INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF DATA-LINK SEMINAR

REPORT OF THE 3rd MEETING OF THE FANS INTEROPERABILITY TEAM-ASIA (FIT-ASIA/3) AND THE 19TH MEETING OF THE REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP (RASMAG/19)

BANGKOK, THAILAND, 26 – 30 MAY 2014

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

Approved by the Meeting
and published by the ICAO Asia and Pacific Office, Bangkok

CONTENTS

APPENDICES TO THE REPORT OF FIT-Asia/2 and RASMAG/19

INTRODUCTION

Meetings

1.1 The Third Meeting of the Future Air Navigation Systems Interoperability Team-Asia (FIT-Asia/3) was held on 26 May 2014 at Pattaya, Thailand and the Nineteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/19) was held from 27-30 May 2014 at the same venue.

Attendance

2.1 A total of 45 participants attended either or both the FIT-Asia/3 and RASMAG/19 meetings from Bangladesh, Cambodia, China, India, Indonesia, Japan, Lao PDR, Malaysia, Republic of Korea, Thailand, the United States, Viet Nam, IATA, and IFATCA. Australia New Zealand, Singapore and Boeing provided papers for the meeting (which were presented by the Secretariat), but were unable to attend due to the political uncertainty in Thailand. The list of participants is at **Appendix A** to this report.

Officers and Secretariat

3.1 Mr Shane Sumner, Regional Officer ATM, acted as the Secretary to the FIT-Asia/3 meetings.

3.2 Dr Paisit Herabat, Expert, Director Level (Aeronautical Radio of Thailand) chaired the FIT-Asia/3 meeting.

3.3 Due to the political situation in Thailand, Mr. Robert Butcher, Operational Analysis Manager, Safety and Assurance Group, Airservices Australia, was unable to chair the RASMAG/19 meeting, which was moderated by the Secretariat Mr. Len Wicks, Regional Officer, ATM, ICAO Asia and Pacific Office. However, Mr Butcher was able to join the meeting remotely using electronic means for a brief period during Wednesday 28 May 2014.

Opening of the Meeting

4.1 On behalf of Mr Arun Mishra, Regional Director of ICAO Asia and Pacific Office, Mr Shane Sumner and Mr. Len Wicks welcomed all participants.

4.2 Dr Paisit Herabat and Mr Robert Butcher welcomed participants to the respective meetings.

Documentation and Working Language

5.1 The working language of the meeting and the language for all documentation was English. 11 working papers (WPs) and 4 information paper (IPs) were presented to FIT-Asia/3, and 32 WPs and 7 IPs were presented to RASMAG/19. The list of papers and presentations is shown at **Appendix B** to this report.

Draft Conclusions, Draft Decisions and Decisions of RASMAG/FIT-Asia – Definition

6.1 RASMAG recorded its actions in the form of Draft Conclusions, Draft Decisions and Decisions within the following definitions:

a) **Draft Conclusions** deal with matters that, according to APANPIRG terms of reference, require the attention of States, or action by the ICAO in accordance with established procedures;

b) **Draft Decisions** deal with the matters of concern only to APANPIRG and its contributory bodies; and

c) **Decisions** of RASMAG or the FIT-Asia that relate solely to matters dealing with the internal working arrangements of the RASMAG or FIT-Asia.

List of Decisions and Draft Conclusions/Decisions

7.1 List of Draft Conclusions

Draft Conclusion RASMAG/19-1: Data Link Implementation Strategy Guidance

That, the Data Link Implementation Strategy Guidance material appended as **Appendix C** to this report be adopted as guidance material for States/Air Navigation Service Providers and made available on the ICAO Asia/Pacific Regional Office Website.

Draft Conclusion RASMAG/19-2: Contact Details for Airspace User Reporting of ADS-C/CPDLC Problems to ANSPs.

That, States are urged to provide, and promulgate in their AIP, a point of contact for airspace users to report Automatic Dependent Surveillance-Contract/Controller Pilot Data-link Communications (ADS-C/CPDLC) problems to the State/ANSP.

Draft Conclusion RASMAG 19/3: Submission of FPLs as Traffic Sample Data (TSD)

That, Asia/Pacific States that do not have an automated TSD generation capability are urged to consult with the appropriate Regional Monitoring Agency (RMA) and if agreed, submit their raw flight plan (FPL) messages to the appropriate RMA, instead of conventional TSDs.

Draft Conclusion RASMAG 19-4: Asia/Pacific AIDC Implementation Task Force

That, an ATS Inter-facility Data-link Communications (AIDC) Implementation Task Force be established that reports to the CNS/SG, to facilitate the urgent expedition of AIDC in the Asia/Pacific, focussed on the Bay of Bengal and South East Asia area.

Note: Terms of Reference for the Asia/Pacific AIDC Task Force (APATF) should be developed by the CNS/SG, in consultation with the ATM/SG.

Draft Conclusion RASMAG/19-5 – Flights in RVSM Airspace by non-approved State Aircraft

That, Asia/Pacific States are urged to ensure close cooperation between civilian and military authorities, so that all RVSM operational requirements are clearly understood and complied with by State aircraft.

FIT-Asia/3

REPORT ON AGENDA ITEMS – FIT-Asia/3

Agenda Item 1: Adoption of Agenda

1.1 The provisional agenda (WP01) was adopted by the meeting.

Agenda Item 2: Central Reporting Agency Report

CRA Website Status (WP07)

2.1 New Zealand provided an update on the status of the CRA problem reporting website.

2.2 In 2009 Airways New Zealand had created the Informal South Pacific ATS Coordination Group (ISPACG) CRA website to provide an on-line problem reporting capability that would improve stakeholders' ability to report FANS1/A (Future Air Navigation Systems) problems and facilitate continuous improvement of the system.

2.3 Stakeholders in FIT-Asia and the North Atlantic Region Data-Link Monitoring Agency (NAT-DLMA) were using the website in addition to the original ISPACG stakeholders. The website was in use by 54 Operators, 18 Civil Aviation Authority/Air Navigation Service Providers (CAA/ANSP), three Communication Service Providers (CSP), and six aircraft manufacturers.

2.4 Details were provided of an upgrade to the website, expected to be completed by July 2014 and including changes to reflect that it was used by CRA/DLM) from multiple regions.

FIT-Asia CRA Problem Report Briefing (IATA/Boeing CRA)

2.5 The FIT-Asia CRA provided a detailed presentation of data-link problem reports including Active, Open, Closed-as-dup and Closed status reports, for the periods January 1 to December 31 2013 and January 1 to May 21 2014.

2.6 The briefing included metrics on problem reports by status, Region, agency type and problem type, and a comparison of problem reports per year.

2.7 Notable among the reported problems were the numbers or reports relating to failure of automatic data link transfers at FIR boundaries, and the incorrect use of free text uplink messages.

2.8 The presentation provided relevant references from the Global Operational Data-link Document (GOLD), and urged states to utilize that document for guidance in the provision of data link services.

CPDLC Automatic Handoff Procedures (WP06)

2.9 The CRA and IATA provided an overview of GOLD procedures relevant to the many problem reports for the FIT-Asia region relating to automatic CPDLC handoff failures.

2.10 A detailed list of procedures enabling automatic handoff of CPDLC connections was provided in GOLD section 2.2.4.5. ANSPs should be familiar with the procedures and ensure automation and ATC standard operating procedures followed GOLD procedures.

2.11 The information provided included discussion of the responsibility, roles and actions of the Current Data Authority (CDA), Next Data Authority (NDA) and flight crews, including the sequence of events involved in the automatic handoff process (**Figure 1**).

