008. A copy of Version 6 of the FOM is attached to Information Paper 8 to the BBACG/20 meeting. The FOM is also available from the Regional Office on request.

9.4 The meeting noted the status of the FOM, Asia/Pacific Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia/Pacific Region, the RTCA DO-306/EUROCAE ED-122, Safety and Performance Standard for Air Traffic Data Link Services in Oceanic and Remote Airspace (generically termed the Oceanic SPR Standard) and the progress of work on the Global Operational Data Link Document (GOLD).

Environmental – 5 years of Flex Track Savings

9.5 The meeting learned that on the 23rd December 2008, Emirates Airline and Airservices Australia announced savings of almost 10 million litres of jet fuel, 772 hours of flight time and consequent reductions of exhaust gas emissions in the five years since the introduction of flex track operations for Emirates flights within Australian FIRs.

9.6 The use of flex tracks allows operators to use other than fixed ATS routes in order to make the best use of tailwinds or avoid headwinds by planning the optimum flight route on the day. Since 2003, Airservices Australia has used advanced technology to generate a daily series of flex tracks to provide airlines with non-fixed ATS routes that are optimized for the prevailing weather. The result is a far more efficient means of operation in terms of reduced flight times, fuel burn and emissions.

9.7 In that time Emirates Airline has expanded its network of flex track operations within the Brisbane and Melbourne FIRs to include Sydney – Dubai- Sydney; Dubai – Melbourne – Dubai; Dubai – Perth – Dubai; Singapore – Brisbane; and Bangkok – Sydney flights. Emirates Airline now operates approximately 2,920 FANS flights a year on sectors to Sydney, Perth, Brisbane and Melbourne and will expand flex track usage with the introduction of Airbus A380 services from Dubai to Sydney and non-stop A340-500 services from Dubai to Brisbane (in addition to the existing Dubai – Singapore – Brisbane daily service).

9.8 As a result of these initiatives, Emirates Airline and Airservices Australia announced that the following savings had been achieved over the last five years since the introduction of Flex Tracks within Australian Airspace on 1st December 2003. These savings include:

- 9.6 million litres of fuel (equivalent to approximately 351 tanker trucks);
- 772 hours and 21 minutes in reduced flight times;
- 26,644 tonnes of carbon dioxide (CO2); and
- 163 tonnes of nitrogen oxide (NOx).

9.9 The meeting commended the several ANSPs who have greatly contributed to the success of flex track operations across the Indian Ocean through their mutual cooperation - including the extension of flex tracks and establishment of additional fixed connector routes and boundary waypoints within the Mauritius, Male, Colombo and Jakarta FIRs.

9.10 The meeting was informed that work is continuing with other ANSPs within the region to deliver even greater operating efficiencies through the broader introduction of flex tracks and fixed connector routes across the Arabian Sea/Indian Ocean airspace. It is anticipated that the next step would be the introduction of User Preferred Routes (UPRs), which provide a unique flight path for each aircraft as selected by the operator. Subsequently, even greater long-range operating efficiencies can be expected through the implementation of dynamic re-route in flight procedures (DARP) in due course.

Agenda Item 10: Date and Venue for the BBACG/21 meeting

10.1 The meeting recognized that the majority of the BBACG work programme was being conducted by the ATFM/TF, the FIT-BOB and the new Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF). As such, an annual meeting of BBACG was considered adequate and the meeting agreed that the BBACG/21 meeting would be held in late January 2010.

10.2 Discussions during the ASIOACG/4 meeting had highlighted the efficiencies gained by holding the BBACG and ASIOACG meetings back to back. ASIOACG had requested that BBACG continue to support this arrangement and, accordingly, the meeting agreed that the January 2010 meeting would be conducted as a two and a half day BBACG meeting immediately followed by a two and a half day ASIOACG meeting. The Regional Office would issue invitations to this effect at the appropriate time.

10.3 The meeting recognized the many benefits that had accrued to the meeting by virtue of the location in the Maldives. The programme had incorporated a visit to the ATC facilities at Malé International Airport and this was found to be extremely valuable in opening communications between experts from the various States attending.

10.4 With this in mind, the meeting requested that the Airports Authority of India consider hosting the January 2010 combined BBACG and ASIOACG meetings in Chennai, India. India would examine this possibility and provided feedback to the Regional Office in due course.

Closing of the meeting

10.5 In closing the BBACG meeting, Mr. Tiede summarized the substantive outcomes that had been achieved in both the ASIOACG and BBACG forums. He also considered that the crossovers between the two groups had improved communication and would continue to lead to efficiencies in many areas.

10.6 Mr. Tiede thanked all participants and their administrations for their excellent support and contributions, and expressed his sincere appreciation for the close cooperation of the Civil Aviation Department and the generous support and kind hospitality of the Maldives Airports Company Limited in hosting the meetings. He commented on the excellent arrangements that had been put in place by the Maldives, including the dinner hosted by Mr. Mohamed Amir, Managing Director of MACL. Mr. Tiede expressed his personal thanks to Mr. Ahmed Nazim (Director, Air Traffic Management and Rescue Services MACL) and all the staff members of MACL for the professional and well run meetings.

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The Combined Fourth Meeting of the Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG/4) and Twentieth Meeting of the ICAO Bay of Bengal ATS Coordination Group (BBACG/20)

Malé, Republic of Maldives, 25th – 29th January 2009

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LIST OF WORKING AND INFORMATION PAPERS

WORKING PAPERS

NUMBER	AGENDA	WORKING PAPERS	PRESENTED BY
WP/1	1	Provisional Agenda for BBACG/20	Secretariat
WP/2	2	Outcomes of APANPIRG/19	Secretariat
WP/3	2	Outcomes of the 45th DGCA Conference	Secretariat
WP/4	4	Review of Regional PBN Implementation Plan	Secretariat
WP/5	5	Review of the Asia and Pacific ATS Route Catalogue	Secretariat
WP/6	2	AIS Update from the AIS Implementation Task Force and the First Meeting of the AIS-AIM Study Group	Secretariat
WP/7	8	Review BBACG Task List	Secretariat
WP/8	8	Review FIT-BOB Task List	Secretariat
WP/9	2	Establishment of ICAO Flight Plan and ATS Messages Task Force	Secretariat
WP/10	3	BOBCAT Activities Update since ATFM/TF/12	Thailand
WP/11	3	Outcomes of ATFM Seminar/Workshop	Secretariat
WP/12	2	Outcomes from RASMAG/10	Secretariat
WP/13	3	Air Traffic Flow Management Task Force	Secretariat
WP/14	4	Proposal to establish a Task Force for Implementation of Reduced Horizontal Separations in Bay of Bengal	Secretariat
WP/15	3	Bay of Bengal – An Update from IATA	IATA
WP/16	3	Establishment of M770 Bypass Procedure	Thailand
WP/17	5	Re-designation of ATS Routes as RNAV in the Colombo, Melbourne and surrounding FIRs	Australia

INFORMATION PAPERS

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/1	-	List of Working and Information Papers	Secretariat
IP/2	2	Inter-Regional Afghanistan Interface Meeting (IRAI)	Secretariat
IP/3	3	Traffic Sample Data (TSD) State Letter	Secretariat
IP/4	2	The Fifth Meeting of the Western Pacific/South China Sea RVSM Scrutiny Group	Secretariat
IP/5	9	Forecasts of Asia/Pacific Traffic	Secretariat

NUMBER	AGENDA	INFORMATION PAPERS	PRESENTED BY
IP/6	2	Outcomes of the Arabian Sea/Indian Ocean ATS Coordination Group	Secretariat
IP/7	4	Outcomes of the FANS 1/A Implementation Team – Bay of Bengal	Secretariat
IP/8	9	FANS Operations Manual Version 6	Secretariat
IP/9	2	Review of the Fourth Meeting of South-East Asia RNP Implementation Task Force	Secretariat
IP/10	2	Review of the 34th Meeting of the RVSM Implementation Task Force	Secretariat
IP/11	2	Review of the Southeast Asia ATS Coordination Group and its FANS Implementation Team, Southeast Asia	Secretariat
IP/12	4, 5	Myanmar and Pakistan Papers to 45th DGCA Conference	Secretariat

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APANPIRG/19 List of Conclusions relating to ATM/AIS/SAR

Conclusion 19/1	–	Regional performance framework
Conclusion 19/2	–	National performance framework
Conclusion 19/7	-	RNP 4 capability for operators
Conclusion 19/8	–	Conduct regional runway safety seminar/workshop.
Conclusion 19/9	–	Support for Ad-Hoc GOLD Working Group.
Conclusion 19/10	–	Future date-time for NOTAMC and NOTAMR
Conclusion 19/11	–	Update SAR Matrix including guidance material.
Conclusion 19/12	–	Accelerated Data Link Implementation in the Manila Flight Information Region (FIR).
Conclusion 19/14	–	Approval of China RMA as Asia Pacific RMA
Conclusion 19/15	–	Enhanced communications between States and RVSM RMAs
Conclusion 19/25	–	ASIA/PAC PBN Implementation Plan
Conclusion 19/27	–	Flight Procedure Design Office
Conclusion 19/29	–	Separation Standards for PBN
Conclusion 19/37	–	Revised Mandate Regional ADS-B Out Implementation
Conclusion 19/56	–	Common methodology for environmental benefits

APANPIRG List of Decisions relating to ATM/AIS/SAR

Decision 19/4	–	Dissolution of the Regional Performance Framework Task Force.
Decision 19/5	–	Dissolution of the RVSM/TF
Decision 19/6	–	Establishment of an ICAO Flight Plan & ATS Message Implementation Task Force
Decision 19/13	–	ATM/AIS/SAR Task List
Decision 19/57	-	Amendments to the Terms of Reference of the ATM/AIS/SAR SG

TERMS OF REFERENCE

Asia/Pacific ICAO Flight Plan & ATS Messages Implementation Task Force (FPL&AM/TF)

Terms of Reference

The terms of reference of the FPL&AM/TF are:

1) To conduct a comprehensive review of Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, effective 15 November 2012) in order to identify, study and address implementation complexities arising from the adoption of amended PANS ATM Chapter 4, Chapter 11, Appendix 2 and Appendix 3 provisions relating to the ICAO Flight Plan and associated ATS Message formats; and

2) As a result of the review, and in accordance with relevant additional ICAO provisions, prepare and promulgate coordinated Asia/Pacific transition strategies and plans with associated timelines to enable the streamlined implementation of the amended Flight Plan and ATS Message provisions contained in Amendment 1 to the Fifteenth Edition of the PANS ATM.

In addressing these terms of reference, the Task Force should consider, *inter alia*, the following aspects:

1) Likelihood that such changes within local systems will differ between Regions and systems, therefore global transition is not feasible in view of the localized issues and APANPIRG is best placed to authorize regional transition plans;

2) Inter and intra regional issues;

3) Impact on inter-system co-ordination messaging (e.g. AIDC)
   - AIDC guidelines and other regional documents will need to be updated;

4) Contingency arrangements for States that cannot comply by the due date;
   - How to handle staged implementations by States and/or airspace users,
   - Expectations across ANSPs with different implementation dates, and
   - Systems that transition early will need to be capable of handling both new and current instruction sets.

5) Inter-system exchanges need to take account of differing automation capabilities in order to avoid excessive message rejection;

6) Establishment of an Information Management system to track implementation timelines for various States/systems;

7) Management of Repetitive Flight Plans;

8) Implications for presentation formats, including paper & electronic flight progress strips;

9) Impacts to users (flight planning systems etc); and

10) Appropriately timed withdrawal of existing State or Regional specific requirements to ensure consistency with new instruction set.

Membership

Proposed membership of the Task Force should include, but is not limited to, operational and systems engineering personnel from the following States:

Australia, China, Hong Kong-China, India, Indonesia, Japan, Malaysia, New Zealand, Singapore, Thailand, United States, Viet Nam, IATA and IFALPA.

Industry participation, if required, is to be included under responsibility of State delegations or with approval from the ICAO Asia/Pacific Regional Office.

Reporting

Report progress to ATM/AIS/SAR/SG/19 and CNS/MET/SG/13 (June/July 2009), and APANPIRG/20 (September 2009).

ICAO Strategic Objectives and GPIs

Amendment 1 to the Fifteenth Edition of PANS-ATM promulgates updates to operational messages, including the ICAO Flight Plan message set, in order to provide, *inter alia*, increased detail and definition of aircraft equipage with the objective of better managing and enabling provision of the related ATS services.

The Task Force will prepare and maintain a performance framework form (PFF) to codify the implementation of the new ICAO Flight Plan format and associated ATS Messages as an Asia/Pacific regional performance objective. The work and outcomes from the Task Force are expected to support:

ICAO Strategic Objectives:

- *A: Safety – Enhance global civil aviation safety*
- *D: Efficiency – Enhance the efficiency of aviation operations*
- *E: Continuity – Maintain the continuity of aviation operations*

Global Plan Initiatives

GPI-5	*Performance based navigation*
GPI-9	*Situational awareness*
GPI-11	*RNP and RNAV Standard Instrument Departures (SIDs) and Standard Terminal Arrivals (STARs)*
GPI-17	*Implementation of data link applications*

…… *end* ……

RASMAG Plain Language definition of Large Height Deviation (LHD)

Based on, amongst others, the *Guidance Material on the Implementation of a 300 M (1,000 ft) Vertical Separation Minimum (VSM) between FL290 and FL410 Inclusive for Application in the Airspace of the Asia Pacific Region* and discussions during the meeting, during 2007 RASMAG adopted the following plain language definition of a Large Height Deviation for regional promulgation:

A RVSM large height deviation (LHD) is defined as any vertical deviation of 90 metres/300 feet or more from the flight level expected to be occupied by the flight

RASMAG also agreed to promulgate the following guidance (see below) to support the plain language definition of a LHD.

4.1 The causes of a LHD occurrence include:

- Operational errors (aircraft operating at a flight level other than the assigned flight level due to ATC/Pilot loop errors and incorrect clearance), which are categorized into three causes:
  - Flight crew not following the correct ATC clearance
  - ATC issuing an incorrect ATC clearance
  - Receiving ATC unit unable to apply the separation standards during a transfer of control responsibility between two ATC units.

- Aircraft contingency events occurring in situation where the pilot cannot initially follow normal contingency procedures and is forced to climb/descend through flight levels before diverting from track,

- Deviation due to the effect of high level meteorological conditions, and/or

- Deviation due to Traffic Collision Avoidance System (TCAS) advisories, which includes:
  - Flight crew correctly following the TCAS Resolution Advisory (RA), [see note below],
  - Flight crew incorrectly following the TCAS RA, and
  - Any vertical displacement not conforming to the resolution advisory.

Note: *RASMAG stressed that it was important to note that a LHD resulting from actions complying with a TCAS RA would not reflect risk in the RVSM airspace since it is a proper remedial action of flight crew to prevent a possible mid-air collision between aircraft. Nonetheless, it was strongly recommended that all LHD occurrences related to TCAS resolution advisory be reported to the responsible RMA for detailed airspace safety analyses.*

RASMAG Categorization of Large Height Deviations (LHD) in RVSM Safety Monitoring Reports for application by Asia/Pacific RVSM Regional Monitoring Agencies (RMAs)

The APANPIRG Regional Airspace Safety Monitoring Advisory Group (RASMAG) recognized that in order to be consistent with the RASMAG plain language LHD definition and associated guidance listing possible causes of LHD occurrences adopted by RASMAG during 2007, standardization of the LHD categorizations applied by Asia/Pacific RMAs was necessary. Accordingly, RASMAG adopted and promulgated the LHD categorizations described in Table 1 below for application by all RMAs serving the Asia/Pacific region.

(***last updated RASMAG/8 December 2007)***

Code	RVSM Operations Large Height Deviation (LHD) Categorization
Operational Errors	
A	flight crew failing to climb/descend the aircraft as cleared;
B	flight crew climbing/descending without ATC clearance;
C	Incorrect operation or interpretation of airborne equipment (e.g. incorrect operation of fully functional FMS, incorrect transcription of ATC clearance or re-clearance, flight plan followed rather than ATC clearance, original clearance followed instead of re-clearances etc);
D	ATC system loop error; (e.g. ATC issues incorrect clearance or flight crew misunderstands clearance message);
E	coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues (e.g. late or non-existent coordination, incorrect time estimate/actual, flight level, ATS route etc not in accordance with agreed parameters);
F	coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues;

Aircraft Contingency Events	
G	aircraft contingency event leading to sudden inability to maintain assigned flight level (e.g. pressurization failure, engine failure);
H	airborne equipment failure leading to unintentional or undetected change of flight level (e.g. altimetry errors);
Deviation due to Meteorological Condition	
I	turbulence or other weather related causes;
Deviation due to TCAS RA	
J	TCAS resolution advisory; flight crew correctly following the resolution advisory; ***Note:*** *LHD resulting from actions complying with a TCAS RA would not reflect risk in the RVSM airspace since it is a proper remedial action of flight crew. Nonetheless, it is strongly recommended that all LHD occurrences related to TCAS resolution advisory be reported to the responsible RMA for detailed airspace safety analysis.*
K	TCAS resolution advisory; flight crew incorrectly following the resolution advisory
Others	
L	An aircraft being provided with RVSM separation is not RVSM approved (e.g. flight plan indicating RSVM approval but aircraft not approved, ATC misinterpretation of flight plan)
M	Other ***Note****: this includes situations of flights operating (including climbing/descending) in airspace where flight crews are unable to establish normal air-ground communications with the responsible ATS Unit.*

Table 1: LHD Categorizations utilized by Asia/Pacific RMAs

ASIOACG/4 Open Action Items (Updated 27th January 2009)

Number	Action Item	Action Officer(s)	Current Status	Action Pending	Target Date
01-5	Flex Track Connector Routes between Melbourne and Colombo FIRs	Emirates Airline, Sri Lanka, Maldives and Australia.	Open	ASIOACG/3 (July 2008) Discussions ongoing – Emirates and Sri Lanka and Maldives	Jan 2009
				ASIOACG/4 (January 2009) 2 Connector routes opened and established in December 2008 and currently being utilised.	
01-6	Flex Tracks Connector Routes between Muscat, Mumbai, Male FIRs	Oman Airservices Australia India Male Mauritius	Open	Liaise with Mumbai, Muscat and Colombo regarding the establishment of appropriate Flex Track connector routes	Jul 2008
		AAI (Mumbai)	Open	ASIOACG/3 (July 2008) Agreed to implement KITAL – ELKEL (To coincide with proposed removal of CVSM within the AFI Region on 25th Sept 2008)	25 Sep 08
				ASIOACG/4 (January 2009) AAI confirms that KITAL – ELKEL is available for use from 12th March 2009.	12 Mar 09

01-7	Flight Level Allocation Scheme (FLAS)	AAI	Open	A. Review of present FLAS in the Arabian Sea B. Removal of FLAS in the Arabian Sea	
		AAI Oman Yemen (CAMA) IATA	ASIOACG/2 (Jan 08) Open Open Open Open	Discussions during ASIOACG/2 – Agreed: 1. IATA to write to AAI requested data on the airlines which are operating eastbound on both A451 & G450 2. IATA would contact those Airlines to emphasise the requirements for Boundary and Waypoint Estimates. 3. Increase the use of CPDLC/ADS-C within the Mumbai FIR 4. IATA agreed to develop a User Requirements list – which could lead to priority being given to FANS 1/A equipped aircraft.	Jan 2009
		IATA AAI	ASIOACG/3 (Jul 08) Open Open Open Open Open	Discussions during ASIOACG/3 – Agreed: 1. Data Collection and analysis & AAI to advise IATA of Aircraft not complying with Comm requirements inbound to Mumbai FIR. 2. Safety Analysis 3. Removal of RVSM/CVSM transition procedures 4. Commence suspension Aug 2008 between 0530 and 0930 UTC daily. Joint NOTAM to be issued on Entry/Exit times 5. ADS-C/CPDLC in Mumbai FIR – H24 operation	Jul 2008 Aug 2008 Sep 2008 15 Aug 08 Oct 2008

01-7	Flight Level Allocation Scheme (FLAS)		Open	ASIOACG/4 (January 2009) The trial suspension of the FLAS is extended to 31st May 2009. AAI is collecting data and will review the proposed removal of FLAS. Aircraft Equipage data collection concerning FLAS (ASIOACG/2 Points 2 through 4) – IATA has distributed equipage survey forms to its members (January 2009) and the results will be reported to ASIOACG/5. IATA requested AAI to provide FPL Data giving details of Airway, Entry/Exit, Aircraft Equipage, to analyse the requirement for developing improved Airspace Management. ASIOACG/4 requested IATA and AAI to work closely together to implement RNP on a route by route basis where possible.	30 Jun 09 Jan 2010 30 Jun 09 Jan 2010
02-3	ASIOACG Letter of Agreement	ASIOACG Secretary	Open	Secretary to coordinate sign-off with all Parties ASIOACG/3 LOA distributed to members present	Jan 2009
				ASIOACG/4 (January 2009) MACL signed and others to be invited to sign	Jan 2010

02-4	Establishment of Indian Ocean UPR (Southern Africa to Southeast Asia)	Airservices Australia Singapore Airlines	ASIOACG/2 (Jan 08) Open	1. Prepare Contact List (use proforma) 2. Develop Operational Concept which identifies Operators; City Pairs; & Aircraft types for interim application (March 2008) 3. SQ to provide initial Flight Plan Data (K.K. Goh) JNB – CPT – SIN	Mar 2008
		SQ to liaise with IATA Airservices to liaise with South Africa	ASIOACG/3 (Jul 08) Open	Further consultation with Airservices, Mauritius and South Africa More work required with Indonesia with regard to extending benefits further east. IATA to work with Indonesia to identify Entry and Exit points for Connector Routes. Airservices to draft AIP SUP for consultation between Mauritius, Australian and South Africa and with SQ, MH and MK Report progress to ASIOACG/4 Need to broaden concept into longer term implementation of other tracks Contact List to be updated/populated	Jan 2009
		Airservices Australia	ASIOACG/4 (Jan 09) Open	The information provided under WP/08 will be circulated to all involved by the 1st Feb 2009 to further progress implementation. WP/08 was a collation of all the input to date. An update will be circulated to all who provided input Input provided by: South Africa, Mauritius, Australia, Indonesia and SQ plus others.	1st Feb 09

02-06	Update FIT-BOB Table of ADS/CPDLC Equipage and ATS Status	All ANSPs	ASIOACG/2 (Jan 08) Closed	ANSPs are requested to review and update table at ASIOACG/3	Jul 2008
			ASIOACG/3 (Jul 08) Closed	Referred to FIT-BOB/10 for update (10 – 11 Jul 08) To be updated at ASIOACG/4	Jan 2009
			ASIOACG/4 (Jan 09)	This matter will be addressed through the FIT-BOB/11 meeting in April 2009	Apr 2009
03-01	Baseline Aircraft and ATM Capability – Data Collection *(Data Collection Working Group)*	IATA & Airlines Airports Authority of India (AAI) Airservices Australia (ASA) Other ANSPs	ASIOACG/3 (Jul 08) Open	Objectives: 1. Establish Data Collection Working Group (WG) 2. Collect 3 months of Data 3. WG to meet in October to analyse Data 4. Report to ASIOACG/4 – January 2009 Data Requirements: IATA: Identify Airlines in region Type of Aircraft Routes and common crossing Routes Equipage (COM/NAV/SUR) AAI: Crossing Traffic vs. Main ATS Routes Air/Ground & Ground/Ground Com issues ASA: Collation of Data received Other ANPS: Provision of Data as and when requested by the *Data Collection Working Group*	Jul 2008 Jul – Oct Oct 2008 Jan 2009

			ASIOACG/4 (Jan 09) Closed	Meeting was presented with results of a simple baseline analysis but further work/analysis should be absorbed into the *proposed "ASIOACG CNS/ATM Working Group"* (See Action Item 03-02) Action Item is **closed** and incorporated into Action Item 03-02	
03-02	Establishment of ASIOACG CNS/ATM Working Group	ANSPs IATA Member Airlines ICAO ASIOACG Secretary	Open	1. To support further expansion of RNP10 and associated Separation Standards 2. Establishment of Arabian Sea/Indian Ocean Route Review Working Group Objectives: 1. Develop WG Terms of Reference 2. Define Airspace and limitations 3. To build on initial work of MID IATA 4. To comply with ICAO PBN Concepts 5. Refer to ICAO through MIDANPIRG & APANPIRG (Secretariat/ICAO)	Jul 2009

		Airservices Australia Emirates Airline	ASIOACG/4 (Jan 09) Open	1. ASIOACG/ agreed to establish the "*ASIOACG CNS/ATM Working Group"* 2. Working Group Terms of Reference agreed and shown as Appendix A to this Attachment 3. Composition of WG to include: ▪ Australia ▪ India ▪ Maldives ▪ Oman ▪ Sri Lanka ▪ IATA (inc. Emirates & Etihad) ▪ Other ASIOACG members as and when requested 4. The ASIOACG CNS/ATM Working Group shall meet on a six monthly basis (July/January) to progress tasks allocated by ASIOACG. 5. Emirates Airline proposes to host first meeting in Dubai during July 2009. 6. Airservices Australia requested to nominate a Chairman – no Secretary required. 7. Emirates Airline will endeavour to provide continued use of ASIOACG website (Mercator) to assist the Working Group in its activities. 8. The CNS/ATM Working Group shall convene immediately prior to BBACG/21 so that its report can be finalised and presented to both BBACG/21 (for information) and to ASIOACG/5	July 2009 Jan 2010

03-03	Redesignation of ATS Routes as RNAV in the Colombo, Melbourne and surrounding FIRs	Airservices Australia	Open	1. Progress ANP Amendment 2. Develop Safety Plan for implementation of RNP10 and associated separation minima on those Routes	Jan 2009 Jul 2009
			ASIOACG/4 (Jan 09)	1. Airservices Australia to liaise with other ANSPs/States and ICAO on Route Names and Draft Amendment to ANP – to also agree on common implementation date. (see list of Routes in Report of ASIOACG/4) 2. Airservices Australia will draft ANP Amendment proposal and circulate to States concerned and coordinate separately with Seychelles and Mauritius	July 2009
03-04	RVSM implementation in AFI Region	ANSPs neighbouring AFI FIRs	~~Open~~	Initiate coordination with adjoining AFI FIRs Update LOAs	Aug 2008
			ASIOACG/4 (Jan 09) Closed	Successfully implemented - Closed	CLOSED
04-01	Emirates "Green Flight" DXB – SYD 1st February 2009	Emirates Airline ICAO (MIDANPIRG) ICAO (APANPIRG)	Open	Emirates Airline to operate UAE412 DXB – SYD on 1st Feb 2009 as "Green Flight" and to report results of savings achieved (including emissions) to ASIOACG and through IATA to MIDANPIRG and APANPIRG	Mar 2009

04-02	Introduction of Flex Track operations within Mumbai FIR	AAI ASIOACG CNS/ATM Working Group	Open	1. Phased approach 2. Area for consideration is the Southern Portion of the Mumbai FIR 3. Emirates to provide information regarding proposed LOAs, AFTN Track Definition Messages (TDM)	Jul 2009
04-03	Future of ASIOACG Meetings and Administration	Airservices Australia ASIOACG Secretary	Open	1. The meeting requested Airservices Australia to consider the appointment of a Secretariat member to ASIOACG. 2. ASIOACG CNS/ATM Working Group has been established and will convene in July 2009. The Working Group will meet again immediately prior to BBACG/21 so that its report can be finalised and presented to both BBACG/21 (for information) and to ASIOACG/5. 3. ASIOACG will now meet on an annual basis with ASIOACG/5 scheduled to convene immediately after BBACG/21 (possibly in Chennai, India during late January 2010 and subject to agreement between India and ICAO (Bangkok). 4. It is recognised that the ASIOACG membership also includes Mauritius, Seychelles and Yemen and that these ANSPs must not only be encouraged to attend future meetings, but that consideration be given to holding ASIOACG/6 (Jan 2011) at a location closer to these States.	Jan 2010
04-04	Inclusion of TMA efficiencies as ASIOACG standing Agenda Item	ASIOACG Secretary	Open	Include “TMA Efficiencies” as Standing Agenda Item for future ASIOACG meetings	Jan 2010

Arabian Sea/Indian Ocean ATS Coordination Group
CNS/ATM Working Group

(ASIOACG CNS/ATM WG)

Terms of Reference

(27th January 2009)

A. Objective:

Deliver ATM in support of COM /NAV/SUR capabilities of aircraft operating in the ASIOACG area.

B. Terms of Reference:

The CNS/ATM Working shall:

- Develop proposals and monitor enroute efficiencies delivered by flexible tracking arrangements (e.g. Flex Tracks, UPR etc)
- Manage data collected to assess aircraft NAV/COM/SUR capabilities;
- Develop a revised route structure based on aircraft and ATM capabilities in accordance with ICAOs PBN concept; and
- Conduct other activities as directed by ASIOACG.

C. Working Arrangements:

The CNS/ATM Working Group shall meet on a six monthly basis (July/January) to progress tasks allocated by ASIOACG.

The January meeting shall be conducted immediately prior to the BBACG so that its report can be finalised and presented to both BBACG (for information) and ASIOACG.

D. Core Participants:

Australia
India
Maldives
Oman
Sri Lanka
IATA (including Emirates Airline and Etihad Airways)
Other ASIOACG Members as and when required.

E. Administration:

The Working Group shall appoint a Chairman. A Secretary is not required for the Working Group.

AIR TRAFFIC CONTROL ASSOCIATION
INDUSTRIAL AWARD

PRESENTED TO AN INDUSTRY LEADER
FOR OUTSTANDING ACHIEVEMENT
THAT HAS ADDED TO THE QUALITY
SAFETY OR EFFICIENCY OF AIR TRAFFIC CONTROL

Awarded to

Asia-Pacific Air Traffic Flow Management Task Force

Bangkok, Thailand
November 2008

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

DRAFT

AIR TRAFFIC FLOW MANAGEMENT (ATFM) COMMUNICATIONS HANDBOOK FOR THE ASIA PACIFIC REGION

Version 0.2 – November 2008

Issued by the ICAO Asia/Pacific Regional Office, Bangkok

FOREWORD

Centralized air traffic flow management (ATFM) facilities are best able to communicate the capacity of their national airspace systems to accept traffic from adjacent international air traffic service (ATS) providers. As coordination and collaboration efforts to balance traffic demand and airspace/airport capacity intensify between affected States, common ATFM procedures and communication are essential. Once procedures are defined, a key element in removing language barriers is establishing common terms and phrases. Terminology and phraseology differences in the operational application of ATFM procedures could be a potential source of confusion during communications, both written and verbal, between international ATFM facilities.

Common terminology is an essential element in exchanging definitive, clear, and concise communication between international ATFM facilities. Likewise, the phraseology should follow a technical pattern for the exchange of standardized and harmonized messages. This Asia/Pacific guidance material is intended to support States in meeting these objectives and has been adopted by APANPIRG/xx, under the terms of Conclusion xx/Xx, for this purpose. As this is the first document of its kind for the region, APANPIRG noted that further development and amendment was likely. However, it is expected that the guidance herein will be equally applicable to both verbal ATFM coordination exchanges and as the basis for written ATFM messages. Although the terminologies and phraseologies presented herein are not intended to be a requirement for ATFM communications, they are recommended to States as guidelines for the exchange of ATFM messages.

TABLE OF CONTENTS

1. Introduction

1.1 ATFM is a function of air traffic management (ATM) established with the objective of contributing to a safe, orderly, and expeditious flow of traffic while minimizing delays. This is accomplished through the dynamic use of operational traffic management initiatives supported by continuous coordination and analysis.

1.2 The purpose of ATFM is to balance air traffic demand with airspace and/or airport capacity to ensure the most efficient use of the airspace system. This is achieved by ensuring that capacity is utilized to the maximum extent possible and that air traffic volumes are compatible with the capacities declared by the appropriate air navigation service providers.

1.3 ATFM implementation should provide for the organization and handling of the flow of air traffic in such a way that, while ensuring the safe, orderly and expeditious flight of individual aircraft, the totality of the traffic handled at any given point or in any given area is compatible with the capacity of the air traffic control system.

1.4 The operation of ATFM service includes the application of ATFM measures that are designed to achieve the optimum flow of traffic. These measures include, but are not limited to:

a) Allocating and updating departure slots;
b) Allocating and updating arrival slots;
c) Allocating and updating en-route slots;
d) Re-routing of traffic;
e) Alternate flight profiles;
f) Minutes-in-trail assignments;
g) Mile-in-trail assignments;
h) Airborne holding; and
i) Ground holding.

1.5 Inherent in the provision of an ATFM service is the necessity to coordinate arrangements clearly and accurately between ATC units. In most instances this is achieved via voice coordination between operatives in the respective units, however many occasions also require written messaging to support implementation of ATFM operational initiatives. Accordingly, efficient and effective written and verbal communication using standardized and documented terminologies and phraseologies is essential.

2. General

2.1 The primary goal of this guidance material is to promulgate appropriate terminologies and phraseologies for the exchange of written and verbal ATFM messages between units providing ATFM services, both within States and between States. The terminologies and phraseologies contained herein are intended to reflect the current use of plain language and provide a basis for regional standardization and harmonization.

2.2 Although there are various plain language words and phrases in use today by ATFM service providers, these words and phrases are all capable of being organized into a modular and structured method of delivery to ensure the harmonization of communications and reduce the incidence of misunderstanding between units providing ATFM services.

2.3 It is not the intent of these guidelines to provide detailed information on ATFM concepts, procedures, and initiatives; however, since not all readers may be familiar with ATFM terms used in the examples, a brief description of ATFM operational initiatives is provided at **Appendix 1**. The list is not all-inclusive and does not preclude the innovation and application of other procedures that will result in improved ATFM services.

3. Modular and Structured ATFM messages

3.1 The use of a modular and structured ATFM message provides for consistent ATFM message design and delivery. Each component of the ATFM message can contain plain language elements that, when combined, provide a complete ATFM message. Harmonization is achieved by the delivery of an ATFM message that has all of the required components in a structured format while making allowances for different plain language elements. This is of particular benefit for ATFM service providers that use different ATFM terminology or for non-native English speaking ATFM service providers.