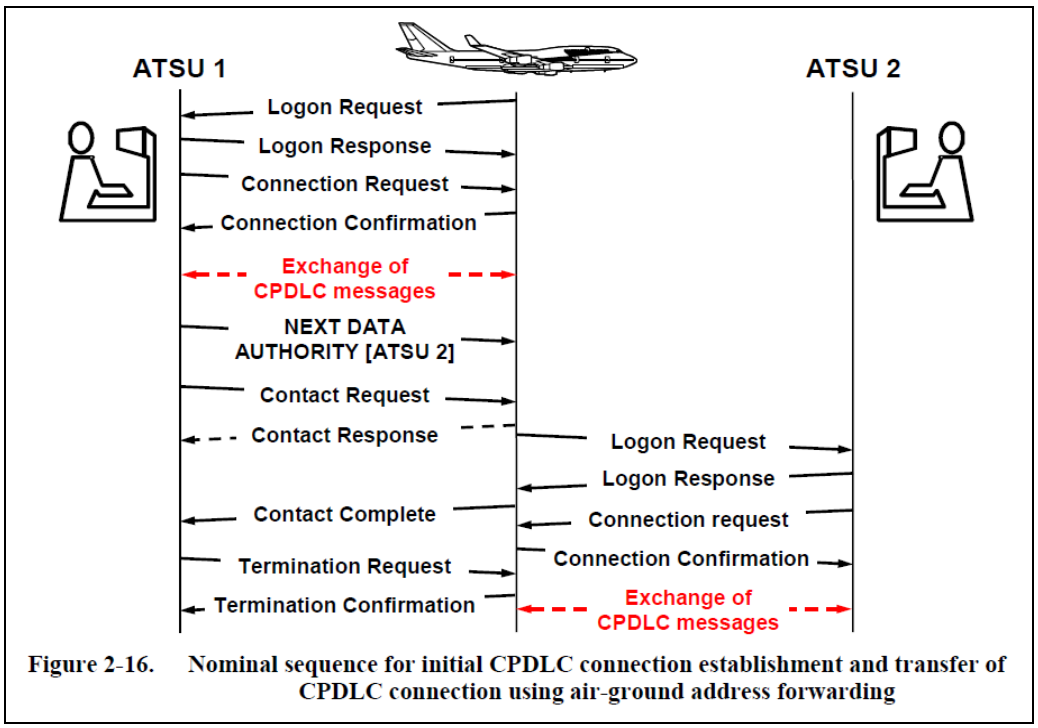

Figure 2-16. Nominal sequence for initial CPDLC connection establishment and transfer of CPDLC connection using air-ground address forwarding

Figure 1: GOLD Nominal Sequence for CPDLC Connection and Automatic Transfer

Problem Reports and CRA Arrangements (WP02)

2.12 The Secretariat presented follow-up information arising from FIT-Asia/2 relating to apparent deficiencies in data-link problem and performance reporting by FIT-Asia States/Administrations, and the associated lack of arrangements between Administrations and Competent Central Reporting Agencies for the technical analysis of data-link systems' performance.

2.13 The FIT-Asia Terms of Reference (TOR) required that it conducted a number of activities to support Fit-Asia States' compliance with Annex 11 – *Air Traffic Services* and the GOLD requirements for data-link performance. As at 1 week before the meeting only two FIT-Asia Administrations had registered with the FIT-Asia CRA.

2.14 Monitoring, analysis and reporting of data-link performance was essential for the achievement and maintenance of system performance required for the application of RNP based separations which, under the Asia/Pacific Seamless ATM Plan, States were expected to implement in upper airspace by November 2015. The Seamless Plan also identified Aviation System Block Upgrade (ASBU) module B0-TBO *En-route Data-Link* as Priority 1, *Critical Upgrade*.

2.15 The meeting was also reminded of the following Conclusion agreed by APANPIRG:

Conclusion 24/24: ADS/C and CPDLC Problem Reporting and Analysis

That, FIT-Asia States are requested to:

- *register on the FIT-Asia website (http://www.ispacg-cra.com), and report their registration to the ICAO Asia/Pacific Regional Office by 31 December 2013;*
- *report problems relating to Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data-Link Communications (CPDLC) services to the Central Reporting Agency (CRA) for analysis, utilizing the FIT-Asia website; and*
- *ensure the CRA analysis is reported to FIT-Asia.*

- **Table 1** provides a list of FIT-Asia Administrations with ADS-C/CPDLC known to be either implemented or planned, the expectations for ADS-C/CPDLC placed upon them under the Seamless ATM Plan (Category R airspace), and their FIT-Asia CRA registration status.

Administration	Data-Link Service Status	ADS/CPDLC Seamless ATM Expectation (Nov 2015)	FIT-Asia CRA Registration
China	Implemented	YES	YES
India	Implemented	YES	YES
Indonesia	Implemented	YES	
Malaysia	Implemented	YES	
Myanmar	Implemented	YES	
Maldives	Implemented	YES	
Philippines		YES	SEASMA*
Sri Lanka	Implemented	YES	
Singapore	Implemented		SEASMA*
Thailand	Implemented		
Viet Nam	Implemented		SEASMA*
** The South East Asia Safety Monitoring Agency (SEASMA) provides CRA service for Philippines, Singapore and Viet Nam. Philippines has not yet implemented data-link services. Singapore provides performance reports for the Singapore FIR to FIT-Asia. Current SEAMA CRA arrangements expire September 2015.*			

Table 1: CRA Registration

2.16 The meeting was informed that in the event that Administrations implement or have implemented data-link services without a competent CRA service and a robust program of post-implementation performance monitoring, the service does not comply with ICAO SARPS as defined in Annex 11. In these cases the service may be recorded as an APANPIRG Deficiency.

2.17 The meeting was reminded that GOLD Appendix D detailed performance data and data formats for post implementation monitoring, and guidance on how to obtain the required data points and the calculation of data-link system performance. GOLD was available through the ICAO Secure Portal and on the Asia/Pacific Regional Office website. The GOLD Performance Analysis Tool (G-PAT), used for the analysis of data collected in accordance with GOLD guidelines, was available through the ICAO GOLD secure website, or by direct enquiry to ISPACG. A template for ADS-C/CPDLC performance reporting was developed by FIT-Asia/2, and was also available on the ICAO Asia/Pacific Regional Office web-page.

2.18 It was pointed out to the meeting that registration on the FIT-Asia CRA website would provide benefits not only to States with implemented data link services, but also to those States planning implementation, as it would provide a valuable resource of knowledge and experience shared by other user States.

Agenda Item 3: Review of ADS/CPDLC Operations

FANS1/A Performance in Chennai FIR (WP03)

3.1 India presented the observed performance of the ADS/CPDLC data link within the Chennai Flight Information Region during a five month period from December 2013 to April 2014.

3.2 India had mandated that BOBASMA be the nodal point for conducting end-to-end safety and system performance monitoring of the four ATS data-link ground systems in Chennai, Mumbai, Delhi and Kolkata. The ATM systems at Mumbai, Delhi and Kolkata were being upgraded.

3.3 Data extracted from data-link system recordings for the months of December 2013 to April 2014 was used to measure FANS1/A system performance in the Chennai FIR against the Required Communication Performance (RCP) and Required Surveillance Performance (RSP) guidelines contained in the Global Operational Data-Link Document (GOLD). The GPAT tool version 3 was used.

3.4 **Table 2 and Figure 2** summarize the Actual Communications Performance (ACP) for CPDLC per media type (Satellite, VHF and combined). The 180 second transaction completion target (95% of transactions) was met in all three cases. System performance fell slightly below the 210 second transaction completion target of 99.9%.

VOMF FIR CPDLC ACP				
Messages		% >180 sec (Target 95%)	% >210 sec (Target 99.9%)	Remarks
SAT	12,689	99.27%	99.62%	
VHF	19,331	99.73%	99.82%	
All	32,020	99.54%	99.73%	

Table 2: Chennai FIR CPDLC ACP by Data-Link Media Type

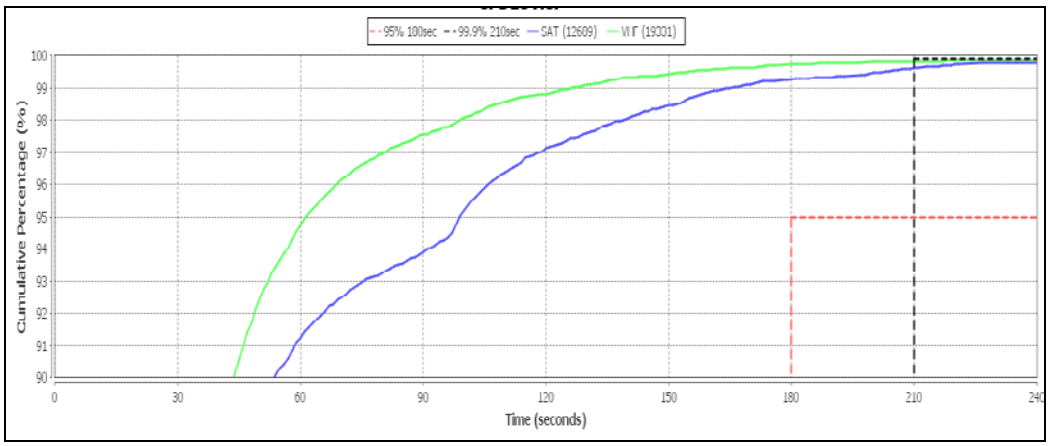

Figure 2: Chennai FIR CPCLC ACP by Data-Link Media Type

3.5 **Table 3** and **Figure 3** present ADS-C downlink latency per media type. Downlink latency performance met the RSP-180 criteria that 95 per cent of transactions be completed within 90 seconds, but fell below the requirement for 99.9 per cent of transactions to be completed within 180 seconds.