3.2 This guidance material promulgates the concept of modular and structured ATFM messages as the basis for written and verbal ATFM coordination and defines an ATFM message in terms of five modules – the "Who", "What", "Where", "When" and "Why" of the ATFM communication. These five modules are described as follows:

a) **Who:** The ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact;

b) **What:** The ATFM objective to be achieved;

c) **Where:** The location of the ATFM objective to be achieved;

d) **When:** The time and/or duration of the ATFM objective to be achieved; and

e) **Why:** The reason for the ATFM objective.

3.3 There is no module regarding "How" the ATFM restrictions should be achieved by the counterpart ATFM service provider. This is because it is clearly the counterpart's responsibility "how" they fulfill the ATFM restrictions within their airspace. However, the ATC unit being asked

to implement ATFM restrictions may collaborate with the originating ATC unit on the type and method of ATFM measure to be applied.

3.4 Generally speaking, ATFM service providers should resolve demand-capacity related constraints by initiating local and/or national ATFM initiatives first. Hence, ATFM operational initiatives will be requested by an adjacent international ATFM facility only when national measures are exhausted and therefore compliance should be considered highly necessary. Accordingly, once information is exchanged regarding an ATFM initiative and an action is agreed, application of the ATFM operational initiative is considered MANDATORY. Importantly, it should be noted that a critical situation at the receiving ATC unit could require imposition of an ATFM restriction without any option of non compliance by the transferring ATC unit.

3.5 Below are the examples of possible ATFM messages:

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC … REQUIRE 100 MILES IN TRAIL REGARDLESS OF FLIGHT LEVEL ON R220, R580 AND ALL PACOTS TRACKS FOR TRAFFIC LANDING NARITA ESTIMATING FIR BOUNDARY FROM 0100 UTC UNTIL 0500 UTC DUE TO SEVERE WEATHER".

- "FUKUOKA ATMC, THIS IS FAA COMMAND CENTER… CAPACITY RESTRICTION: LOS ANGELES HAS STARTED FLOW RESTRICTIONS FOR ALL AIRCRAFT LANDING LOS ANGELES DUE TO EARTHQUAKE. LOS ANGELES APPROACH IS UNABLE TO ACCEPT INBOUND TRAFFIC UNTIL FURTHER NOTICE".

4. ATFM Message Components

4.1 As the modular and structured ATFM message may contain several different elements of plain language, this section will examine each of the five components and detail some of the possible plain language words and phrases that are in use today.

The WHO Component

4.2 The 'WHO' component identifies the ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact. ATFM units will be addressed by name until ICAO Annex 10 – *Aeronautical Telecommunications* is amended to incorporate appropriate ATFM unit identifiers. Examples of the 'WHO' component include:

- "FUKUOKA ATMC, THIS IS FAA COMMAND CENTER…"
- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC…"

The WHAT Component

4.3 The 'WHAT' component identifies the ATFM objective to be achieved. The 'WHAT' component may also be used to provide ATFM information. Objectives include, but are not limited to:

- "REQUIRE (number) MILES (or MINUTES) IN TRAIL AT THE SAME FLIGHT LEVEL";

- "REQUEST (number) MILES (or MINUTES) IN TRAIL REGARDLESS OF FLIGHT LEVEL";
- "REQUEST A RATE OF LESS THAN (number) AIRCRAFT PER HOUR";
- "FLIGHT LEVELS (number) AND (number) NOT AVAILABLE";
- "ONLY FLIGHT LEVELS (number), (number) AND (number) ARE AVAILABLE";
- "(route/airport/airspace) NOT AVAILABLE DUE (reason) ALTERNATIVE[S] IS/ARE (routes/airports)".

The WHERE Component

4.4 The 'WHERE' component represents the location of the ATFM objective to be achieved. It is often preceded by a modifying clause, indicating which aircraft or group of aircraft the restriction will apply to. The modifying clause and the location combination are used to construct the 'WHERE' component. Examples of which aircraft or group of aircraft are to be restricted include:

- "FOR ALL AIRCRAFT…"
- "FOR TRAFFIC FASTER THAN 300 KNOTS…"
- "FOR HEAVY AIRCRAFT…"
- "FOR TRAFFIC LANDING…"
- "FOR AIRCRAFT DEPARTING…"
- "FOR TRAFFIC OVERFLYING…"
- "FOR AIRCRAFT PASSING…"

4.5 Examples of location include:

- "AT NIPPI…"
- "ON A337…"
- "WESTBOUND ON PACOTS TRACK CHARLIE…"
- "INBOUND ON G344…"
- "ON PACOTS TRACK 2 LANDING SAN FRANCISCO AIRPORT…"
- "ABOVE FLIGHT LEVEL 300…"

4.6 In practice the modifying clause and the location are combined into one ATFM message, for example*:*

- "FOR ALL AIRCRAFT WESTBOUND ON PACOTS TRACK CHARLIE…"

The WHEN Component

4.7 The 'WHEN' component represents the time and/or duration of the ATFM objective to be achieved:

- "[FROM (time)] UNTIL (time)".

4.8 Examples of time/duration include:

- "FROM 0300 UTC UNTIL 0600 UTC…"
- "FROM NOW UNTIL 0600 UTC…"

- "FROM 2300 UTC UNTIL FURTHER NOTICE…"
- "UNTIL FURTHER NOTICE…"

The WHY Component

4.9 The 'WHY' component represents the reason for the ATFM objective:

- "DUE TO (reason)";
- "FOR (reason)".

4.10 Examples of reasons include:

- "DUE TO RUNWAY CLOSURE"
- "FOR (SEVERE) WEATHER"
- "DUE TO COMMUNICATION FAILURE"
- "DUE TO (significant event/natural disturbance such as FIRE or VOLCANIC ASH)"
- "FOR STATE AIRCRAFT ACTIVITY"
- "DUE TO EQUIPMENT OUTAGE"
- "FOR EMERGENCY"
- "DUE TO ATFM INITIATIVES IN (location)"

5. ATFM Message Types

5.1 ATFM messages can be readily categorized by identifying the primary objective to be achieved by each type of message. This section describes a number of ATFM message types and their application in achieving particular objectives.

Messages containing information to be shared prior to commencing ATFM restrictions

5.2 ATFM related information-sharing should be facilitated not only during the actual flow control but also (and more importantly) well prior to invoking the ATFM restrictions when the possibility of flow control arises. The following phrases will make clear the distinction between the ATFM messages and the information provided for situational awareness:

- "POSSIBLE TRAFFIC FLOW RESTRICTIONS";
- "CAPACITY RELATED INFORMATION".

5.3 Examples of messages sent prior to invoking ATFM restrictions follow:

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC… **POSSIBLE TRAFFIC FLOW RESTRICTIONS**… NARITA AIRPORT HAS CLOSED ONE RUNWAY AND STARTED SNOW REMOVAL".

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC… **CAPACITY RELATED INFORMATION**…NARITA AIRPORT HAS ENTERED THE STORM ZONE OF THE TYPHOON".

ATFM Operational Initiative Messages

5.4 ATFM operational initiatives communicate air traffic flow restrictions/objectives from one air navigation service provider to another. They follow the five module structure described earlier:

a) Who: The ATFM service unit being contacted followed by the ATFM service unit that is initiating the contact.

b) What: The ATFM objective to be achieved.

c) Where: The location of the ATFM objective to be achieved.

d) When: The time and/or duration of the ATFM objective to be achieved.

e) Why: The reason for the ATFM objective.

5.5 Examples of ATFM operational initiatives include:

- "FUKUOKA ATMC, THIS IS FAA COMMAND CENTER … REQUIRE 30 MINUTES IN TRAIL AT THE SAME FLIGHT LEVEL FOR ALL AIRCRAFT LANDING CHICAGO FROM 0800 UTC UNTIL FURTHER NOTICE DUE TO STATE AIRCRAFT ACTIVITIES".

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC… FL350 AND BELOW NOT AVAILABLE FOR AIRCRAFT OVERFLYING JAPANESE DOMESTIC AIRSPACE UNTIL 0900 UTC DUE TO EMERGENCY".

Reply to ATFM Operational Initiative Messages

5.6 The following phrases will be used for replying to ATFM initiative messages:

- "ACCEPT (operational initiative)";
- "AGREED TO (operational initiative)";
- "(operational initiative) IS ACCEPTABLE [DEPENDS ON THE DEMAND] (other pertinent information, if any)";
- "UNABLE (operational initiative) [DUE (reason)] (alternative proposed)".

5.7 Examples of replying to ATFM operational initiatives follow:

- "**AGREE TO** 30 MINUTES IN TRAIL AT THE SAME FLIGHT LEVEL ON PACOTS TRACKS 2 AND 3 FROM 1000 UTC UNTIL 1500 UTC".

- "**UNABLE TO** ACCEPT THE RESTRICTION FROM 1430 UTC DUE TO TRAFFIC VOLUME ON A590 UNTIL 1530 UTC, **PROPOSE** COMMENCE RESTRICTION FROM 1530".

Messages for the coordination of aircraft exempted from ATFM operational initiatives:

5.8 The following types of aircraft may be exempted from ATFM restrictions:

a) Aircraft in a state of emergency
b) Aircraft engaged in search and rescue missions
c) Aircraft operating for humanitarian reasons
d) Aircraft carrying the head of State or distinguished visitors of State
e) Aircraft carrying a patient who needs urgent medical treatment

5.9 The following phrases will be used for the coordination of aircraft which are exempt from ATFM restrictions:

- "REQUEST EXEMPTION FROM ATFM FOR (aircraft identification) [DUE (reason)]";
- "COORDINATION OF ATFM EXEMPTION FOR (aircraft identification) [DUE (reason)]".

5.10 Examples of messages requesting ATFM exemption follow:

- "FUKUOKA ATMC, THIS IS FAA COMMAND CENTER… **REQUEST EXEMPTION FROM ATFM**…UAL123 DUE PATIENT WHO NEEDS URGENT MEDICAL TREATMENT".

- "UAL123…EXEMPTION APPROVED".

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC… **COORDINATION OF ATFM EXEMPTION**… JA501A DUE OPERATING SEARCH AND RESCUE MISSIONS".

Messages providing information for the next coordination

5.11 If it is possible and appropriate, the expected time of next coordination should be forwarded with the ATFM messages:

- "I WILL CALL YOU AT (time) FOR FURTHER COORDINATION".

5.12 An example of a message with information for the next coordination follows:

- "FUKUOKA ATMC, THIS IS FAA COMMAND CENTER… REQUIRE 30 MINUTES IN TRAIL REGARDLESS OF FLIGHT LEVEL FOR ALL AIRCRAFT ON PACOTS TRACK 8 FROM 1000 UTC UNTIL FURTHER NOTICE DUE TO MILITARY ACTIVITY. **I WILL CALL YOU AGAIN AT 1100 UTC FOR FURTHER COORDINATION".**

Amendment Messages

5.13 The amendment of an ATFM message should be structured in a similar way to the initial message and include similar elements but with additional modifiers. These modifiers may include:

a) CHANGE
b) AMEND
c) REDUCE
d) INCREASE
e) DECREASE

5.14 Amendment messages should also identify which message is being amended, as several restrictions could be in place at one time. Examples of ATFM amendment messages include:

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC… WE HAVE **CHANGED** THE RESTRICTION ON TRAFFIC FLYING PACOTS TRACKS CHARLIE, ECHO AND FOXTROT FOR NARITA AIRPORT. WE NOW NEED 20 MINUTES IN TRAIL AT THE SAME FLIGHT LEVEL ON PACOTS TRACKS CHARLIE, ECHO AND FOXTROT FOR TRAFFIC LANDING NARITA FROM NOW UNTIL 0900 UTC".

- "FUKUOKA ATMC, THIS IS FAA COMMAND CENTER…WE HAVE **INCREASED** THE INBOUND RATE FROM 5 AIRCRAFT PER HOUR TO 10 AIRCRAFT PER HOUR FOR TRAFFIC BEYOND OAKLAND FIR UNTIL FURTHER NOTICE".

Cancellation Messages

5.15 The cancellation of an ATFM message should be structured in a similar way to the initial message and include similar elements but also contain a canceling word or phrase. It is normally not necessary to state the reason for the cancellation. A canceling word or phrase may include:

a) CANCEL
b) RESUME
c) RESUME NORMAL
d) RELEASE

5.16 Cancellation messages should also identify which message is being cancelled, as several restrictions could be in place at one time. An example of an ATFM cancellation message follows:

- "FAA COMMAND CENTER, THIS IS FUKUOKA ATMC… **CANCEL** THE RESTRICTION ON TRAFFIC BEYOND THE FUKUOKA FIR AT THIS TIME. **RESUME NORMAL** TRAFFIC FLOW".

6. Active Listening

6.1 Although written ATFM messaging is able to be read and re-read to ensure understanding, because of the variety of ATFM information that may be exchanged verbally and the inability to prescribe phraseologies for every situation that will be encountered, **active listening** is encouraged. Active listening is a structured form of listening and responding that focuses the attention on the speaker. The listener must take care to attend to the speaker fully, and then repeats, in the listener's own words, what he or she thinks the speaker has said. The listener does not have to agree with the speaker; he or she must simply state what they think the speaker said. This enables the speaker to find out whether the listener really understood. If the listener did not understand, the speaker can explain further. Once the speaker and listener are clear as to the message, the listener should respond with agreement, acceptance or disagreement.

6.2 Active listening has several benefits. First, it forces people to listen attentively to others. Second, it avoids misunderstandings, as people have to confirm that they do really understand what another person has said.

7. Abbreviations

7.1 **Appendix 2** provides a sample list of abbreviations used that are not defined in the ICAO Doc. 8400 (PANS-ABC). Neighboring ATFM facilities may wish to develop a similar list of abbreviations which are frequently used in ATFM communications, and include them in a letter of agreement.

Appendix 1

EXAMPLES OF AIR TRAFFIC FLOW MANAGEMENT OPERATIONAL INITIATIVES

The following list contains the ATFM operational initiatives presently utilized by the United States Federal Aviation Administration. The list is provided for example purposes, it is not all-inclusive and does not preclude the innovation and application of other procedures that will result in improved ATFM service delivery.

Name	Description
Airborne holding	Planned holding of aircraft may be utilized. This is normally done when the operating environment supports holding and the weather conditions are expected to improve shortly; this ensures aircraft are available to fill the capacity at the airport.
Altitude	Utilized to segregate different flows of traffic, or to distribute the number of aircraft requesting access to a specified geographic region. ***a) Capping:*** Term used to indicate aircraft will be cleared to an altitude lower than their requested altitude until they are clear of a particular airspace. Capping may apply to the initial segment of the flight or for the entire flight. ***b) Tunneling:*** Term used to indicate traffic will be descended prior to the normal descent point at the arrival airport to remain clear of an airspace situation; e.g., holding.
Fix balancing	Assigning an aircraft a fix other than that in the filed flight plan in the arrival or departure phase of flight to equitably distribute demand.
Ground delay programs (GDP)	Aircraft are held on the ground in order prior to departure to manage capacity and demand at a specific downstream location. The purpose of the program is to limit airborne holding.
Ground stops (GS)	GS is a process that requires aircraft that meet specific criteria to remain on the ground. Since this is one of the most restrictive methods of traffic management, alternative initiatives should be explored and implemented if appropriate. GSs should be used: a) In severely reduced capacity situations (below most user arrival minimums, airport/runway closed for snow removal, or aircraft accidents/incidents); b) To preclude extended periods of airborne holding; c) To preclude sector/center reaching near saturation levels or airport grid lock; d) In the event a facility is unable or partially unable to provide ATC services due to unforeseen circumstances; and e) When routings are unavailable due to severe weather or catastrophic events.

Name	Description
Miles-in-trail (MIT)	The number of miles required between aircraft that meet a specific criteria. The criteria may be separation, airport, fix, altitude, sector, or route specific. MIT are used to apportion traffic into manageable flows, as well as to provide space for additional traffic (merging or departing) to enter the flow of traffic.
Minutes-in-trail (MINIT)	The number of minutes required between successive aircraft. It is normally used in a non-radar environment, or when transitioning to a non-radar environment, or when additional spacing is required due to aircraft deviating around weather.
Reroutes	Reroutes are ATC routings other than the filed flight plan. They are issued to: a) Ensure aircraft operate with the "flow" of traffic. b) Remain clear of special use airspace. c) Avoid congested airspace. d) Avoid areas of known weather where aircraft are deviating or refusing to fly.
Sequencing programs	These programs are designed to achieve a specified interval between aircraft; they may be software generated or determined by ATFM personnel. Different types of programs accommodate different phases of flight. ***a) Departure Sequencing Program (DSP):*** Assigns a departure time to achieve a constant flow of traffic over a common point. Normally, this involves departures from multiple airports. ***b) En route Sequencing Program (ESP):*** Assigns a departure time that will facilitate integration in the en route stream. ***c) Arrival Sequencing Program (ASP):*** Assigns fix crossing times to aircraft destined to the same airport.

Appendix 2

SAMPLE TABLE OF ABBREVIATIONS

The abbreviations listed here are those used by the FAA Command Centre (ATCSCC) and Fukuoka ATMC respectively that are not defined in the ICAO Doc. 8400 (PANS-ABC), and are provided only as examples. The shaded abbreviations are considered to be the common terms between the two centers.

ABBREVIATION	ATCSCC MEANING	ATMC MEANING
AAR	Airport Acceptance Rate	
ACID	Aircraft Identification	
ADL	Aggregate Demand List	
ADR	Airport Departure Rate	
ADZY	Advisory	
AIM	Aeronautical Information Manual	
ALTRV	Altitude Reservation	Altitude Reservation
ANP	Air Navigation Plan	
AOA	Office of the Administrator	
AOC	Airline Operations Center	
AP	Air Patrol	
APREQ	Approval Request	Approval Request
APVL	Approval	Approval
ARO	Airport Reservation Office	
ARTCC	Air Route Traffic Control Center	Air Route Traffic Control Center
ASM		Airspace Management
AT	Air Traffic	
ATCSCC	Air Traffic Control System Command Center	Air Traffic Control System Command Center
ATMC	Air Traffic Management Center	Air Traffic Management Center
ATMetC		Air Traffic Meteorological Center
ATO	Air Traffic Operations Program	
AUTODIN	Automatic Digital Network	
CARF	Central Altitude Reservation Function	
CCFP	Collaborative Convective Forecast Product	
CCWSU	Command Center Weather Service Unit	
CDM	Collaborative Decision Making	Collaborative Decision Making
CDR	Coded Departure Route(s)	Conditional Route
CDR	Continuous Data Recording	
CDT	Controlled Departure Time	

ABBREVIATION	ATCSCC MEANING	ATMC MEANING
CFR	Code of Federal Regulations (formerly FAR)	
CIWS	Corridor Integrated Weather System	
COMSEC	Communications Security System	
CR	Collaborative Routing	
CT	Select Flights Ground Delay Program	
CTA	Controlled Time of Arrival	
CTAS-TMA	Center TRACON Automation System Traffic Management Advisor	
CVRS	Computerized Voice Reservation System	
CWA	Central Weather Advisory	
CWSU	Center Weather Service Unit	
DARC	Direct Access Radar Channel	
DCCWU	ATCSCC Weather Unit	
DOTS	Dynamic Ocean Track System	Dynamic Ocean Track System
DP	Departure Procedure	
DSP	Departure Sequencing Program	
EDCT	Expected Departure Clearance Time	Expected Departure Clearance Time
EFAS	Enroute Flight Advisory Service	
EFTO	Encrypt For Transmission Only	
EOF	Emergency Operations Facility	
EOR	Emergency Operations Room	
EPS	Engineered Performance Standards	
ESCAT	Emergency Security Control of Air Traffic	
ETE	Estimated Time Enroute	Estimated Time Enroute
ETMS	Enhanced Traffic Management System	
EUCARF	European Central Altitude Reservation Facility	
FA	General Ground Delay Program	
FAA	Federal Aviation Administration	Federal Aviation Administration
FADT	Fuel Advisory Delay Time	
FCA	Flow Constrained Area	
FDMS		Flight Data Management System
FDPS		Flight Data Processing Section
FEA	Flow Evaluation Area	
FP	Flight Plan	
FPL	Full Performance Level	

ABBREVIATION	ATCSCC MEANING	ATMC MEANING
GA	General Aviation	
GAAP	General Aviation Airport Program	
GDP	Ground Delay Program	
GS	Ground Stop	
HARS	High Altitude Route System	
HDTA	High Density Traffic Airport	
IFCN	Interfacility Communication Network	
IFPFP	Individual Flight Plan From this Point	Individual Flight Plan From this Point
IFSS	International Flight Service Station	
INATS	Interruption of Air Traffic Service	
JCAB	Japan Civil Aviation Bureau	Japan Civil Aviation Bureau
LAA	Local Airport Advisory	
LADP	Local Airport Deicing Plan	
LOA	Letter of Agreement	Letter of Agreement
MAP	Monitor Alert Parameter	
MARSA	Military Assumes Responsibility for Separation of Aircraft	Military Assumes Responsibility for Separation of Aircraft
MEL	Minimum Equipment List	
MINIT	Minutes in Trail	
MIT	Miles in Trail	
MOS	Military Operations Specialist	
MTSAT	Multi-functional Transport Satellite	Multi-functional Transport Satellite
MVFR	Marginal Visual Flight Rules	
NADIN	National Airspace Data Interchange Network	
NAS	National Airspace System	
NAVAID	Navigational Aid	Navigation Aid
NFDC	National Flight Data Center	
NMCC	National Maintenance Coordination Center	
NOAA	National Oceanic and Atmospheric Administration	
NOM	National Operations Manager	
NOPAC	North Pacific	North Pacific
NOS	National Oceanographic Service	
NRP	National Route Program	
NTMO	National Traffic Management Officer	
NWS	National Weather Service	

ABBREVIATION	ATCSCC MEANING	ATMC MEANING
OAG	Official Airline Guide	
ODP		Oceanic Air Traffic Control Data Processing System
OPSNET	Operations Network	
OTG		Oceanic Track Generator
OTR		Oceanic Transition Route
PACMARF	Pacific Military Altitude Reservation Facility	Pacific Military Altitude Reservation Function
PACOTS	Pacific Organized Track System	Pacific Organized Track System
PMTC	Pacific Missile Test Center	
PO	Plan of Operation	
Pref Route	Preferential Route	
PT	Planning Team	
RA	Route Advisory	
RAA	Remote Airport Advisory	
ROT	Runway Occupancy Time	
SAA	Special Activity Airspace	
SOP	Standard Operating Procedure	
STMP	Special Traffic Management Program	
SUA	Special Use Airspace	
SVRW	Severe Weather	
SWAP	Severe Weather Avoidance Program	
TEC	Tower-Enroute Control	
TELCON	Telephone Conference	
TFM	Traffic Flow Management	
TIS	Traffic Information System	
TMC	Traffic Management Coordinator	Traffic Management Coordinator
TMCIC	Traffic Management Coordinator in Charge	
TMI	Traffic Management Initiative	
TMU	Traffic Management Unit	Traffic Management Unit
TSTM	Thunderstorm	
WSO	Weather Service Office	

INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE

ASIA/PACIFIC PERFORMANCE-BASED NAVIGATION IMPLEMENTATION PLAN

Interim Edition

September 2008

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ASIA/PACIFIC PERFORMANCE-BASED NAVIGATION IMPLEMENTATION PLAN

1. Executive Summary

1.1 This Asia/Pacific PBN Implementation Plan has been produced in line with Resolution A 36/23 adopted by ICAO Assembly in its 36th Session held in September 2007 and Conclusion 18/53 adopted by APANPIRG/18. The Regional Plan addresses the strategic objectives of PBN implementation based on clearly established operational requirements, avoiding equipage of multiple on-board or ground based equipment, avoidance of multiple airworthiness and operational approvals and explains in detail contents relating to potential navigation applications. The Plan envisages pre- and post-implementation safety assessments and continued availability of conventional air navigation procedures during transition. The Plan discusses issues related to implementation which include traffic forecasts, aircraft fleet readiness, adequacy of ground-based CNS infrastructure etc. Implementation targets for various categories of airspace for the short term (2008 – 2012) and for the medium term (2013 – 2016) have been projected in tabular forms to facilitate easy reference. For the long term (2016 and beyond) it has been envisaged that GNSS will be the primary navigation infrastructure. It is also envisaged that precision approach capability using GNSS and its augmentation system will become available in the long term.

2. Explanation of Terms

2.1 The drafting and explanation of this document is based on the understanding of some particular terms and expressions that are described below:

2.1.1 **Asia/Pacific PBN Implementation Plan.** A document offering appropriate guidance for air navigation service providers, airspace operators and users, regulating agencies, and international organizations, on the evolution of navigation, as one of the key systems supporting air traffic management, and which describes the RNAV and RNP navigation applications that should be implemented in the short, medium and long term in the ASIA/PAC Region.

2.1.2 **Performance Based Navigation** Performance based navigation specifies RNAV and RNP system performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in an airspace.

2.1.3 **Performance requirements.** Performance requirements are defined in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept. Performance requirements are identified in navigation specifications which also identify which navigation sensors and equipment may be used to meet the performance requirement.

3. Acronyms

3.1 The acronyms used in this document along with their expansions are given in the following list

ABAS	Aircraft-Based Augmentation System
AIS	Aeronautical Information System
APAC	Asia and Pacific Regions
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
APCH	Approach
APV	Approach Procedures with Vertical Guidance
ATC	Air Traffic Control
Baro VNAV	Barometric Vertical Navigation
CNS/ATM	Communication Navigation Surveillance/Air Traffic Management

CPDLC	Controller Pilot Data Link Communications
DME	Distance Measuring Equipment
FASID	Facilities and Services Implementation Document
FIR	Flight Information Region
FMS	Flight Management System
GBAS	Ground-Based Augmentation System
GNSS	Global Navigation Satellite System
GRAS	Ground-based Regional Augmentation System
IATA	International Air Transport Association
IFALPA	International Federation of Air Line Pilots' Associations
INS	Inertial Navigation System
IRU	Inertial Reference Unit
PANS	Procedures for Air Navigation Services
PBN	Performance Based Navigation
PIRG	Planning and Implementation Regional Group
RASMAG	Regional Airspace Safety Monitoring Advisory Group
RCP	Required Communication Performance
RNAV	Area Navigation
RNP	Required Navigation Performance
SARP	Standards and Recommended Practices
SBAS	Satellite-Based Augmentation System
SID	Standard Instrument Departure
STAR	Standard Instrument Arrival
TMA	Terminal Control Area
VOR	VHF Omni-directional Radio-range
WGS	World Geodetic System

4. Introduction

Need for the regional PBN Implementation Plan

4.1 The Thirty-sixth Session of the ICAO Assembly held in Montreal in September 2007 adopted a Resolution to resolve that States and planning and implementation regional groups (PIRGs) complete a PBN implementation plan by 2009.

4.2 Recognizing that the PBN concept is now established, States should ensure that all RNAV and RNP operations and procedures are in accordance with the PBN concept as detailed in State letter AN 11/45-07/22 and the ICAO Doc 9613: PBN Manual for ensuring a globally harmonized and coordinated transition of PBN.

4.3 In view of the need for detailed navigation planning, it is advisable to develop a PBN Regional Plan to provide proper guidance to air navigation service providers, airspace operators and users, regulating agencies, and international organizations, on the evolution of navigation, as one of the key systems supporting air traffic management, which describes the RNAV and RNP navigation applications that should be implemented in the short and medium term in the ASIA/PAC Region.

4.4 Furthermore, the Asia/Pacific PBN Implementation Plan will be the basic material serving as guidance for regional projects for the implementation of air navigation infrastructure, such as ABAS, SBAS, GBAS, GRAS, etc., as well as for the development of national implementation plans.

Roles of Navigation in supporting ATM operations

4.5 An Airspace Concept may be viewed as a general vision or master plan for a particular airspace. Based on particular principles, an Airspace Concept is geared towards specific objectives. Strategic

objectives drive the general vision of the Airspace Concept. These objectives are usually identified by airspace users, air traffic management (ATM), airports as well as environmental and government policy. It is the function of the Airspace Concept and the concept of operations to respond to these requirements. The strategic objectives which most commonly drive Airspace Concepts are Safety, Capacity, Efficiency, Access, and the Environment.

4.6 Navigation is one of several enablers of an Airspace Concept. Communications, ATS Surveillance and ATM are also essential elements of an Airspace Concept.

4.7 The Performance Based Navigation (PBN) concept specifies RNAV and RNP system performance requirements in terms of accuracy, integrity, availability, continuity and functionality needed for the proposed operations in the context of a particular Airspace Concept, when supported by the appropriate navigation infrastructure. In that context, the PBN concept represents a shift from sensor-based to performance-based navigation. Performance requirements are identified in navigation specifications which also identify the choice of navigation sensors and equipment that may be used to meet the performance requirements. These navigation specifications are defined at a sufficient level of detail to facilitate global harmonization by providing specific implementation guidance for States and operators.

4.8 Under the PBN concept, the generic navigation requirements are defined based on operational requirements. Thus, users may evaluate the available options. To ensure synchronization of investment and interoperability of the airborne and ground systems, the selection of the solution should be in consultation with aviation stakeholders, including international and domestic airline operators, air navigation service providers, and regulators. The solution selected should also be the most cost-effective one.

4.9 The development of the Performance Based Navigation concept recognized that advanced aircraft RNAV systems are achieving a predictable level of navigation performance accuracy which, together with an appropriate level of functionality, allows a more efficient use of available airspace to be realized. It also takes account of the fact that RNAV systems have developed over a 40-year period and as a result there were a large variety of implementations. Identifying navigation requirements rather than on the means of meeting the requirements will allow use of all RNAV systems meeting these requirements irrespective of the means by which these are met.

Benefits of Performance-Based Navigation

4.10 The main benefits derived from the implementation of PBN are:

a) Increased airspace safety through the implementation of continuous and stabilized descent procedures using vertical guidance;
b) Reduced aircraft flight time due to the implementation of optimal flight paths, with the resulting savings in fuel, noise reduction, and environmental protection;
c) Use of the RNAV and/or RNP capabilities that already exist in a significant percentage of the aircraft fleet flying in APAC airspace;
d) Improved airport and airspace arrival paths in all weather conditions, and the possibility of meeting critical obstacle clearance and environmental requirements through the application of optimized RNAV or RNP paths;
e) Implementation of more precise approach, departure, and arrival paths that will reduce dispersion and will foster smoother traffic flows;
f) Reduced delays in high-density airspaces and airports through the implementation of additional parallel routes and additional arrival and departure points in terminal areas;
g) Reduction of lateral and longitudinal separation between aircraft to accommodate more traffic;

h) Decrease ATC and pilot workload by utilizing RNAV/RNP procedures and airborne capability and reduce the needs for ATC-Pilot communications and radar vectoring;
i) Increase of predictability of the flight path.

Goals & Objectives of PBN Implementation

4.11 APANPIRG, in its Eighteenth meeting, discussed various issues related to an early implementation of PBN in the region. To facilitate coordination between States, a PBN Task Force was formed to develop a harmonized regional PBN Implementation plan.

4.12 The Asia/Pacific PBN Implementation Plan has the following strategic objectives:

a) To ensure that the implementation of the navigation item of the CNS/ATM system is based on clearly established operational requirements.
b) To avoid undue equipage of multiple on board equipment and/or ground-based systems.
c) To avoid the need for multiple airworthiness and operational approvals for intra- and inter-regional operations.
d) To explain in detail the contents of the Regional Air Navigation Plan, relating to potential navigation applications.

4.13 Furthermore, the Asia/Pacific PBN Implementation Plan will provide a high-level strategy for the evolution of the navigation applications to be implemented in the ASIA/PAC Region in the short term (2008-2012) and medium term (2013-2016). This strategy is based on the concepts of Area Navigation (RNAV) and Required Navigation Performance (RNP) in accordance with ICAO Doc. 9613: Performance Based Navigation Manual, and will be applied to aircraft operations involving instrument approaches, standard departure (SID) routes, standard arrival (STAR) routes, and ATS routes in oceanic and continental areas.

4.14 The Asia/Pacific PBN Implementation Plan was developed by the APAC States together with the international organizations concerned (IATA, IFALPA), and is intended to assist the main stakeholders of the aviation community plan a gradual transition to the RNAV and RNP concepts. The main stakeholders of the aviation community that benefit from this Regional Plan are:

- Airspace operators and users.
- Air navigation service providers.
- Regulating agencies.
- International organizations.

4.15 This Regional Plan is intended to assist the main stakeholders of the aviation community plan the future transition and their investment strategies. For example, airlines and operators can use this Regional Plan to plan future equipage and additional navigation capability investments; air navigation service providers can plan a gradual transition for the evolving ground infrastructure. Regulating agencies will be able to anticipate and plan for the criteria that will be needed in the future.

4.16 Recognizing the safety benefits of PBN, the thirty-sixth session of the ICAO Assembly held in Montreal, September 2007 adopted a Resolution to resolve that States and planning and implementation regional groups (PIRGs) complete a PBN implementation plan by 2009 to achieve:

a) Implementation of RNAV and RNP operations (where required) for en route and terminal areas according to established timelines and intermediate milestones; and
b) Implementation of approach procedures with vertical guidance (APV) (Baro-VNAV and/or augmented GNSS) for all instrument runway ends, either as the primary approach or as a back-up for precision approaches by 2016 with intermediate milestones as follows: 30 per cent by 2010, 70 per cent by 2014.

Planning Principles

4.17 Planning for the implementation of PBN in the ASIA/PAC Region shall be based on the following principles:

a) Pre- and post-implementation safety assessments will be conducted to ensure the application and maintenance of the established target levels of safety.
b) Continued application of conventional air navigation procedures during the transition period, to guarantee the operations by users that are not RNAV- and/or RNP-equipped.
c) The first regional PBN implementation plan should address the short term (2008-2012) and medium term (2013-2016) and take into account long term global planning issues.
d) Target date for completion of the first regional PBN implementation plan is APANPIRG/19.