VOMF FIR ADS-C Downlink Latency				
Messages		% >90 sec (Target 95%)	% >180sec (Target 99.9%)	Remarks
SAT	84,848	97.02%	98.85%	
VHF	93,654	98.19%	99.42%	
All	178,502	97.63%	99.15%	

Table 3: Chennai FIR ADS-C Downlink Latency by Data-Link Media Type

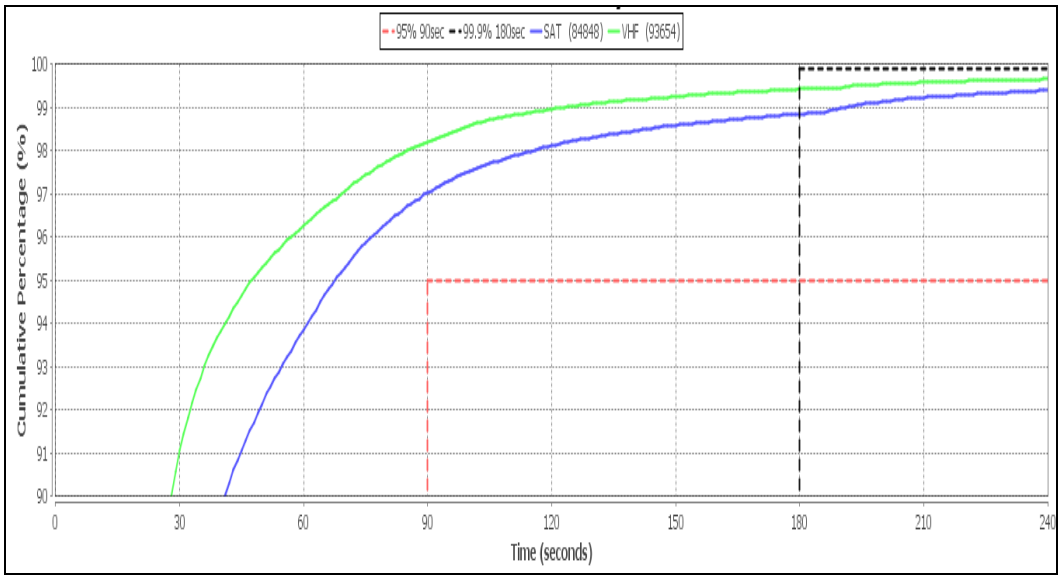

Figure 3: Chennai FIR ADS-C Downlink Latency by Data-Link Media Type

3.6 The meeting discussed the issue of performance reports, including those from other States reported during FIT-Asia/2 (Bangkok, Thailand, 28 – 29 March 2013) indicating that performance had fallen just short of the 99.9% standard. Further expert opinion would be sought relating to the operational implications of the 99.9% criteria, the possible causes of failure to meet it by only small margins, and solutions.

Use of FANS 1/A Capability to Implement 30 NM Longitudinal Separation (WP04)

3.7 India presented the proposal to implement 30NM longitudinal separation between FANS 1/A aircraft in the Bay of Bengal – Arabian Sea – Indian Ocean airspace, as the first step in the introduction of 30NM horizontal separation on four ATS routes.

3.8 The implementation safety assessment was conducted by the Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA). Implementation of 30 NM longitudinal separation was expected to commence from AIRAC date 24 July 2014.

3.9 **Table 4** shows the monthly traffic count on the four routes concerned, M300, N571, P570 and P574, based on the December 2013 traffic sample data.

Route	Monthly Traffic Count	Daily Average
M300	3360	108
N571	3907	126
P570	1394	45
P574	1766	57

Table 4: Monthly Traffic count based on December 2013 TSD

3.10 **Figure 4** shows the percentage of data-link capable aircraft on the four routes in the Mumbai and Chennai FIRs, and the percentage that actually logged on to data-link.

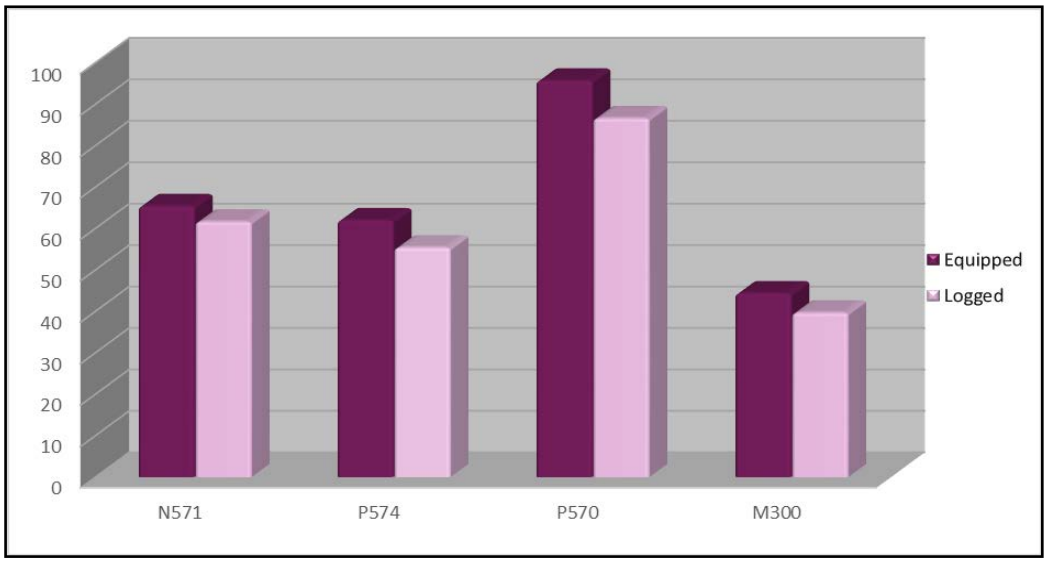

Figure 4: Data Link Equipped and Logged On Aircraft (Percentage)

3.11 The meeting discussed the limitations inherent in specifying 30NM separation on specific routes, rather than within an airspace volume. The meeting was also reminded that 30NM separation using ADS-C/CPDLC required aircraft to have the appropriate RNP approval.

China Investigation Airbus A380 FANS on L888 (WP08)

3.12 China presented the findings of the analysis of FANS operations problems on L888 reported by Airbus. The relevant AFTN and ACARS messages were collected and analysed, and the operational status of ADS-C/CPDLC workstations and ATC operations in Kunming (ZPPP), Chengdu (ZUUU), Lanzhou (ZLLL) and Urumqi (ZWWW) ATC centres were examined and reviewed.

3.13 The ADS-C/CPDLC system at Chengdu was integrated in the upgraded automation system since August 2013, while in the other centres it was stand-alone. For all four centres the correlation of AFN logon information with the flight plan information was not automatic, and needed controller actions.

3.14 Investigation of the issue of delay of confirmation of flight application found that the aircraft identification used for the flight did not match the identification approved and confirmed by CAAC before the flight was conducted. ATC had requested the pilot to change call-sign.

3.15 Analysis of the failure of automatic CPCLC transfer functions found that all connection processes had to be actioned manually. It was found that the ATC uplink messages were rejected due to an invalid flight number, and this was caused by a mismatch between the operator's ICAO 3 letter designator and that registered in the CSP's operator list. This mismatch resulted in the operator not being identified as a valid user and rejection of all data-link services.

3.16 Non-replies to CPDLC requests in the Kunming FIR were found to be due to the availability of VHF coverage and ATC preference for its use. ATMB was considering changes to AIP to add descriptions of ATC communications in this portion of the route.

3.17 Free text messages were used by ATC to ascertain the boundary estimate of the next second FIX, as this information was required for ATC coordination procedures but there was no standard uplink message. The four ATC centres concerned were notified that ATC use of free text messages should be avoided to promote standardized practices as recommended in GOLD.

Data Link Performance Report for L888 Route (WP09)

3.18 China has provided data link services on ATS route L888 in western China since 2001 the data link system comprised a variety of ground systems providing services to FANS 1/A aircraft.

3.19 Performance data from the ADS-C/CPDLC systems for the period February 2013 to March 2014 were measured against Required Communications Performance (RCP) 400 specification for the Kunming, Chengdu, Lanzhou and Urumqi FIRs.

3.20 **Table 5** and **Figure 5** summarize CPDLC Actual Communications Performance (ACP).

CPDLC ACP				
Messages		**%< 320 sec (Target 95%)**	**%< 370 sec (Target 99.9%)**	**Remarks**
Satellite	6899	100.00%	100.00%	-
VHF	3627	100.00%	100.00%	-
HF	10	100.00%	100.00%	-
Total	10536	100.00%	100.00%	-

Table 5: CPDLC ACP per Media Type of L888 route

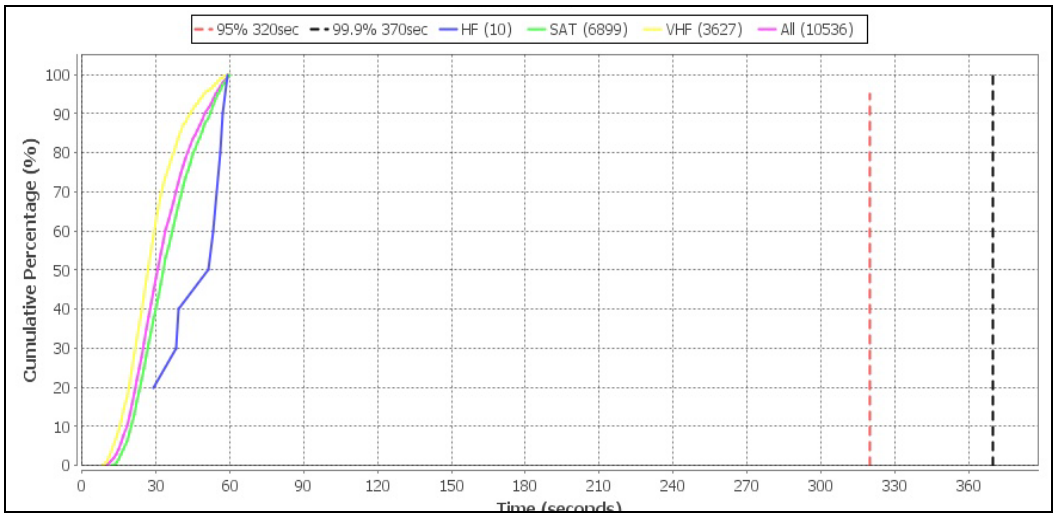

Figure 5: ACP by Data Link Media Type of L888 route

3.21 **Table 6** and **Figure 6** summarize ADS-C downlink latency measurement by media type

ADS-C Downlink Latency				
Messages		**% < 300 sec (Target 95%)**	**%< 400 sec (Target 99.9%)**	**Remarks**
Satellite	716687	99.59%	99.73%	-
VHF	233570	99.83%	99.90%	-
HF	3152	86.34%	90.51%	-
Total	953409	99.60%	99.74%	-

Table 6: ADS-C Downlink Latency per Media Type of L888 route

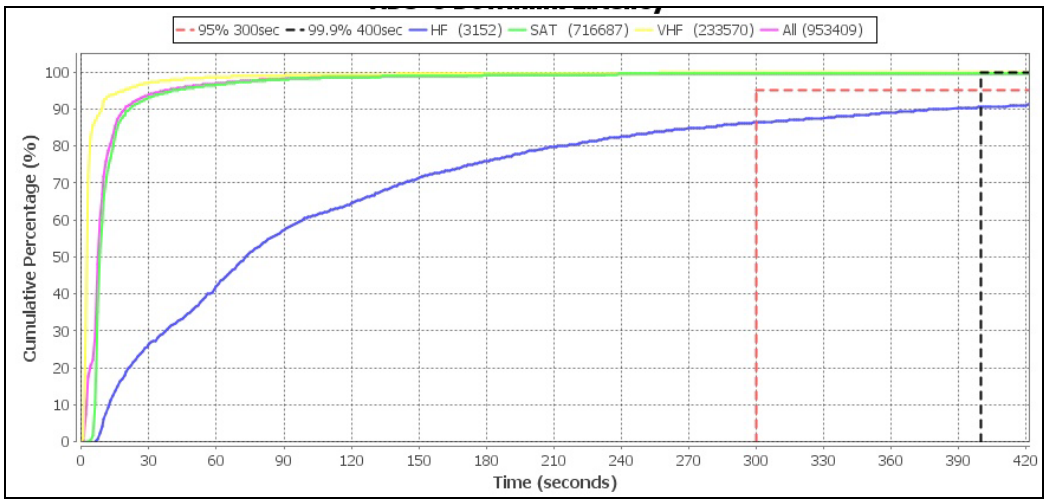

Figure 6: ADS-C Downlink Latency of L888 route

3.22 China advised there were some apparent issues in using the G-PAT tool, including data more than 12 months old being combined with data for month 1 of the sample period, and the apparent lack of a facility for de-identification of operator performance analyses. Expert advice would be sought on these issues. Minor corrections to the FIT-Asia performance reporting template would also be made as part of an overall editorial review.

Data Link Performance Report for Singapore FIR (IP03)

3.23 Singapore provided the data link performance analysis for the Singapore FIR for the period April 2013 to April 2014. Data was presented based on performance monitoring guidance from the FANS Operations Manual (FOM), which had been superseded by RCP and RSP system performance criteria in GOLD Appendix D. It was anticipated that performance reporting would transition to the format defined in GOLD in mid-2014. System availability measurement was based on outages reported by the CSP and outages observed by the Air Navigation Service Provider. Overall performance was similar to previous years.

3.24 For uplinks, the end-to-end round trip of 60 sec, the performance of 2 minutes of 95% of the messages and round trip time of 360 sec for 99% of the messages were achieved. The total reject rate remained below 0.1%. Investigations into the drop in uplink success rate from more than 99% to about 96% were in progress.

3.25 Singapore had offered the funding of provision of CRA services for the South East Asia region for 3 years in 2011, and this would end by September 2014. While Singapore would extend the funding for another year till September 2015, there should be a sustainable model in place for CRA funding in the near future. As the CRA expert was not in attendance at the meeting this matter could not be fully discussed.

Agenda Item 4: Data-Link Guidance Material

Implementation of New Functionality by an ATS Unit (IP/04)

4.1 Australia provided information discussing some of the issues for an ANSP to consider when implementing new functionality, such as data link, in their air traffic management system.

4.2 In the past the air traffic services community consisted of "islands", with little or no interconnectivity. The entire "island concept" had changed. In an environment with ever increasing automation, it was critical that the effect of changes in functionality, or even the implementation of new procedures, were carefully considered and properly coordinated with adjoining ATS Units

4.3 It was necessary to be aware that any automation system was only as good as the data used to drive the automation. To ensure interoperability between adjoining ATS units, it would be necessary to:

- make changes to data adaptation, which would take some time to determine and to implement;
- develop and promulgate procedures; and
- update Letters of Agreement

4.4 These actions required coordination with adjoining ATS Units in sufficient time to permit them to make any required changes to their own automation systems. It was also necessary to consider that many ATS Units only made data adaptation changes on AIRAC dates, the next one of which may be a month in the future.

4.5 For example, in the period leading up to the planned implementation of a data link system by an ATS Unit it could initially appear that such an implementation could be "contained" within the ATS Units' airspace. However, an adjoining ATS Unit would need to:

- Configure the parameters for the automated transmission of the NDA message;
  - The adjoining ATS Unit would need to know the ATS Unit's logon address. Many automated systems expect the logon address to be the same as the FIR name of the ATS unit;
- Configure the parameters for the automation of Address forwarding;
  - The adjoining ATS Unit would need to know the 7 character ACARS address of the ATS Unit; and
- Configure the parameters for the termination of the CPDLC connection

4.6 All of the above parameters needed to be discussed and agreed upon by the two ATS Units. This could only be accomplished if timely coordination was conducted.

4.7 There were many other issues to be considered. A suggested strategy for the implementation of data link was provided, and the meeting subsequently agreed to a draft Conclusion for RASMAG's consideration (paragraph 2.3, and **Appendix C**, RASMAG report).