5. PBN Operational Requirements & Implementation Strategy

5.1 Introduction of PBN should be consistent with the Global Air Navigation Plan. Moreover, PBN implementation shall be in full compliance with ICAO SARPs and PANS and support ICAO Global Plan Initiatives.

5.2 The ICAO Council accepted the second amendment to the Global Air Navigation Plan for the CNS/ATM System in November 2006. The approved plan has been renamed as Global Air Navigation Plan (Doc 9750). The relevant Global Plan Initiatives including implementation of performance based navigation (PBN) and navigation system have been included in the Global Plan. The introduction of PBN must be supported by an appropriate navigation infrastructure consisting of an appropriate combination of Global Navigation Satellite System (GNSS), self-contained navigation system (inertial navigation system) and conventional ground-based navigation aids.

5.3 The Strategy for the Provision of Precision Approach, Landing & Departure Guidance Systems and the Strategy for Implementation of GNSS Navigation Capability were reviewed and updated by the Eleventh meeting of CNS/MET Sub Group of APANPIRG in July 2007. The updated strategies were reviewed and adopted by APANPIRG as Strategies for the Provision of Navigation Services in its Eighteenth meeting held in September, 2007 under its Conclusion 18/30.

Route Operations

5.4 As the routes structure and en-route operation are complicated in Asia-Pacific region, it is difficult to restructure and include the whole airspace in a single implementation plan for en-route operations.

5.5 Considering the traffic characteristics and CNS/ATM capability, en-route operations can be classified as Oceanic, Remote continental, and Continental en-route.

5.6 In principle for each classification of en-route operation (5.5 above) should adopt, but not be limited to single RNAV or RNP navigation specification. This implementation strategy will be applied by the state/territories/international organizations themselves, and the RNAV and RNP navigation applications should be coordinated between these states to ensure harmonization.

5.7 In areas where operational benefits can be achieved and appropriate CNS/ATM capability exists or can be provided for a more accurate navigation specification, States are encouraged to introduce the more accurate navigation specification on the basis of coordination with stakeholders and affected neighboring States/Territories.

TMA Operations

5.8 TMA operations have their own characteristics, taking into account the applicable separation minima between aircraft and between aircraft and obstacles. It also involves the diversity of aircraft, including low-performance aircraft flying in the lower airspace and conducting arrival and departure procedures on the same path or close to the paths of high-performance aircraft.

5.9 In this sense, the States/Territories shall develop their own national plans for the implementation of PBN in TMAs, based on the Asia/Pacific PBN Implementation Plan, seeking the harmonization of the application of PBN and avoiding the need for multiple operational approvals for intra- and inter-regional operations, and the applicable aircraft separation criteria.

Instrument Approaches

5.10 States are encouraged to introduce PBN approaches that provide Vertical Guidance to enhance safety. Conventional approach procedures and conventional navigation aids should be maintained to support non-equipped aircraft during the transitional period.

5.11 During early implementation of PBN, IFR Approaches based on PBN should be designed to accommodate mixed-equipage (PBN and non-PBN) environment. ATC workload should be taken into account while developing approach procedures. One possible way to accomplish this is to co-locate the Initial Approach Waypoint for both PBN and conventional approaches

6. Current Status & Forecast

APAC traffic forecast

6.1 The GEN part of FASID (Doc9673 Vol. II) provides the information and data of the following traffic forecasts:

- **Forecasts of air traffic demand for air navigation systems planning**
- **Passenger forecasts**
- **Aircraft movement forecast**
- **Major city-pairs forecasts**

6.2 The forecast data as well as the figures contained in the FASID document are the results of the regular meetings of Asia/Pacific Area Traffic Forecasting Group (APA TFG). These forecasts are updated periodically in conjunction with APA TFG meetings and are not subject to the amendment procedure related to the FASID. The APA TFG is tasked to update the long-range forecasts of passenger traffic produced for the Asia and Pacific (ASIA/PAC) regions, encompassing the intra-Asia/Pacific and trans-Pacific markets, along with preliminary city-pair forecasts to include the 40 busiest routes in terms of passengers carried within these regions. In addition, aircraft movements are forecast for a five-year horizon initially for the aggregate trans-Pacific market and city-pairs of three selected flight information regions (FIRs) of the intra-Asia/Pacific traffic. States are encouraged to consider the up to date forecast data contained in the FASID document while developing or updating the regional and national implementation plan.

6.3 The forecast conducted by IATA on 27 February 2008 for Asia and Pacific traffic in respect of passenger, cargo, aircraft movements and new aircraft deliveries in all the Regions is also provided in the Appendix B to this plan as reference.

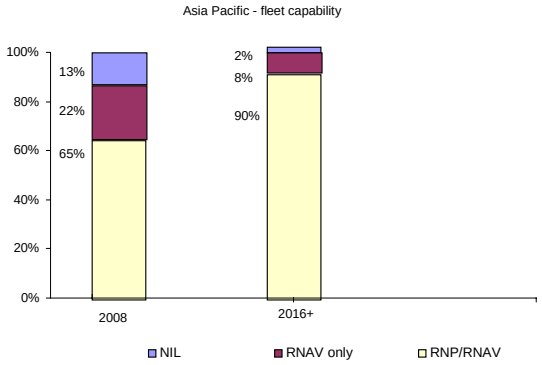
Aircraft fleet readiness status

6.4 2007 was a record year for Asia/Pacific airlines with 418 new aircraft deliveries and more than 1,000 new orders. The overall number of deliveries to Asia/Pacific based airlines in 2008 is expected to total 430 aircraft.

6.5 All major commercial aircraft manufacturers since the 1980's have included RNAV capabilities. The commercial aircraft currently produced incorporate an RNP capability.

6.6 One significant issue for PBN implementation today is directly related to the multitude of FMS installations and varying degrees of capabilities associated with the current fleet of RNAV aircraft. Specifically, there are numerous FMS systems installed in today's fleets, all with varying capabilities.

6.7 The diagram below displays a high level analysis based on fleet numbers from Ascend Online Fleets database March 2008 and RNAV/RNP classification by IATA.



CNS Infrastructure

Navigation infrastructure

Global Navigation Satellite System (GNSS)

6.8 Global Navigation Satellite System (GNSS) is a satellite-based navigation system utilizing satellite signals, such as Global Positioning System (GPS), for providing accurate and reliable position, navigation, and time services to airspace users. In 1996, the International Civil Aviation Organization (ICAO) endorsed the development and use of GNSS as a primary source of future navigation for civil aviation. ICAO noted the increased flight safety, route flexibility and operational efficiencies that could be realized from the move to space-based navigation.

6.9 GNSS supports both RNAV and RNP operations. Through the use of appropriate GNSS augmentations, GNSS navigation provides sufficient accuracy, integrity, availability and continuity to support en-route, terminal area, and approach operations. Approval of RNP operations with appropriate certified avionics provides on-board performance monitoring and alerting capability enhancing the integrity of aircraft navigation.

6.10 GNSS augmentations include Aircraft-Based Augmentation System (ABAS), Satellite-Based Augmentation System (SBAS), Ground-Based Augmentation System (GBAS), and Ground-based Regional Augmentation System (GRAS).

Other PBN navigation infrastructure

6.11 Other navigation infrastructure includes INS, VOR/DME, DME/DME, and DME/DME/IRU. These navigation infrastructures may satisfy the requirements pf RNAV navigation specifications, but not those of RNP.

6.12 INS may be used to support PBN en-route operations with RNAV-10 and RNAV-5 navigation specifications.

6.13 VOR/DME may be used to support PBN en-route and STAR operations based on the RNAV-5 navigation specification.

6.14 Uses of DME/DME and DME/DME/IRU may support PBN en-route and terminal area operations based on RNAV-5, RNAV-2 or RNAV-1 navigation specifications. Validation of DME/DME coverage area and appropriate DME/DME geometry should be conducted to identify possible DME/DME gaps, including identification of critical DMEs, and to ensure proper DME/DME service coverage.

Surveillance infrastructure

6.15 For RNAV operations, States should ensure that sufficient surveillance coverage is provided to assure the safety of the operations. For RNP operations, surveillance coverage may not be required. Details on the surveillance requirements for PBN implementation can be found in the ICAO PBN Manual and ICAO PANS-ATM (Doc 4444), and information on the current existing surveillance infrastructure in the Asia-Pacific can be found in ICAO FASID table.

Communication infrastructure

6.16 Implementation of RNAV/RNP routes includes communication requirements. Details on the communication requirements for PBN implementation can be found in ICAO PANS-ATM (Doc 4444), ICAO RCP Manual (Doc 9869), and ICAO Annex 10. Information on the current existing communication infrastructure in the Asia-Pacific can also be found in ICAO FASID table.

7. Implementation Road Map of Performance Based Navigation

ATM Operational Requirements

7.1 The Global ATM Operational Concept (Doc 9854) makes it necessary to adopt an airspace concept able to provide an operational scenario that includes Route networks, Minimum separation standards, assessment of obstacle clearance, and a CNS infrastructure that satisfies specific strategic objectives, including safety, access, capacity, efficiency, and environment.

7.2 In this regard, the following programmes will be developed:

a) traffic and cost benefit analyses
b) necessary updates on automation
c) operational simulations in different scenarios
d) ATC personnel training
e) Flight plan processing
f) Flight procedure design training to include PBN concepts and ARINC-424 coding standard
g) Enhanced electronic data and processes to ensure appropriate level of AIS data accuracy, integrity and timeliness
h) WGS-84 implementation in accordance with ICAO Annex 15

i) uniform classification of adjacent and regional airspaces, where practicable
j) RNAV/RNP applications for SIDs and STARs
k) Coordinated RNAV/RNP routes implementation
l) RNP approach with vertical guidance

Short Term Implementation Road Map

Route Operations

7.3 During the planning phase of any implementation of PBN routes, States should gather inputs from all aviation stakeholders to obtain operational needs and requirements. These needs and requirements should then be used to derive airspace concepts and to select appropriate PBN navigation specification.

7.4 In this phase, the application of RNAV-10 and RNP-4 navigation specifications is expected for Oceanic and Remote continental routes. Prior to implementation of RNP-4, States should consider air traffic demands, ATC workload, and fleet readiness statistics and consult all stakeholders.

7.5 For Continental routes, the application of RNAV-5 and RNAV-2 navigation specifications is expected. In the continental en-route areas of operation, States may choose to implement RNAV-2 routes to enhance efficiency of airspace usage and support closer route spacing, noting that appropriate communication and surveillance coverage must be provided. The RNAV-2 navigation specification can also be used in certain airspace, where sufficient CNS capability is provided and there are operational benefits.

TMA Operations

7.6 In selected TMAs, the application of RNAV-1 in a radar environment can be supported though the use of GNSS or ground navigation infrastructure, such as DME/DME and DME/DME/IRU. In this phase, mixed operations (equipped and non-equipped) will be permitted.

7.7 In a non-radar environment and/or in an environment without adequate ground navigation infrastructure, the SID/STAR application of Basic-RNP1 is expected in selected TMAs with exclusive application of GNSS. In this phase, mixed operations (equipped and non-equipped) will be permitted.

Instrument Approaches

7.8 The application of RNP APCH with Baro-VNAV procedures is expected to be implemented in the maximum possible number of airports, primarily international airports. To facilitate transitional period, conventional approach procedures and conventional navigation aids should be maintained for non-equipped aircraft.

7.9 States should promote the use of APV operations (Baro-VNAV or augmented GNSS) to enhance safety and accessibility of RNP approaches.

7.10 The application of RNP AR APCH procedures should be considered in selected airports, where obvious operational benefits can be obtained due to the existence of significant obstacles.

Summary table & Implementation targets

Short Term (2008-2012)		
Airspace	**Preferred Nav. Specifications**	**Acceptable Nav. Specifications**
Route – Oceanic	RNP-4	RNAV-10
Route – Remote continental	RNP-4	RNAV-10
Route – Continental en-route	RNAV-2, RNAV-5	
TMA – Arrival	RNAV-1 in radar environment and with adequate navigation infrastructure. Basic-RNP 1 in non-radar environment	
TMA – Departure	RNAV-1 in radar environment and with adequate navigation infrastructure. Basic-RNP 1 in non-radar environment	
Approach	RNP APCH with Baro-VNAV in most possible airports RNP AR APCH in airport where there are obvious operational benefits.	
Implementation Targets • RNP APCH (with Baro-VNAV) in 30% of instrument runways by 2010 and 50% by 2012 and priority should be given to airports with operational benefits • RNAV-1 SID/STAR for 50% of international airports by 2010 and 75% by 2012 and priority should be given to airports with RNP Approach • Re-defining existing RNAV/RNP routes into PBN navigation specification by 2012 • Implementation of additional RNAV/RNP routes		

Medium Term Implementation Road Map

Route Operations

7.11 Noting the current development of route spacing standards for RNAV-1, RNAV-2, RNP-2, in this phase, it is expected that the implementations of all existing RNAV/RNP routes are consistent with PBN standards. States are encouraged, as much as possible, to harmonize their RNAV/RNP routes based on consistent PBN navigation specifications and separation standards. Implementations of additional RNAV/RNP routes are also encouraged.

7.12 With the utilization of ADS and CPDLC, the application of RNP routes in the Oceanic and Remote continental airspace in the ASIA/PAC Region is expected. This will permit the use of smaller lateral and longitudinal separation, such as 30 NM. States should also consider the fleet readiness status during their planning.

7.13 Noting the current development of RNP-2 navigation specification, in this phase, the application of RNP-2 is expected for the continental en-route airspace with high air traffic density. Depending on the

sufficiency of DME/DME coverage or GNSS availability, States may consider the use of RNAV-2 navigation specification.

7.14 In this phase, the establishment of a backup system in case of GNSS failure or the development of contingency procedures will be necessary.

TMA Operations

7.15 Noting the current development of Advanced RNP-1 navigation specification, in this phase, it is expected that the application of RNAV-1 or RNP-1 will be expanded in selected TMAs. The application of RNAV-1/RNP-1 will also depend on DME/DME infrastructure, GNSS availability and aircraft navigation capability. In TMAs of high air traffic complexity and movement (excluding airspaces), the use of RNAV-1 or RNP-1 equipments will be mandatory. In TMAs of less air traffic complexity, mixed operations will be permitted (equipped or non-equipped).

Instrument Approaches

7.16 In this phase, the extended application of RNP APCH with Baro-VNAV or APV in most airports is expected. These applications may also serve as a back-up to precision approaches and provide vertical guided approaches for the runways without precision approach capability.

7.17 The extended application of RNP AR Approaches is expected for airports where there are operational benefits.

7.18 The introduction of application of landing capability using GNSS and its augmentations is expected to guarantee a smooth transition toward high-performance approach and landing capability.

Summary table & Implementation targets

Medium Term (2013-2016)		
Airspace	**Preferred Nav. Specification**	**Acceptable Nav. Specification**
Route – Oceanic	RNP-2	RNP-4, RNAV-10
Route – Remote continental	RNP-2	RNAV-2, RNP-4, RNAV-10
Route – Continental en-route	RNAV-1, RNP-2	RNAV-2, RNAV-5
TMA – Arrival	Expand RNAV-1 or RNP-1 application Mandate RNAV-1 or RNP-1 approval for aircraft operating in higher air traffic density TMAs	
TMA – Departure	Expand RNAV-1 or RNP-1 application Mandate RNAV-1 or RNP-1 approval for aircraft operating in higher air traffic density TMAs	
Approach	Expansion of RNP APCH (with Baro-VNAV) and APV Expansion of RNP AR APCH where there are operational benefits Introduction of landing capability using GNSS and its augmentations	
Implementation Targets • RNP APCH with Baro-VNAV or APV in 100% of instrument runways by 2016 • RNAV-1 or RNP-1 SID/STAR for 100% of international airports by 2016 • RNAV-1 or RNP-1 SID/STAR for 70% of busy domestic airports where there are operational benefits • Implementation of additional RNAV/RNP routes		

Long Term Implementation Strategies (2016 and beyond)

7.19 In this phase, GNSS is expected to be a primary navigation infrastructure for PBN implementation. States should work co-operatively on a multinational basis to implement GNSS in order to facilitate seamless and inter-operable systems and undertake coordinated R&D programs on GNSS implementation and operation.

7.20 Moreover, during this phase, States are encouraged to consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance.

7.21 With the expectation that precision approach capability using GNSS and its augmentation systems will become available, States are encouraged to explore the use of such capability where there are operational and financial benefits.

8. Transitional Strategies

8.1 During transition to PBN, sufficient ground infrastructure for conventional navigation systems must remain available. Before existing ground infrastructure is considered for removal, users should be given reasonable transition time to allow them to equip appropriately to attain equivalent PBN-based navigation performance. States should approach removal of existing ground infrastructure with caution to ensure that safety is not compromised, such as by performance of safety assessment, consultation with users through regional air navigation planning process.

8.2 States should coordinate to ensure that harmonized separation standards and procedures are developed and introduced concurrently in all flight information regions along major traffic flows to allow for a seamless transition towards PBN.