Agenda Item 5: FIT-Asia Task List

Task List Actions 2/2, 2/5 and 2/6 (WP11)

5.1 IATA updated the meeting on the tasks assigned to it by FIT-Asia/2, relating to the active participation of airlines in the reporting of data-link problems, the safety implications of incorrect downlinking of BACK ON ROUTE messages, and the requirements for correct CPDLC logon and actions in the event of amendment to information in the original flight plan or logon rejection.

5.2 The meeting discussed the lack of points of contact for aircraft operators to report data link and other system problems directly to the ANSP, and the benefits of putting such arrangements in place rather than depending on possibly unexpected third-party contact a considerable time after the occurrence. The meeting agreed to a Draft Conclusion for RASMAG's consideration (paragraph 2.4, RASMAG report).

FIT-Asia Task List (WP/10)

5.3 The meeting reviewed the task list, closing 5 tasks and raising 5 new tasks. 2 outstanding tasks remained open. The task list as updated by the meeting is provided at **Appendix D** to this report.

Agenda Item 6: Any Other Business

Regional Supplementary Procedures Supporting ADS-C/CPDLC Mandates (WP05)

6.1 The Secretariat presented a Proposal for Amendment (PfA) to Regional Supplementary Procedures (ICAO Doc 7030) to support State mandates for ADS-C and CPDLC equipage in aircraft operating outside territorial airspace, within the area of responsibility of the State.

6.2 The ICAO Regional Supplementary Procedures (SUPPS) formed the procedural part of the Air Navigation Plans developed by Regional Air Navigation (RAN) Meetings to meet those needs of specific areas which are not covered in either the Annexes to the Convention on Civil Aviation or the Procedures for Air Navigation Services (PANS). The RAN Meeting function for the Asia/Pacific Region is carried out by the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG).

6.3 APANPIRG had adopted Conclusions supporting mandates for the carriage and use of ADS-C and CPDLC equipment within portions of airspace within their area of responsibility, and priority for access to such airspace.

6.4 PfA had been drafted by the ICAO Asia/Pacific Regional Office relating to mandates for CPDLC (Serial No. APAC-S 14/07), and for ADS-B, ADS-C, ACAS II and Mode S SSR transponders (14/09), to provide a framework for Asia/Pacific States to establish performance-based airspace by enabling States to promulgate equipage mandates in airspace over the High Seas. A parallel PfA relating to Performance-Based Navigation (PBN) had also been drafted.

6.5 The proposed amendments were in accordance with the concept of Seamless ATM and performance-based approaches, the Aviation System Block Upgrade (ASBU) initiative and Global Air Traffic Management Operational Concept (ICAO Doc 9854).

6.6 ADS-C related excerpts from PfA 14/09 are provided at Appendix E to this report, and PfA 14/07 (CPDLC) is provided at Appendix F. Following endorsement by APANPIRG/25 through the ATM/SG, the PfAs would be circulated to the States for comments and submitted for Council approval. The meeting noted the PfAs, and did not suggest any modification or amendment.

Identifying and Validating Competent CRA (IP02)

6.7 The FIT-Asia Task List included at item 2/2 a task for the investigation of the issue of identifying and validating competent CRAs.

6.8 The *Guidance Material for End-to-End Safety and Performance Monitoring of Air Traffic Service (ATS) Data Link Systems in the Asia Pacific Region (Version 4.0 – February 2011)* was available on the ICAO Asia/Pacific Regional Office website at:

http://www.icao.int/APAC/Documents/edocs/GuidanceMaterial_EndToEnd_ver4.pdf

6.9 The guidance material provided information on the establishment and operation of an implementation/interoperability team and CRA including roles, terms of reference, functions and resource requirements.

Agenda Item 7: Date and Venue of the Next Meeting

7.1 The next FIT-Asia meeting would be held at a time and venue to be advised.

Closing of the Meeting

8.1 In closing the Meeting, the Chairman thanked delegates for their support and contributions for the duration of the meeting.

RASMAG/19

REPORT ON AGENDA ITEMS – RASMAG/19

Agenda Item 1: Adoption of Agenda

1.1 The provisional agenda (WP01) was adopted by the meeting.

Agenda Item 2: Review Outcomes of Related Meetings

Relevant Meeting Outcomes (WP02)

2.1 The Secretariat provided briefings on the outcomes of relevant meetings, including the:

a) First Meeting of the APANPIRG Air Traffic Management Sub-Group (ATM/SG/1) was held at Bangkok from 20 to 24 May 2013;

b) Fourth Meeting of the ICAO Asia/Pacific Seamless Air Traffic Management (ATM) Planning Group (APSAPG/4) was held at Hong Kong, China from 03 to 07 June 2013;

c) Twenty Fourth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/24) was at Bangkok from 24 to 26 June 2013.

d) 50th Conference of Directors General of Civil Aviation (DGCAs), Asia and Pacific Regions was held at Bangkok from 1 to 4 July 2013;

e) Europe – Asia Trans-regional Special Coordination Meeting was held at Beijing, China from 23 to 25 September 2013;

f) Ninth Meeting of the South East Asia and Bay of Bengal Sub-Regional ADS-B Implementation Working Group (SEA/BOB ADS-B WG/9) was held in Beijing, China, from 30 October to 1 November 2013;

g) combined Fourth Meeting of the South Asia/Indian Ocean ATM Coordination Group (SAIOACG/4) and Twenty-First Meeting of the South-East Asia ATM Coordination Group (SEACG/21) was held at Hong Kong, China from 24 to 28 February 2014; and

h) Thirteenth Meeting of the Automatic Dependent Surveillance – Broadcast (ADS-B) Study and Implementation Task Force (ADS-B SITF/13) was held in Hong Kong, China, from 22 to 25 April 2014.

FIT/Asia/3

2.2 A FIT-Asia/2 meeting report was provided to RASMAG/19 in Flimsy 1.

2.3 Regarding the material intended to guide implementation of data link systems provided by Australia in FIT-Asia/3/IP04, the RASMAG/19 meeting agreed to the following Draft Conclusion developed by FIT-Asia/3 for APANPIRG's consideration:

Draft Conclusion RASMAG/19-1: Data Link Implementation Strategy Guidance

That, the Data Link Implementation Strategy Guidance material appended as **Appendix C** to this report be adopted as guidance material for States/Air Navigation Service Providers and made available on the ICAO Asia/Pacific Regional Office Website.

2.4 RASMAG/19 discussed the issue of lack of points of contact for aircraft operators to report data link and other system problems directly to the ANSP (FIT-Asia/3/WP11). The RASMAG/19 meeting agreed to the following Draft Conclusion developed by FIT-Asia/3 for APANPIRG's consideration:

Draft Conclusion RASMAG/19-2: Contact Details for Airspace User Reporting of ADS-C/CPDLC Problems to ANSPs.

That, States are urged to provide, and promulgate in their AIP, a point of contact for airspace users to report Automatic Dependent Surveillance-Contract/Controller Pilot Data-link Communications (ADS-C/CPDLC) problems to the State/Air Navigation Service Provider (ANSP).

RASMAG/MAWG/1 Meeting (IP06)

2.5 The First Meeting of the Regional Airspace Safety Monitoring Advisory Group Monitoring Agency Working Group (RASMAG/MAWG/1) was held at Honolulu, Hawaii, USA, from 2 – 6 December 2013. Work undertaken at the MAWG/1 included:

a) a detailed review of horizontal collision risk methodologies with agreement that the En-Route Monitoring Agencies (EMAs) would work to standardize on the Hsu model;

b) a review of progress on work being undertaken within the ICAO Separation and Airspace Safety Panel (SASP) to globalise the Asia/Pacific Enroute Monitoring Agency Manual;

c) undertaking a detailed review of altimetry system error (ASE) results from ADS-B monitoring systems, and from Aircraft Geometric Height Measurement Element (AGHME) and Height Monitoring Unit (HMU) in the United States and Japan;

d) discussing the impact of Strategic Lateral Offset Procedures (SLOP) and their impact on the risk in Reduced Vertical Separation Minimum (RVSM) airspace;

e) reviewing identified operations by non-approved aircraft as RVSM-approved and developed a clear process by which Regional Monitoring Agencies (RMAs) would identify and attempt to resolve these issues;

f) updating the latest safety assessment reports provided by monitoring agencies; and

g) agreeing on a standardized and revised reporting template for monitoring agencies.

Agenda Item 3: Reports from Asia/Pacific RMAs and EMAs

AAMA Safety Report (WP03)

3.1 Australia presented the results of (RVSM safety assessments undertaken by the Australian Airspace Monitoring Agency (AAMA) for the twelve month period ending 31 December 2013.

3.2 The report showed that for the Australian (Brisbane, Melbourne), Nauru, Papua New Guinea (PNG, Port Moresby) and Solomon Islands (Honiara) Flight Information Regions (FIRs), the Target Level of Safety (TLS) was met with a risk assessment of **3.43 x 10^{-9}** (, 5.0 x 10^{-9}). **Figure 7** presents the collision risk estimate trends for Australian, Nauru, PNG and Solomon Islands Airspace.

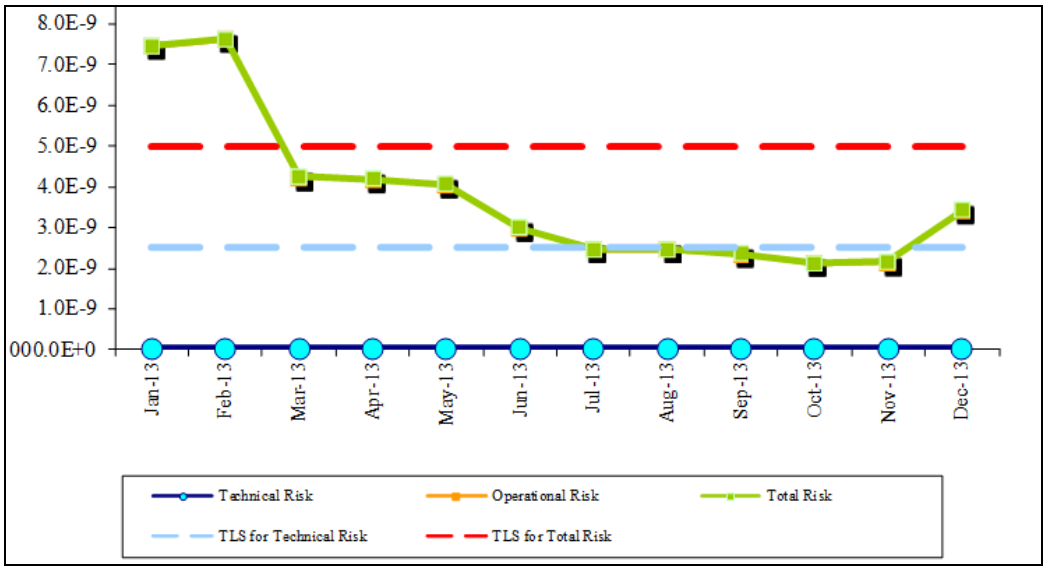

Figure 7: Australian, Nauru, PNG and Solomon Islands Airspace Risk Estimate Trends

3.3 The report showed that for Indonesian airspace, the TLS was met for the reporting period with the assessed risk calculated as **3.82 x 10^{-9}**. **Figure 8** presents collision risk estimate trends during the period from 01 January 2013 to 31 December 2013.

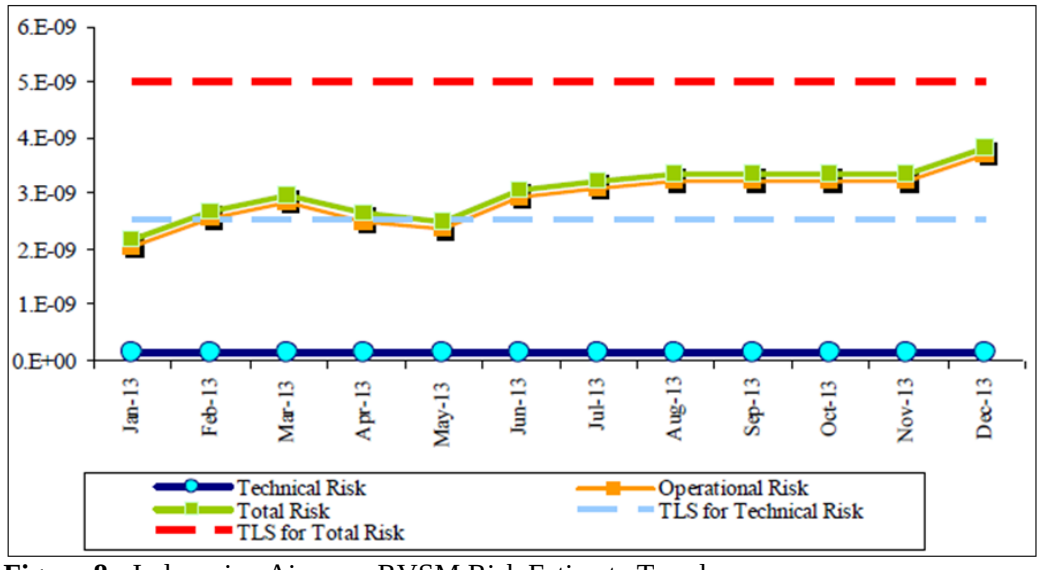

Figure 8: Indonesian Airspace RVSM Risk Estimate Trends

3.4 Although the Indonesian risk estimate remained below TLS, the analysis by AAMA showed that many of the Large Height Deviation (LHD) occurrences were located in a single geographic location at the boundary between the Jakarta and Ujung Pandang FIRs near Surabaya. Further analysis by the AAMA indicated the primary origin of these incidents was Jakarta Area Control Centre (ACC).

China RMA Safety Report (WP04)

3.5 China presented the results of the airspace safety oversight for the RVSM operation in the airspace of Chinese FIRs and the Pyongyang FIR (Democratic Republic of Korea – DPRK) from 01 January 2013 until 31 December 2013.

3.6 The estimates of technical and total risks for the airspace of Chinese FIRs satisfied the agreed TLS value of no more than 2.5 x 10^{-9} and 5.0 x 10^{-9} fatal accidents per flight hour, with an overall risk estimate of **2.99 x 10^{-9}**. **Figure 9** presents collision risk estimate trends for the Chinese FIRs.

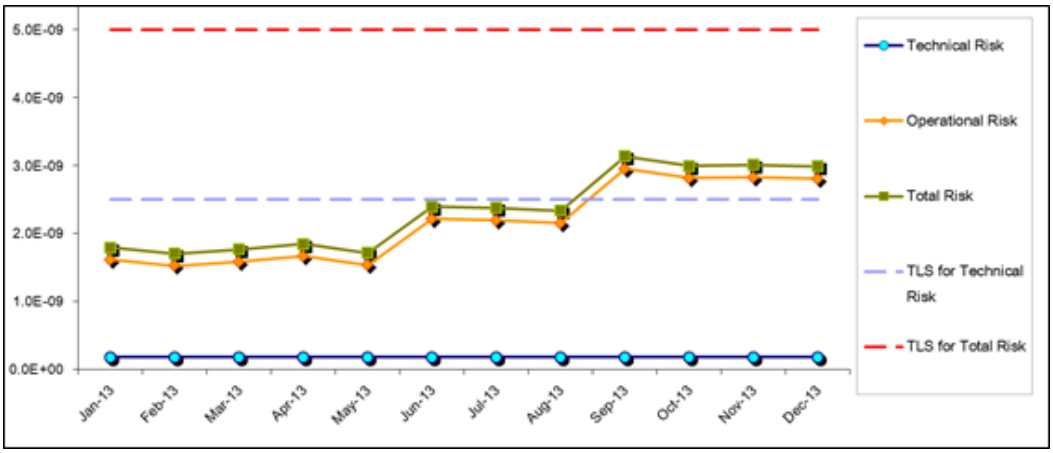

Figure 9: Airspace of Chinese FIRs RVSM Risk Estimate Trends

3.7 China RMA noted the continued problems they had experienced with the interface between Urumqi and Lahore (Pakistan) FIRs. They stated that China had proposed enhancements to communications and ATS surveillance near the border, but had encountered difficulties in establishing the facilities, which might best be sited in Pakistan (but this posed questions regarding ownership and maintenance). China again requested ICAO to work with Pakistan to resolve the problem, as they were concerned about the safety risks at the PURPA crossing point. The Secretariat informed the meeting that there was an outstanding task regarding the need for a Special Coordination Meeting between Pakistan and China to address this high risk situation.

3.8 Based on the data from the DPRK, no LHD had occurred during 2013 within the Pyongyang FIR. Considering the long-term nil LHD reports, to make a conservative estimate for the operational risk, China RMA used the operational risk value of Chinese FIRs, and the technical risk was calculated from the Traffic Sample Data (TSD) data collected in December 2013 from the Pyongyang FIR.