8.3 States should cooperate on a multinational basis to implement PBN in order to facilitate seamless and inter-operable systems and undertake coordinated R&D programs on PBN implementation and operation.

8.4 States are encouraged to consider segregating traffic according to navigation capability and granting preferred routes to aircraft with better navigation performance**,** taking due consideration of the needs of State/Military aircraft.

8.5 States should encourage operators and other airspace users to equip with PBN-capable avionics. This can be achieved through early introductions of RNP approaches, preferably those with vertical guidance.

8.6 ICAO Asia-Pacific Regional Office should provide leadership supporting implementation and transition towards PBN.

9. Safety Assessment & Monitoring Requirements

Need for a safety assessment

9.1 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.

Undertaking a safety assessment

9.2 To demonstrate that the system is safe it will be necessary that the implementing agent – a State or group of States - ensures that a safety assessment and, where required, ongoing monitoring of the PBN en-route implementation are undertaken. The implementing agent may have the capability to undertake such activities or may seek assistance from a competent Asia/Pacific regional Safety Monitoring Agency (SMA). The latter course of action is preferred as an SMA can establish the necessary monitoring and data collection activity in an effective manner if the implementing agent is in the area for which the SMA holds responsibility.

9.3 In undertaking a safety assessment to enable en-route implementation of PBN, a State authority or SMA shall:

1) Establish and maintain a database of PBN approvals;

2) Monitor aircraft horizontal-plane navigation performance and the occurrence of large navigation errors and report results appropriately to the RASMAG;

3) Conduct safety and readiness assessments and report results appropriately to the RASMAG;

4) Monitor operator compliance with State approval requirements after PBN implementation;

5) Initiate necessary remedial actions if PBN requirements are not met.

9.4 Detailed information relating to the roles and responsibilities of Asia/Pacific SMAs is contained in the *Asia/Pacific Safety Monitoring Agency Handbook*, which is available from the ICAO Asia/Pacific Regional Office.

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Appendix A – CHANGES TO THE PBN REGIONAL PLAN

Whenever a need is identified for a change to this document, the Request for Change (RFC) Form (see Section 1.6 below) should be completed and submitted to the ICAO Asia and Pacific Regional Office. The Regional Office will collate RFCs for consideration by the Performance Based Navigation Task Force (CNS/MET Sub-group of APANPIRG).

When an amendment has been agreed by a meeting of the Performance Based Navigation Task Force then a new version of the PBN Regional Plan will be prepared, with the changes marked by an "|" in the margin, and an endnote indicating the relevant RFC, so a reader can see the origin of the change. If the change is in a table cell, the outside edges of the table will be highlighted; e.g.:

Final approval for publication of an amendment to the PBN Regional Plan will be the responsibility of APANPIRG.

1.5 EDITING CONVENTIONS

(Intentionally blank)

1.6 PBN Regional Plan REQUEST FOR CHANGE FORM

RFC Nr:	

Please use this form when requesting a change to any part of this PBN Regional Plan. This form may be photocopied as required, emailed, faxed or e-mailed to ICAO Asia and Pacific Regional Office +66 (2) 537-8199 or icao_apac@bangkok.icao.int

1. SUBJECT:			
2. REASON FOR CHANGE:			
3. DESCRIPTION OF PROPOSAL: [expand / attach additional pages if necessary]			
4. REFERENCE(S):			
5. PERSON INITIATING:		**DATE:**	
ORGANISATION:			
TEL/FA/X/E-MAIL:			
6. CONSULTATION	**RESPONSE DUE BY DATE:**		
Organization	**Name**	**Agree/Disagree**	**Date**
7. ACTION REQUIRE :			
8. PBN REGIONAL PLAN EDITOR		**DATE REC'D :**	
9. FEEDBACK PASSED		**DATE :**	

1.7 AMENDMENT RECORD

Amendment Number	Date	Amended by	Comments

Appendix B – IATA Traffic Forecast

By 2010 Asia will be the largest single market for aviation - IATA 27th Feb 2008. Globally predicted passenger traffic will rise by 4.9 per cent per year between 2007 and 2026, almost trebling in two decades as jet planes got bigger and more people flew on them. Meanwhile airfreight will rise by 5.8 per cent annually in the same period.The greatest demand will come from the Asia-Pacific region, where airlines will take delivery of 31 per cent of new planes in the next 20 years, compared with 24 per cent for Europe and 27 per cent for North America.

Passenger
Asia Pacific airlines saw a marginal drop in demand growth from 6.2 per cent in December 2007 to 5.7 per cent in January 2008. Currently, airlines in the region benefited from increased competitiveness due to the strong Euro and the booming economies of both India and China.

Cargo
Steady year-on-year airfreight growth of 4.5 per cent was recorded in January 2008. In the larger freight markets there is continued strength. Asia Pacific airlines saw demand increase 6.5 per cent, up from 6 per cent in December 2007, boosted by the booming economies in China and India.

For the period 2002-2020 aircraft movements are expected to increase at an annual growth rate of 5.4 per cent, to reach almost 294 thousand aircraft movements by the year 2020. Average annual growth rates of 6.5, 5.7 and 5.2 per cent are forecast for the periods 2005 - 2010, 2010-2015 and 2015 - 2020, respectively.

TRANSPACIFIC PASSENGER FORECAST			
Average Annual Percentage Growth Rates			
Low	Medium		High
2005-2010	5.3	6.5	7.8
2010-2015	4.5	5.7	7.0
2015-2020	4.0	5.2	6.5
2002-2020	4.1	5.4	6.7

The Intra-Asia/Pacific passenger aircraft movements are expected to increase at an average annual growth rate of 4.6 per cent to the year 2020. The growth rates for the intermediate periods of 2005-2010, 2010-2015 and 2015-2020 are 5.0, 4.3 and 4.2 per cent, respectively.

INTRA ASIA /PACIFIC AIRCRAFT MOVEMENT FORECAST			
Average Annual Percentage Growth Rates			
Low	Medium		High
2005-2010	3.6	5.0	5.5
2010-2015	3.1	4.3	5.2
2015-2020	3.1	4.2	5.2
2002-2020	3.3	4.6	5.6

New Aircraft Deliveries by Region

Record new aircraft orders were placed by the airline industry in 2005 – 2007. The large numbers of new orders represent strong confidence in the future prospects of the global airline industry. In its latest forecast of aviation growth, European aircraft maker Airbus said the world's fleet of large passenger jets (of more than 100 seats) would double in the next 20 years to nearly 33,000. The greatest demand will come from the Asia-Pacific region, where airlines will take delivery of 31 per cent of new planes in the next 20 years, compared with 24 per cent for Europe and 27 per cent for North America.

New Aircraft Deliveries by Region	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012+**
	Existing						
Africa	**665**	**26**	**15**	**20**	**16**	**13**	**28**
Asia Pacific	**3,578**	**329**	**428**	**407**	**344**	**267**	**440**
Europe	**5,301**	**292**	**348**	**364**	**251**	**153**	**297**
Latin America/Caribbean	**1,031**	**93**	**91**	**45**	**66**	**43**	**65**
Middle East	**626**	**41**	**57**	**44**	**36**	**27**	**164**
North America	**6,987**	**240**	**293**	**309**	**222**	**163**	**412**
Total	**18,188**	**1,026**	**1,237**	**1,208**	**944**	**679**	**1,551**
Increase in Global aircraft fleet (%)	**4.2**	**4.9**	**4.6**	**4.9**	**3.4**	**2.4**	**2.4**

Appendix C - Reference documentation for developing operational and airworthiness approval

TO BE DEVELOPED.

Appendix D – Practical Example of tangible benefits

TO BE DEVELOPED.

SN	Activity	Start	Complete	Present Status	Group Responsible
	Identify Operational Need				
1	Agree that an operational needs for a 50 NM horizontal separation in South China Sea area	13-Mar-06	13-Mar-06	Completed	RNP-SEA TF
2	Seek agreement from Hong Kong China for the implementation of 50 NM horizontal separation on L642 and M771	25-Sep-07	25-Sep-07	Completed	SCM
	Safety Assessment				
3	Engage a qualified Horizontal Safety Assessment Expert	25-Sep-07	Dec-07	Completed	SINGAPORE
4	States to continue to collect and provide traffic data	25-Sep-07		On-going	STATES
5	States to provide additional data as required by the Horizontal Safety Assessment Expert	25-Sep-07		On-going	STATES
6	Examine history of navigational errors and assess possible impact on safety	Jan-08		N/A	RNP-SEA TF
7	Confirm collision risk model assumptions/parameters are consistent with airspace where the 50 NM horizontal separation is to be applied	Jan-08	6-Mar-08	Completed	RNP-SEA TF
8	Conduct simulations to predict occupancy after the 50 NM horizontal separation implementation	Jan-08	5-Mar-08	Completed	SINGAPORE
9	Collect weather and turbulence data for analysis	Jan-08		On-going	STATES
10	Report monthly navigational errors (including operational errors) to Monitoring Authority (Singapore)	13-Mar-06		On-going	STATES
11	Collect additional data if required by the Safety Assessment Expert for the safety assessment for the 50 NM horizontal separation implementation	Jan-08		On-going	STATES
	Feasibility Analysis				
12	Examine the operational factors and workload associated with the 50 NM horizontal separation implementation in South China Sea	13-Mar-06	6-Jun-08	On-goingCompleted	STATES
13	Complete feasibility analysis on the 50NM horizontal separation implementation on L642 and M771	13-Mar-06	25-Sep-07	Completed	N/A
	Determination of Requirements (airborne & ground systems)				
14	States assess the impact of the 50 NM horizontal separation implementation on controller automation systems and plan for upgrades/modifications	13-Mar-06	25-Sep-07	Completed	N/A
	Aircraft & Operator Approval Requirements				
15	Promulgate the operational approval process of RNP 10	13-Mar-06	13-Mar-06	Completed	N/A

SN	Activity	Start	Complete	Present Status	Group Responsible
	Perform Rulemaking (if required)				
16	Recommend State airspace regulatory documentation	13-Mar-06	13-Mar-06	Completed	N/A
	Perform Necessary Industry & International Co-ordination				
17	Establish target implementation date on the 50NM horizontal separation on L642 and M771	25-Sep-07	25-Sep-07	Completed (Target Date of Implementation is 2 July 2008)	RNP SEA TF
18	Report to South-East Asia ATS Coordination Group (SEACG)			On-going	SINGAPORE
19	Prepare draft amendment proposal to amend Doc 7030	25-Sep-07	26-Sep-07	Completed	SCM
20	Submit draft amendment proposal to amend Doc 7030 to ICAO	26-Sep-07		Completed	STATES
21	Assess need to publish AIP Amendment/Supplement, if necessary, containing the 50 NM horizontal separation policy/procedures	26-Sep-07	7-Mar-08	Completed	STATES
22	Assess need for NOTAM	13-Mar-06	Jun-08	Completed	STATES
23	Review inter-facility coordination procedures	26-Sep-07	Jun-08	Completed	STATES
24	Finalize changes to Letters of Agreement	26-Sep-07	Jun-08	Completed	STATES
	Approval of Aircraft & Operators				
25	Establish approved operations readiness targets	13-Mar-06	13-Mar-06	Completed	N/A
26	Assess operator readiness	13-Mar-06	13-Mar-06	Completed	N/A
	Develop ATC Procedures				
27	Develop procedures for handling non-compliant aircraft in ATS documentation	13-Mar-06	13-Mar-06	Completed	N/A
	ATC Training				
28	Complete training for air traffic controllers on the application of 50 NM horizontal separation	13-Mar-06	6-Jun-08	On-goingCompleted	STATES
	Complete Safety Assessment				
29	Review and accept safety assessment	13-Mar-06	Jun-08	Completed	RNP-SEA TF
	Final Implementation Decision				
30	Go/No-Go Decision	Jun-08	Jun-08	Completed	RNP-SEA TF

SN	Activity	Start	Complete	Present Status	Group Responsible
31	Implementation	Jul-08	3-Jul-08	On-goingCompleted	
	Post Implementation Review				RNP-SEA TF
32	RNP-SEA/TF/3	Jun-08		Completed	RNP-SEA TF
33	RNP-SEA/TF/4	Nov-08	7-Nov-08	On-goingCompleted	RNP-SEA TF

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.

2) To meet this objective the Task Force shall:

a) Review the existing Bay of Bengal route structures and examine suitabilities 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 route structures 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 during 2009.

Phase Two: *To be determined*

Phase Three: *To be determined*

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

(last amended BBACG/20 - 29 January 2009)

OPERATIONAL LETTER OF AGREEMENT BETWEEN

General Administration of Civil Aviation of China	China
Civil Aviation Department	Hong Kong, China
Directorate General of Civil Aviation	Indonesia
Department of Civil Aviation	Malaysia
Air Transportation Office	Philippines
Civil Aviation Authority	Singapore
Aeronautical Radio of Thailand Ltd	Thailand
Civil Aviation Administration	Viet Nam

FOR

MONITORING OF AIRCRAFT NAVIGATION ERRORS

IN THE

SOUTH CHINA SEA AREA

Operational Letter of Agreement

Document Management

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Checklist of Effective Pages

Subject	Pages	Issue Date
Letter of Agreement	1 – 10	31 July 2008
Appendix A-Navigation Error Report	A1 – 6	31 July 2008

Operational Letter of Agreement

Overview

Introduction

The following document is a Letter of Agreement (LOA) between those Air Traffic Service (ATS) authorities shown on page one of this document. The letter of agreement details monitoring procedures between the following ATS units:

Bangkok ACC	Hanoi ACC
Ho Chi Minh ACC	Hong Kong ACC
Jakarta ACC	Kota Kinabalu ACC
Kuala Lumpur ACC	Manila ACC
Sanya ACC	Singapore ACC

Objective

The objective of this LOA is to define agreed procedures for the monitoring, notification, investigation, analysis and reporting of aircraft navigation errors in respect of aircraft to which reduced horizontal separation minima is applied when operating on the following designated RNAV routes:

L642	M771	N892
L625	M767	N884

Scope

The procedures contained in this LOA implement the performance monitoring requirements associated with the introduction of the reduced horizontal separation standard, and for the reporting and monitoring of gross lateral and longitudinal navigational errors.

For the purposes of this LOA, the term ‘Service Providers’ refers to organisations which are responsible for the provision of Air Traffic Control (ATC) services.

The term ‘Regulatory Authority’ refers to those organizations responsible for the investigation of navigational errors. In some cases, the Regulatory Authority may be the same as the Service Provider.

Effective Date

This letter of agreement becomes effective on 31 July 2008

Overview, continued

Background

The use of these horizontal separation standards is restricted to aircraft which meet the requirements detailed in the respective States' AIP / AIP Supplements. This includes a requirement for RNP 10 / RNP 4 Performance Based Navigation (PBN) approval and it is the responsibility of the operator to ensure that such requirements are satisfied when so declared.

PBN approval includes operators meeting certain requirements with regard to crew training and in-flight operating procedures. The responsibility for approval for such operations rests with the State of Registry of the Operator.

Monitoring navigation errors is a joint responsibility between the aircraft operators, the States of Registry, and the ATC providers. There are established requirements for the operators to monitor navigation performance under the terms of their PBN Approval. This document sets out the responsibilities and procedures to be followed by staff of the signatory organizations to this LOA.

Area of Applicability

The procedures outlined in this LOA shall be applied to all aircraft operating on the following designated RNAV routes:

L642	M771	N892
L625	M767	N884

Monitoring Procedures

Lateral Deviations

Monitoring shall be based on radar observations.

When the radar controller observes a lateral deviation of 15NM or more, the controller shall:

- Immediately advise the pilot in command; and
- Provide the 'Duty Supervisor' with the necessary information to enable Part 1 of the Navigation Error Investigation Form (as shown in **Appendix A**) to be completed.

Where an aircraft is off-track as the result of ATC approved diversion (e.g. due weather), no notification under the terms of this Letter of Agreement need be submitted.

Longitudinal Deviations

Monitoring of longitudinal errors shall be accomplished by reporting occurrences where the observed longitudinal separation, following a check, is either less or more than the expected longitudinal separation as detailed below.

Where a time standard is being used, this check will follow the receipt of a routine position report. Notification, in accordance with **Appendix A**, shall be submitted in all cases where:

- The separation standard is infringed; or
- The expected time between two aircraft varies by 3 minutes or more, even if the applicable separation standard is not infringed; or
- A pilot estimate varies by 3 minutes or more from that advised in a routine position report.

Where a distance standard is being used, the check may be based on ADS, radar observations, or it may be the result of a specific request for RNAV distance reports. Notification, in accordance with **Appendix A**, shall be submitted in all cases where:

- The separation standard is infringed; or
- The expected distance between two aircraft varies by 10NM or more, even if the applicable separation standard is not infringed.

Notification Procedures

Action by ATC Unit	The duty supervisor, when advised of the deviation, shall be responsible for completion and submission of a Navigation Error Investigation Form. A copy of the aircraft's flight plan shall be attached to the Navigation Error Investigation Form, and forwarded to the Chief of ATC. The Chief of ATC shall forward copies of the Navigation Error Investigation Form (Parts 1 to 4) to the aircraft operator and the State of Registry of the aircraft or the State of the Operator, as considered appropriate. In addition, the copy for the aircraft operator shall be sent with a covering letter (as provided in **Appendix A**) requiring the operator to complete the Navigation Error Investigation Form and to provide reasons for the error.