3.9 The estimate of the overall vertical collision risk for the Pyongyang FIR was **1.58 x 10^{-9}** fatal accidents per flight hour, which satisfied the globally agreed TLS value of 5 x 10^{-9} fatal accidents per flight hour. **Figure 10** presents collision risk estimate trends for DPRK airspace.

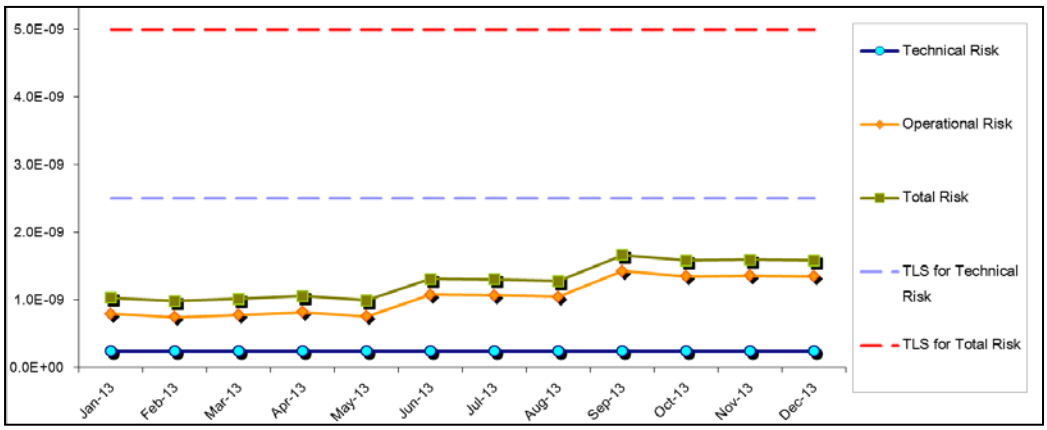

Figure 10: DPRK Airspace RVSM Risk Estimate Trends

JASMA Vertical Safety Report (WP05)

3.10 Japan presented the results of the airspace safety assessment of the Fukuoka FIR by the Japan Airspace Safety Monitoring Agency (JASMA) for the period from 01 January 2013 to 31 December 2013. The report shows that for the Fukuoka FIR, the target level of safety (TLS) was met for the reporting period with the assessed risk calculated as **3.66×10^{-9}**. **Figure 11** presents collision risk estimate trends during the period from 1 January 2013 to 31 December 2013.

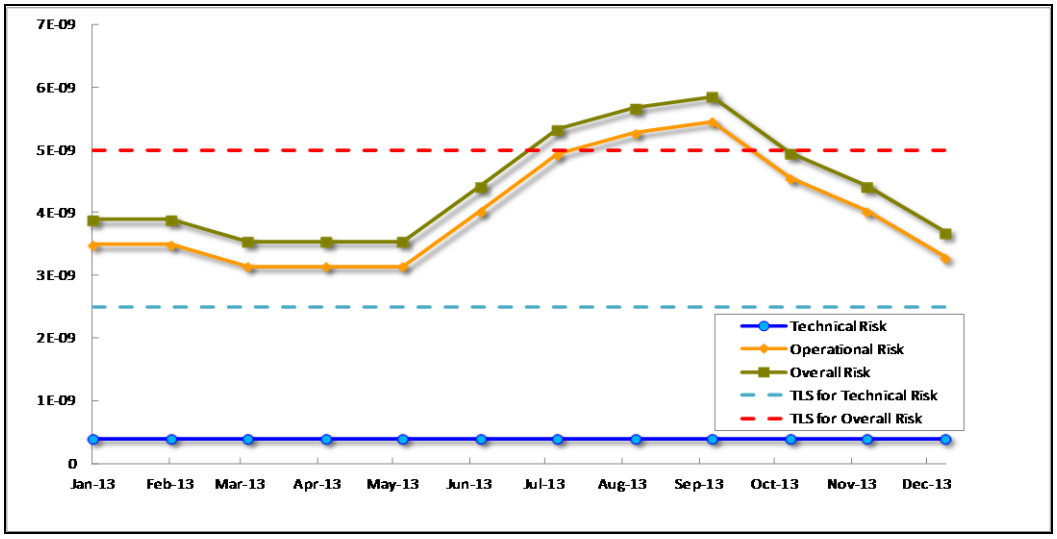

Figure 11: Fukuoka FIR RVSM Risk Estimate Trends

3.11 JASMA received fifteen transfer error reports from MAAR that occurred within the Taibei and Manila FIR. JASMA shared these error reports with the ATC facilities concerned, and determined that the causes for the Taibei incidents were a short flight leg and wind data not being updated, and late AIDC messages being sent.

MAAR Safety Report (WP06)

3.12 The Monitoring Agency for Asia Region (MAAR) provided the results of the airspace safety oversight for the RVSM operation in the Bay of Bengal (BOB), Western Pacific/South China Sea (WPAC/SCS), and Mongolian airspace for the period from 01 January 2013 until 31 December 2013. For this assessed period, Kuala Lumpur did not submit a TSD, and the Lao PDR did not submit an LHD report for the month of December.

3.13 MAAR stated that they had encountered a number of problems with the December 2013 TSD, including very late submission, TSD template not being followed, and TSD containing numerous errors and typos. The main cause of this problem seemed to be because many States still relied heavily on manual processing of their TSDs.

3.14 As a result, MAAR wanted to encourage States that did not have an automated TSD generation capability to submit their raw FPL messages instead of the conventional-format TSDs. MAAR noted that they were currently using this approach with Manila, Male, and Dhaka FIRs, which had proven very successful since it greatly reduced the resources required to prepare the TSDs for States. In this connection, MAAR proposed a Draft Conclusion as follows which was agreed by RASMAG/19 for consideration by APANPIRG:

RASMAG Draft Conclusion 19/3: Submission of FPLs as Traffic Sample Data (TSD)

That, Asia/Pacific States that do not have an automated TSD generation capability are urged to consult with the appropriate Regional Monitoring Agency (RMA) and if agreed, submit their raw flight plan (FPL) messages to the appropriate RMA, instead of conventional TSDs.

3.15 The BOB RVSM airspace overall risk was estimated to be **13.47 x 10^{-9}**, which did not meet the TLS. **Figure 12** presents collision risk estimate trends during the period from January 2013 to December 2013.

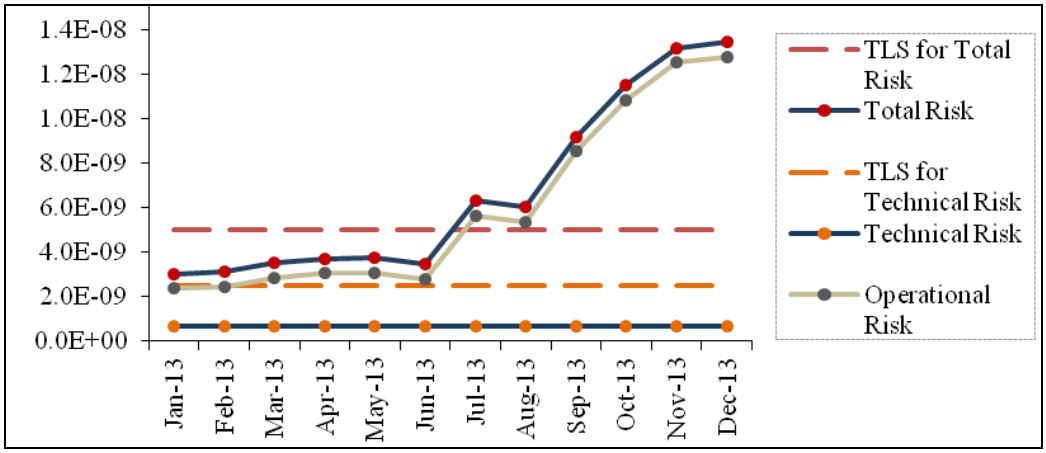

Figure 12: BOB Airspace RVSM Risk Estimate Trends

3.16 The meeting noted that the large increase in Category E reports from July 2013 were largely as a result of efforts by India to sensitize controllers as to the importance of reporting; thus the risk levels have not increased dramatically but are now reflecting the true risk in the airspace concerned. **Figure 13** provides the 12-month cumulative operational risk by LHD category for BOB airspace from January 2013 to December 2013 showing Category E LHDs as the main contributor to the total operational risk.