Investigation Procedures

Investigation Procedures

The investigation of errors notifiable under this Letter of Agreement is a joint responsibility of the operator, the Regulatory Authority of the airspace in which the error occurred, and the State of Registry or State of the Operator of the aircraft involved.

The initial investigation shall be undertaken by the aircraft operator, who is responsible for supplying all data and comments needed to complete the form at **Appendix A**. The completed reports are to be returned by the operator to the originating Regulatory Authority. For aircraft registered in States not included in this LOA, these reports are also to be forwarded to the State of Registry of the aircraft or the State of the operator.

Further action by States other than signatories to this LOA is outside the scope of this agreement, and shall be at the discretion of that State.

On receipt of the completed report from the aircraft operator, the relevant Regulatory Authority will first check that all information required has been supplied and, if necessary, the Regulatory Authority shall request any further information from either the operator, the State of the Operator, or the State of Registry of the aircraft.

If the completed form from the aircraft operator is not received within 14 days of the date of dispatch, the Regulatory Authority will contact the operator and request the completed form.

Once the completed information has been received, the Regulatory Authority will complete Part 5 of the Navigation Error Investigation Form as detailed in **Appendix A**. The cause of the error is to be classified in accordance with the criteria specified in Part 5.

The decision as to whether any further investigation is warranted will be taken by the Regulatory Authority based on their assessment of the seriousness of the error.

Analysis of Errors & Reporting

At the end of each month, Service Providers shall forward to the Air Traffic Services Division, Civil Aviation Authority of Singapore (CAAS), a copy of all completed Navigation Error Investigation Forms (Parts 1 to 5) covering reported errors or nil reports for that month, together with data on the number of movements on the routes being monitored as recorded by the relevant Flight Data Processing System, or other auditable means.

CAAS shall be responsible for calculation of the frequency of the errors, in accordance with Doc 7030.

Each six months, the Monitoring Authority should prepare an assessment schedule setting out the results of the monitoring for the preceding six-month period and forward a copy of this schedule to:

a. All signatory States to the Monitoring Letter of Agreement; and

b. The Chairman of the APANPIRG ATM/AIS/SAR Sub-Group, through the ICAO Bangkok Office.

Permitted Error Rate Exceeded

Where the summary statistics show a long term trend which could result in the Permitted Error Rate being exceeded, ATC Authorities of the States concerned, in conjunction with the ICAO Regional Office, will jointly consider the causes, to determine if the problems can be eliminated, and to take appropriate remedial action.

Revision

This LOA shall remain in force until it is cancelled or superseded.

For any reason, which might make it advisable to change this agreement and its associated attachments, the interested State shall propose the pertinent revision.

Operational Letter of Agreement

Authority

China	Mr Wang Liya Deputy Director General Air Traffic Management Bureau Civil Aviation Administration of China
Hong Kong, China	Mr Ng Shung Ching Colman Assistant Director-General of Civil Aviation Civil Aviation Department Hong Kong, China.
Indonesia	Mr Bambang Tjahjono Director of Aviation Safety Directorate General of Civil Aviation, Indonesia
Malaysia	Mr Ahmad Nizar Bin Zolfakar Director of Air Traffic Services Department of Civil Aviation Malaysia

Continued on next page

Authority, Continued

Philippines	Mr Wilfredo S. Borja Director II, Air Traffic Service Civil Aviation Authority of the Philippines
Singapore	Mr Kuah Kong Beng Chief Air Traffic Control Officer Civil Aviation Authority of Singapore
Thailand	Mr Prakit Suwannabhokin Vice President Air Traffic Services Bureau 1 AEROTHAI
Viet Nam	Mr Bui Van Vo Director Air Navigation Department Civil Aviation Administration of Viet Nam

Operational Letter of Agreement

Appendix A

NAVIGATION ERROR REPORT

Dear

Air Traffic Control service providers are monitoring traffic on routes in the South China Sea Area, as part of the implementation of reduced separation minima on those routes.

These procedures require the reporting and investigation of:

i) Lateral tracking errors of 15NM or more;

ii) Variations of longitudinal separation of three minutes or more; or

iii) Variations of longitudinal separation of 10NM or more.

A Navigation Error Investigation Form relating to one of your aircraft is enclosed.

An investigation of this occurrence is required. A detailed explanation should be provided within 10 days, using the attached Navigation Error Investigation Form. In your reply, you are also requested to indicate any corrective action taken to prevent future occurrences.

Yours faithfully,

NAVIGATION ERROR NVESTIGATION FORM

Instructions for Service Provider responsible officer:

Please ensure that Part 1 of this form has been completed to the maximum extent possible, and distribute according to the requirements of the Letter of Agreement on monitoring of aircraft navigation errors in the South China Sea Area.

Instructions for aircraft owner/operator:

Please supply any details required in Part 1 of this form which have not already been completed, together with the information requested in Parts 2, 3 and 4 (if applicable), and return to:

[*Appropriate Regulatory Authority*]

Instructions for Investigating Agency (Regulatory Authority):

Please complete Part 5 of this form and return to:

[*Appropriate Service Provider*]

NAVIGATION ERROR INVESTIGATION FORM

PART 1 - To be completed by responsible officer in the Service Provider (and aircraft owner/operator if need)		
ATC Unit Observing Error:		
Date/Time (UTC):		
Type of Error: (tick one) ☐ LATERAL ☐ LONGITUDINAL		
Details of Aircraft		
	First Aircraft	**Second Aircraft (when longitudinal deviation observed)**
Aircraft Identification:		
Name of owner/Operator:		
Aircraft Type:		
Departure Point:		
Destination:		
Route Segment:		
Cleared Track:		
Position where error was observed: (BRG/DIST from fixed point or LAT/LONG)		
Extent of deviation – magnitude and direction: (NM for lateral, min/NM for longitudinal)		
Flight Level:		
For All Errors		
Action taken by ATC:		
Other Comments:		

**** (Please Attach ATS Flight Plan)**

NAVIGATION ERROR INVESTIGATION FORM

PART 2 - Details of Aircraft, and Navigation and Communications Equipment Fit (To be completed by aircraft owner/operator)			
LRNS	**Number of Systems (0, 1, 2 etc.)**	**Make**	**Model**
INS			
IRS			
GNSS			
FMS			
Others (please Specify)			
COMS			
HF			
VHF			
SATCOM			
CPDLC			
Which navigation system was coupled to the autopilot at the time of observation of the error?			
Which NAV MODE was selected at the time of observation of the error?			
Which comms system was in use at the time of observation of the error?			
Aircraft registration and model/series			
Was the aircraft operating according to PBN requirements?		☐Yes ☐ No	

NAVIGATION ERROR INVESTIGATION FORM

PART 3 – Detailed description of incident (To be completed by owner/operator – use separate sheet if required)
Please give your assessment of the actual track flown by the aircraft, and the cause of the deviation:
Corrective action proposed:

PART 4 – To be completed by owner/operator, only in the event of partial or total navigation equipment failure.			
Nav System Type	**INS**	**IRS/FMS**	**Others (Please specify)**
Indicate the number of units of each type which failed			
Indicate position at which failure(s) occurred			
Give an estimate of the duration of the equipment failure(s)			
At what time were ATC advised of the failure(s)?			

NAVIGATION ERROR INVESTIGATION FORM

PART 5 – To be completed by investigating agency		
Have all required data been supplied?	□ Yes	□ No
Is further investigation warranted?	□ Yes	□ No
Will this incident be the subject of a separate report?	□ Yes	□ No
General comments:		
Classification: (please circle) A B C D E F G H I		

CLASSIFICATION OF GROSS NAVIGATION ERRORS	
Class	**Cause**
A	Aircraft not approved to PBN requirements
B	ATC system loop error
C	Waypoint insertion error, due to correct entry of incorrect position or incorrect entry of correct position
D	Other navigation errors, including equipment failure notified to ATC in time for action
E	Other navigation errors, including equipment failure notified to ATC too late for action
F	Other navigation errors, including equipment failure of which notification was not received by ATC
G	Mode select error
H	Weather deviation (other than approved)
I	Other (please specify):

Procedures for the Assessment of Aircraft Navigation Errors In Support of the Implementation of Reduced Horizontal Separation Minima In the South China Sea Area

1. Introduction

1.1 This document provides guidance on the methodology to be adopted in the assessment of navigation errors associated with the implementation of reduced horizontal separation minima in the South China Sea Area.

1.2 This document should be read in conjunction with the Letter of Agreement between States of the South China Sea Area, entitled *"Letter of Agreement for the Monitoring of Aircraft Navigation Errors in the South China Sea Area"*.

2. Data Gathering Responsibility

2.1 The States responsible for the gathering and onwards forwarding of data relating to the monitoring letter of agreement, and the monitoring areas identified in paragraph 4, shall be Hong Kong China, the Philippines, and Singapore.

2.2 Data gathering requirements are detailed in paragraph 5.

3. Monitoring Authority

3.1 Civil Aviation Authority of Singapore (CAAS) shall be responsible for the collection and reporting of navigation error.

4. Designated Monitoring Areas

4.1 In order to validate the monitoring requirements supporting the reduction in horizontal separation minima, it is necessary to assess the track keeping ability of aircraft operating on the route structure, whilst they have been using on-board RNAV navigation systems only, for a maximum period of time, relative to the route being flown.

4.2 It is also essential that observation of the navigation of the aircraft, using radar, occurs before the on-board navigation systems have been able to "up-date" using ground-based navigation aids, such as DME/DME, or VOR/VOR.

4.3 In assessing navigation errors on the 6 core routes – ie L642, M771, N892, L625, N884 and M767 – there are only six appropriate areas at which the required monitoring may be undertaken, given the extensive ground-based navigation aid coverage in the South China Sea Area.

4.4 These areas are the route segments between:

a) DULOP and DUMOL on M771
b) AKOTA and AVMUP on L625
c) LULBU and LEGED on N884
d) MELAS and MABLI on N892
e) ESPOB and ENREP on L642
f) TEGID and BOBOB on M767

4.5 Monitoring of aircraft on these route segments should be undertaken as soon as possible after the aircraft enters radar coverage.

4.6 It should be noted that navigation error reports relating to areas other than those stated above, should also be processed and reported on, in order to support data gathering for future reductions in lateral and longitudinal separation. Details on the processing of these reports are given at paragraph 7.

5. Collection and Forwarding of Data

5.1 Those States identified in Paragraph 2, are required, at the end of each month, to collect the following data:

a) Recorded navigation errors at the required monitoring areas, by way of the "Navigation Error Investigation Form", as detailed in the Letter of Agreement on the Monitoring of Navigation Errors; and

b) Total monthly movement statistics relating to air traffic passing the designated monitoring areas within the designated monitoring height band.

Note: The recording of monthly traffic movement statistics in the monitoring areas should be auditable – in other words, some formal method of recording the movements – eg copies of flight progress strips or data from Flight Data Processing Systems – should be available for audit if required.

5.2 After collection, the required data should be forwarded to the Monitoring Authority (CAAS), for assessment, to arrive not later than 15 days from the end of the month within which the data was collected. This will allow time for the Navigation Error Investigation Forms relating to occurrences near the end of a month, to be processed and returned as detailed in that form.

5.3 In respect of paragraph 5.1.a), if there have been no error reports submitted, a "Nil Return" should be submitted to the Monitoring Authority.

6. Assessing of Navigation Errors

6.1 The monitoring requirements associated with the introduction of the reduced horizontal separation minima will be in accordance with the requirements for RNP10 / RNP4 PBN, i.e. aircraft navigation performance shall be such that the standard deviation of lateral track errors shall be in accordance with the PBN requirement.

6.2 The requirements will be met, if the number of navigation errors by approved flights, measured in the monitoring area, divided by the total number of approved flights over those monitoring points, is less than the required parameters, over a period of time for the PBN requirement. (See Appendix B).

6.3 The assessments for each month should be recorded separately, and also cumulatively, on a month-to month basis. If the assessment in any particular month exceeds the required parameter, a check should be made to ensure that the cumulative assessment does not also exceed the required parameter.

6.4 If a trend is identified, which indicates that the required parameter is being exceeded regularly, or the cumulative assessment indicates a upwards trend, the Monitoring Authority should notify, through the ICAO Bangkok Office, the APANPIRG ATM/AIS/SAR Sub-Group, which should then investigate the need for a review of the applicable procedures.

6.5 An example of an assessment schedule is shown at Appendix B.

7. Processing of Navigation Error Reports Relating to Areas Other Than Required Monitoring Areas

7.1 The Letter of Agreement on the Monitoring of Navigation Errors required all participating States to notify all appropriate navigation errors to the Monitoring Authority. This data should be collated and assessed in the following manner.

7.2 If the navigation error report relates to aircraft tracking on RNAV routes L625, L642, M767, M771, N884, or N892, the error should be assessed and processed in accordance with paragraph 6 above.

7.3 If the report relates to aircraft tracking on other routes, the errors should be assessed, and recorded separately. This information should be assessed by the APANPIRG ATM/AIS/SAR Sub-Group meeting, for appropriate action.

8. Reporting Procedures

8.1 The Monitoring Authority should prepare an assessment schedule (refer to Appendix B), and forward a copy of this schedule, at least every 6 months, to:

a) All signatory States to the Monitoring Letter of Agreement; and

b) The Chairman of the APANPIRG ATM/AIS/SAR Sub-Group, through the ICAO Bangkok Office.

8.2 In addition, a report should be prepared on those errors reported in accordance with paragraph 7.3 above.

9. Attachments

Appendix A – Assessment Schedule Process
Appendix B – Sample Assessment Schedule

Appendix A

Assessment Schedule Process For Designated Monitoring Areas

STEP 1.

Hong Kong, Philippines and Singapore carry out a total monthly traffic count for approved traffic at FL290 and above, over the points:

a) DULOP and DUMOL on M771
b) AKOTA and AVMUP on L625
c) LUBLU and LEGED on N884
d) MELAS and MABLI on N892
e) ESPOB and ENREP on L642
f) TEGID and BOBOB on M767

STEP 2.

Hong Kong, Philippines and Singapore collate all Navigation Error Investigation Forms.

STEP 3.

Not later than the 15th day of each month, send the statistics gathered in Steps 1 and 2, to the Monitoring Authority (CAAS).

STEP 4.

The Monitoring Authority collates the information into an assessment schedule.

STEP 5.

Each 6 months, the assessment schedule is sent to:

a) All signatory States to the Monitoring Letter of Agreement; and

b) The Chairman of the APANPIRG ATM/AIS/SAR Sub-Group, through the ICAO Bangkok Office.

STEP 6 (if required).

If the trend in errors is increasing, notify, through the ICAO Bangkok Office, the APANPIRG ATM/AIS/SAR Sub-Group, for appropriate action.

Appendix B

Example of Navigation Error Assessment Schedule For Designated Monitoring Areas

a. Example of Monthly Total – Single Area

Month/ 2007	Total traffic at DULOP/DUMOL	Errors Category 1	Errors Category 2	Error Rate Category 1	Error Ratio Category 2
April	3105	1	0	3.22×10^{-4}	0
May	3042	2	0	6.57×10^{-4}	0
June	2810	0	0	0	0
July	2995	1	1	3.34×10^{-4}	3.34×10^{-4}

Category 1 => 15NM Category 2 = 25 – 35NM

b. Example of Cumulative Monthly Total – Single Area

Month/ 2007	Total traffic at DULOP/DUMOL	Errors Category 1	Errors Category 2	Error Rate Category 1	Error Ratio Category 2
April	3105	1	0	3.22×10^{-4}	0
May	6147	3	0	4.88×10^{-4}	0
June	8957	3	0	3.35×10^{-4}	0
July	11952	4	1	3.34×10^{-4}	8.36×10^{-3}

Category 1 => 15NM Category 2 = 25 – 35NM

c. Example of Monthly Total – All Six Areas

Month/ 2007	Total traffic at Areas	Errors Category 1	Errors Category 2	Error Rate Category 1	Error Ratio Category 2
April	7852	2	0	2.55×10^{-4}	0
May	8311	2	0	2.41×10^{-4}	0
June	8263	1	0	1.21×10^{-4}	0
July	7678	1	1	1.30×10^{-4}	1.30×10^{-4}

Category 1 => 15NM Category 2 = 25 – 35NM

d. Example of Cumulative Monthly Total – All Six Areas

Month/ 2007	Total traffic at Areas	Errors Category 1	Errors Category 2	Error Rate Category 1	Error Ratio Category 2
April	7852	2	0	2.55×10^{-4}	0
May	16163	4	0	2.47×10^{-4}	0
June	24426	5	0	2.05×10^{-4}	0
July	32104	6	1	1.87×10^{-4}	3.11×10^{-3}

Category 1 => 15NM Category 2 = 25 – 35NM

Draft ICAO Air Navigation Plan Amendment Proposal

Proposal for Amendment of Basic Air Navigation Plan

(Serial No APAC 09/xx-ATS)

a) **Plan**: ASIA/PAC, Basic ANP (Doc. 9673)

*(**Note:** complementary amendments to the MID and AFI ANPs are required in some cases, as highlighted below)*

b) **Proposed Amendment**:

Editorial note: Amendments are arranged to show deleted text using strikeout (~~text to be deleted~~), and added text with grey shading (text to be inserted).

AMEND the following ATS routes to redesignate as ATS (RNAV) routes:

Redesignate ~~A209 to~~ N509
ELATI 0200.0S 08957.7E
PORT HEDLAND
(cf. Table ATS 1, Chart ATS 3D)

Redesignate ~~A214~~ to N628
PEKANBARU
BUSUX 0355.0S 06000.0E
(PRASLIN)
(cf. Table ATS 1, Chart ATS 3D)
(**Note:** Amendment to AFI BANP also required)

Redesignate ~~A327 to~~ P627
PHUKET
KADAP 0200.0S 08409.6E
KALBI 0852.3S 07500.0E
(PLAISANCE)
(cf. Table ATS 1, Chart ATS 3D)
(**Note:** Amendment to AFI BANP also required)

Redesignate ~~A451~~ to P751
(ADEN)
ANGAL 1614N 06000E
MUMBAI
(cf. Table ATS 1, Chart ATS 3A, 3D)
(**Note:** Amendment to MID BANP also required)

Redesignate ~~A463~~ to M641
MADURAI
BIKOK 0817.0N 07836.0E
COLOMBO
COCOS IS
PERTH

(cf. Table ATS 1, Chart ATS 3D)

Redesignate ~~B335~~ to N633
KUALA LUMPUR
PEKANBARU
POSOD 0329.5S 09409.9E
PEDPI 1316.6S 07500.0E
(PLAISANCE)
(cf. Table ATS 1, Chart ATS 3D)
(**Note:** Amendment to AFI BANP also required)

Redesignate ~~B340~~ to N640
TRIVANDRUM
BIKOK 0817.0N 07836.0E
COLOMBO
LEARMONTH
MOUNT HOPE
ADELAIDE
(cf. Table ATS 1, Chart ATS 3D)

Redesignate ~~B344~~ to L774
(PLAISANCE)
LELED 1116.5S 07500.0E
ELATI 0200.0S 08957.7E
KETIV 0042.0S 09200.0E
MEDAN
(cf. Table ATS 1, Chart ATS 3D)
(**Note:** Amendment to AFI BANP also required)

Redesignate ~~G462~~ to M762
COLOMBO
JAKARTA
INDRAMAYU
MADIN 0617.9S 11023.0E
CUCUT 0617.7S 11106.0E
SURABAYA
BALI
DARWIN
(cf. Table ATS 1, Chart ATS 3D)

ADD requirement for new ATS (RNAV) routes:

L894	KITAL	2003.0N 06018.0E
	MALE	
	SUNAN	0028.7S 07800.0E
	DADAR	0200.0S 07927.1E
	PERTH	

(cf. Table ATS 1, Chart ATS 3A, 3D)
(**Note**: Replaces R456 IZKI-MALE and A594 MALE-PERTH)

P756	MALE	
	MEDAN	

(cf. Table ATS 1, Chart ATS 3D)
(**Note:** Replaces R456 MALE-MABIX)

L516	KITAL	2003.0N 06018.0E
	ELKEL	0149.0N 06911.0E
	(DIEGO GARCIA)	

(cf. Table ATS 1, Chart ATS 3A, 3D)
(**Note:** Replaces ATS route A452 and realigned)

L899	HANIMAADHOO	
	TRIVANDRUM	

(cf. Table ATS 1, Chart ATS 3D)

DELETE requirement for ATS routes:

~~A452~~	~~GOLEM~~	~~1157.6N 06722.2E~~
	~~ELKEL~~	~~0149.0N 06911.0E~~
	~~(DIEGO GARCIA)~~	

(cf. Table ATS 1, Chart ATS 3D)

~~A594~~	~~MALE~~	
	~~SUNAN~~	~~0028.7S 07800.0E~~
	~~DADAR~~	~~0200.0S 07927.1E~~
	~~PERTH~~	

(**Note**: Replaced by ATS (RNAV) routes L516 and L894)
(cf. Table ATS 1, Chart ATS 3D)

~~R456~~	~~(IZKI)~~	
	~~BOTAN~~	~~2006.6N 06021.8E~~
	~~MALE~~	
	~~MABIX~~	~~0315.0N 09454.0E~~

(cf. Table ATS 1, Chart ATS 3D)
(**Note:** IZKI-MALE replaced by ATS route L894 and MALE-MABIX replaced by P756)

c) **Originated by**: Australia, India, Indonesia, Malaysia, Maldives, Sri Lanka, Thailand

d)	**Reasons of the originator for the amendment:**	The primary users of the ATS routes identified in this amendment proposal are long-haul RNP compliant aircraft. Redesignation of 'conventional' routes as ATS (RNAV) routes will enable transition to RNP based separation minima in accordance with ICAO PBN Concept The proposal was finalised and recommended by the Arabian Sea/Indian Ocean ATS Coordination Group and Bay of Bengal ATS Coordination Group meetings conducted in Malé, Maldives during January 2009 (ASIOACG/4 & BBACG/20, 25-29 January 2009)
e)	**Proposed date for implementation:**	Immediately upon approval by the Council, target date AIRAC 19 November 2009
f)	**Proposal circulated to the following States/Territories and Organizations:**	
		* for information
g)	**Comments of the Secretariat:**	This amendment proposal has been facilitated by the Asia/Pacific Secretariat as an enabling activity for the implementation of RNP 10 based 50 NM/50 NM reduced horizontal separation standards in accordance with ICAO PBN Concept and requirements of the APANPIRG Regional PBN Implementation Plan. The proposal is supported by the Asia/Pacific Regional Office.

BBACG — TASK LIST

(last updated BBACG/20, 29 January 2009)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
18/2	Chennai/Colombo FIR boundary harmonization	Update BBACG/21	India, Sri Lanka Regional Office	Open	India informed BBACG that this matter now under consideration by the Govt of India. Will update by BBACG/21
18/4	Contingency Planning	Update BBACG/21	All States in the region, Regional Office	Open	States in co-ordination with its neighbouring States, develop a contingency plan or plans for their airspace, taking into account Conclusion 17/11 Adoption of Model National ATM Contingency Plan
18/5	Establish requirements for setting up an EMA to provide horizontal safety management services for the Bay of Bengal area	Update BBACG/21	BOB States, Regional Office	Open	Singapore providing EMA coverage for South China Sea. APANPIRG/19 invited Singapore to consider providing EMA assistance to BOB States. BBACG/20 invited India to consider urgently establishing long term EMA capability for horizontal plane safety monitoring and assessment for BOB and Arabian Sea airspace.
18/7	Specify RVSM airspace as Class A	Update BBACG/21	States Regional Office	Open	India informed BBACG/20 that they would update BBACG/21

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
18/8	Lowering MEA on G792 from FL310 to FL300 to be in alignment with P628 in India	Update BBACG/21	Afghanistan, Pakistan, ICAO APAC Regional Office, ICAO Middle East Office	Open	BBACG/20 noted that this matter is in coordination between Pakistan and India
18/9	Search and Rescue Agreements between States	Update BBACG/21	Regional Office All States	Open	a) States, in conjunction with their neighbouring State (s), will develop Search and Rescue Agreements, for the purpose of providing a more efficient response to a search and rescue action and increase the possibility of a successful search and rescue mission; States conduct joint training and exercises, as appropriate, to maximize proficiency; b) a State, together with a neighbouring State, establish common SAR procedures, where practicable; and c) a State, together with a neighbouring State, establish common SAR procedures, where practicable

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
18/10	Operate A466 and N644 as separate routes	Update BBACG/21	Pakistan Regional Office Regional Office to coordinate with all parties concerned.	Open	BBACG/19 reached agreements with Pakistan to resolve this matter. Pakistan will conduct internal coordination with military and implement when able. Pakistan updated 45th DGCA Conference (Kuala Lumpur, November 2008) re positive progress being made by Pakistan.
~~18/11~~	~~Extend operating hours of G792 to H24.~~	~~On Going~~	~~Regional Office, CFACC, Afghanistan and ICAO MID Office~~	~~Open~~ ~~**Closed**~~	~~Preferred outcome is G792 H24 whilst retaining B466 H24. Concern by Afghanistan about merging, Pakistan radar can resolve before entry Kabul.~~ ~~This matter resolved August 2008 with opening of UL333 and lifting of restriction on B466 SERKA PAROD in Kabul FIR. Pakistan ensures 10 minutes separation for westbound flights at PAROD.~~
18/12	Develop a westbound Air Traffic Flow Management Plan (ATFMP)	Update BBACG/21	All concerned States, IFATCA, IFALPA, IATA Regional Office		ATFM operational trial commenced 24 July 2006 under auspices of ATFM/TF. ATFM procedures implemented July 2007 to mange night time 4 hour busy period through Kabul FIR. BBACG/20 noted outcomes of ATFM Seminar/Workshop in Japan during October 2008, and that the matter would be discussed during 2009 ATM/AIS/SAR/SG meeting

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
~~19/1~~	~~Implement 10 minutes vice 15 minutes longitudinal in Colombo FIR~~	~~May 2008~~	~~Australia, Indonesia, Sri Lanka~~	~~Open~~ ~~**Closed**~~	~~Colombo and Jakarta FIRs are already included in Regional Supps for 10 minutes with MNT, affected States to implement 10 mins MNT as soon as possible~~ ~~15 minute separations changed to 10 minutes during late 2008~~
19/2	Australia, Indonesia and Sri Lanka use the opportunity provided by the reduction of longitudinal separation to 10 minutes MNT in the Colombo FIR to review route requirements with the objective of implementing RNP10 routes as widely as possible	Update BBACG/21	Australia, Indonesia, Sri Lanka	Open	Bulk ANP amendment proposal drafted by BBACG/20, target implementation Nov 2009
19/3	IATA consider conducting a one week survey of communications performance in Yangon FIR	Update BBACG/21	IATA, Regional Office	Open	IATA members to be made aware that data from the survey will be made available agencies working in Myanmar to enhance comms. IATA updated BBACG/20 – some improvement evident, but not to required standards.
19/4	Flex Track Connector Routes between Melbourne and Colombo FIRs	Update BBACG/21	Australia, Sri Lanka, IATA	Open	Assist ASIOACG/2 members to make these implementations Some implementations already completed, active work continues on others.

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
19/5	Establishment of Indian Ocean UPR (Southern Africa to Southeast Asia) 1. Australia - Compile Contact List 2. Australia - Develop Operational Concept which identifies Operators; City Pairs; & Aircraft types for interim application (March 2008) 3. Singapore Airlines to provide Flight Plan Data JNB – CPT - SIN	Update BBACG/21	Australia, IATA, affected States	Open	Assist ASIOACG members with this work. Primary coordination point is Mr. Phil Mayo of Airservices Australia, email: (Phil.Mayo@AirservicesAustralia.com) ASIOACG/4 Report contains record of positive progress so far.
~~19/6~~	~~Coordinate arrangements for an ATS routes Regional coordination meeting with Afghanistan, India, Iran, Kazakhstan, Pakistan, & Uzbekistan.~~	~~2008~~	~~Regional Office~~	~~Open~~ **~~Closed~~**	~~APAC Regional Office to commence coordination with the ICAO EUR and MID Offices in this regard~~ ~~Inter Regional Afghanistan Interface Meeting (IRAI) held July 2008~~
~~19/7~~	~~FIT BOB and BBACG to accelerate planning for implementation of 50NM longitudinal separation using CPDLC communications in as many areas of the Bay of Bengal as possible with target date 2009.~~	~~Update BBACG/20~~	~~States, Regional Office, IATA, DSPs, Boeing CRA~~	~~Open~~ **~~Closed~~**	~~BBACG/20 established the Bay of Bengal Reduced Horizontal Separation Implementation Task Force (BOB-RHS/TF), first meeting in second quarter 2009.~~
20/1	Ensure BOBCAT flight plans and movement messages (DEP, CHG, CNL, etc) of flights subject to ATFM procedures (BOBCAT) are addressed by AFTN to Bangkok ATFMU	Update ATFM/TF/13 September 2009	States, IATA	Open	
20/2	States involved with ATFM procedures (BOBCAT) provide BOBCAT related traffic movement data for seven consecutive days every month, in accordance with data requests authorised by ATFM/TF and administered by Bangkok ATFMU	Update ATFM/TF/13 September 2009	Affected States, India, Bangkok ATFMU	Open	Airports Authority of India and Bangkok ATFMU to investigate why data transmitted by AAI is not received by ATFMU. India to ensure all Indian airports involved (see paragraph 3.11 of BBACG/20 report) provide data.

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
20/3	Poor on time performance of BOBCAT aircraft subject to ATFM procedures has direct impact on efficiency of ATFM procedures. All parties to undertake investigation as to reason for poor on-time performance including: a) Incorrect flight planned EET, b) Non compliance with BOBCAT AWUT – early and late departures c) Non compliance with BOBCAT Kabul entry time – early and late at Kabul entry fix.	Update ATFM/TF/13 September 2009	Affected States, IATA	Open	Poor on time performance means it is not possible to proceed further with ATFM initiatives
20/4	India to consider approving use of existing ATS route west of Chennai as connector route for N571/N877 for bypass traffic on L510 to enable efficient and BOBCAT metered traffic feed to UL333 in Kabul FIR	Update ATFM/TF/13 September 2009	India, Regional Office	Open	
0/5	Progress bulk ANP amendment proposal for re-designation of BBACG conventional routes to RNAV routes (BBACG/20 Appendix M refers). Target date for implementation is November 2009 AIRAC.	Update BBACG/21	Affected States, Regional Office	Open	
20/6	Thailand to coordinate with Myanmar re extension of trial of L759/M770 bypass procedures until end of May 2009	February 2009	Thailand, Myanmar	Open	
20/7	India to review invitation from BBACG/20 to establish En-route Monitoring Agency (EMA) capability in order to provide horizontal (lateral and longitudinal) safety monitoring and assessment services to support PBN implementation (RNP 10, RNP 4) in Bay of Bengal and Arabian Sea	BOB-RHS/TF/1	India, Regional Office	Open	

……..……

FIT-BOB TASK LIST

(last updated FIT-BOB/10, 11 July 2008)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
1.	Coordinate with FIT-BOB States on harmonizing implementation of operational trial.	As soon as practicable	ICAO Regional Office, BBACG FIT-BOB, ASIOACG and Indian Ocean States, IATA	Ongoing	Operational trials underway in BOB since February 2004 , Arabian Sea since July 2006 FIT-BOB will also provide FIT and CRA services for Informal Arabian Sea/Indian Ocean ATS Coordination Group (ASIOACG) and all Indonesian FIRs
2.	Collecting of ADS/CPDLC problem reports and submit to CRA.	Immediate	States, operators	Ongoing	To be submitted to CRA as soon as practicable to facilitate analyzing the reports.
3.	Establish provisions for monthly ADS/CPDLC system performance data from ANSP to be submitted to the CRA.	Monthly	States	Ongoing	Essential for evaluating overall system performance within the trial airspace, to be submitted on a monthly basis for each FIR.
4.	Establish data confidentiality agreements with States and operators participating in the trial airspace.	Immediate	CRA, States and operators	As required	Necessary to establish agreement with data providers for release of data and to de-identify reports.

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
8/2	Prepare and promulgate by AIP Supplement/AIC/NOTAM a set of standardised procedures for the operational trials in the Bay of Bengal, Arabian Sea and Indian Ocean areas	FIT-BOB/10 July 2008	India, Sri Lanka, Indonesia, Malaysia, IATA, Regional Office	Ongoing	Review existing procedures in conjunction with the Ho Chi Minh procedures for March 2007 operational trial in order to optimise & standardise procedures
9/1	Networking problems are being experienced; the CSPs providing service in the BOB region are encouraged to work together to resolve internetworking issues.	FIT-BOB/10 July 2008	SITA ARINC AEROTHAI Boeing	Ongoing	The resources of the Boeing CRA are available to CSPs if specific internetworking testing is required.
9/2	In relation to funding mechanisms for the CRA, IATA to explore possibility of 2 party agreement (IATA & Boeing) to cover existing and anticipated area of responsibility of BOB-CRA	FIT-BOB/10 July 2008	IATA Boeing Regional Office	Ongoing	IATA to continue with 3 party agreements until outcomes of 2 party model are available.
9/3	States to comply fully with the provisions of the FOM in respect to provision of data to the CRA.	FIT-BOB/10 July 2008	States	Ongoing	
9/4	FIT-BOB and BBACG to accelerate planning for implementation of 50NM longitudinal separation using CPDLC communications with target date 2009 in as many areas of the Bay of Bengal as possible.	FIT-BOB/10 July 2008	States Regional Office IATA CSPs Boeing CRA	Ongoing	
10/4	Regional Office to issue State Letter drawing attention to commencement of CRA services as described in India AIP Supplement 40/2008	August 2008	Regional Office	Ongoing	