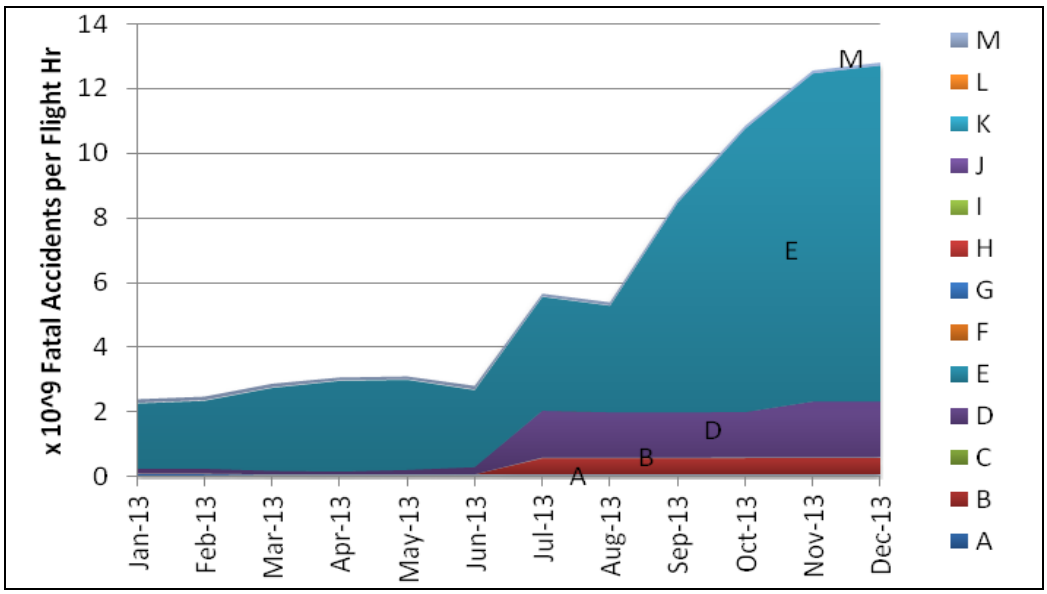

Figure 13: Trends of Operational Risk by LHD Category for BOB Airspace

3.17 MAAR noted that the hot spots were Transfer of Control (ToC) points between Indian FIRs and Myanmar and Malaysian FIRs. There were 15 occurrences (totalling 152 minutes) that the transferring ACC investigated and claimed that they already sent the transfer messages and the necessary time or flight level revisions. For some occurrences, the aircraft did not change flight levels and stayed at the transferred flight levels throughout the FIR. Moreover, they noted that deficiencies in communication and surveillance services (**Figure 14**) may also be a factor that contributed to the duration of LHDs (see Figure 14 regarding Very High Frequency (VHF) communications and Secondary Surveillance Radar (SSR) and WP24).

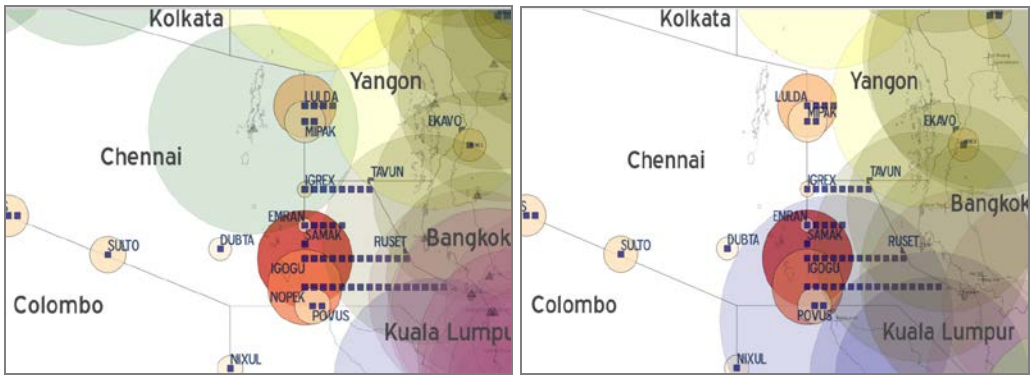

Figure 14: VHF and SSR coverage, BOB Hot Spot Analysis

3.18 MAAR noted the distinctive group of LHDs prevalent in the Kabul FIR. Since the Kabul FIR had military level restrictions, most LHDs involved a neighbouring ACC (Samarkand, Uzbekistan, at position AMDAR) releasing aircraft at flight levels that were not allowed as specified in the Air Traffic Service (ATS) Letter of Agreement (LOA).

3.19 MAAR provided the meeting with a number of recommendations regarding operational risk mitigation measures, including ATC-to-ATC communication, ATS surveillance, ADS-C/CPDLC, reporting procedures for flight crews prior to entering FIRs, and ATC automation systems, especially in the areas of the human-machine interface and electronic flight progress strips. The meeting acknowledged the excellent analysis work by MAAR, noting that the recommendations were consistent with the Seamless ATM Plan, except that early reporting before entry to FIRs may be problematic. IATA particularly thanked MAAR for its proactive work and coordination with airlines.

3.20 MAAR noted that there were coordination problems between India and Myanmar, which resulted in the receiving controller not acknowledging the same information provided by the transferring controller. The meeting noted that this could be due to English proficiency, but MAAR would investigate further to clarify. These incidents could be investigated during a Special Coordination Meeting (SCM) between the States concerned.

3.21 Malaysia stated that they had tested AIDC with India but needed to integrate it into their ATM system, which had an embargo on changes until mid-2014 after the Kuala Lumpur third runway project had been completed. India stated that they were ready to operationalise AIDC with Malaysia. Viet Nam also informed the meeting that they had tested AIDC with Singapore and both sides would put AIDC into operation in the third or fourth quarter of 2014.

3.22 The WPAC/SCS RVSM airspace total risk was estimated to be **5.22 x 10^{-9}**. **Figure 15** presents collision risk estimate trends during the period from January 2013 to December 2013.

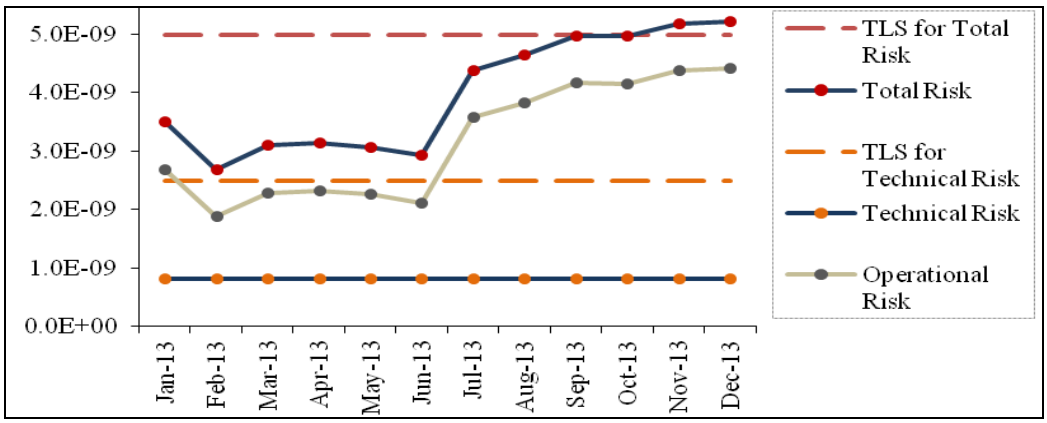

Figure 15: WPAC/SCS Airspace RVSM Risk Estimate Trends

3.23 MAAR noted that the main hot spots within WPAC/SCS airspace were at the ToC point between the Philippines and Hong Kong China, Viet Nam (Hanoi FIR) and Singapore (see WP24). MAAR stated that Category E and M LHDs were the main contributor to the total operational risk. The sudden increase in operational risk in July 2013 was due to a single Category M LHD of 77 minutes duration. This event accounted for 1.55 x 10^{-9} Fatal Accidents per Flight Hour (FAPFH). Without this event, the total risk would have been 3.67 x 10^{-9} FAPFH. MAAR also informed the meeting that the Civil Aviation Authority of Singapore (CAAS) had already investigated the event and had taken action to prevent reoccurrences.

3.24 The Mongolian RVSM airspace total risk was estimated at **7.63 x 10^{-9}**, which did not meet the TLS. **Figure 16** presented collision risk estimate trends from January 2013 to December 2013.

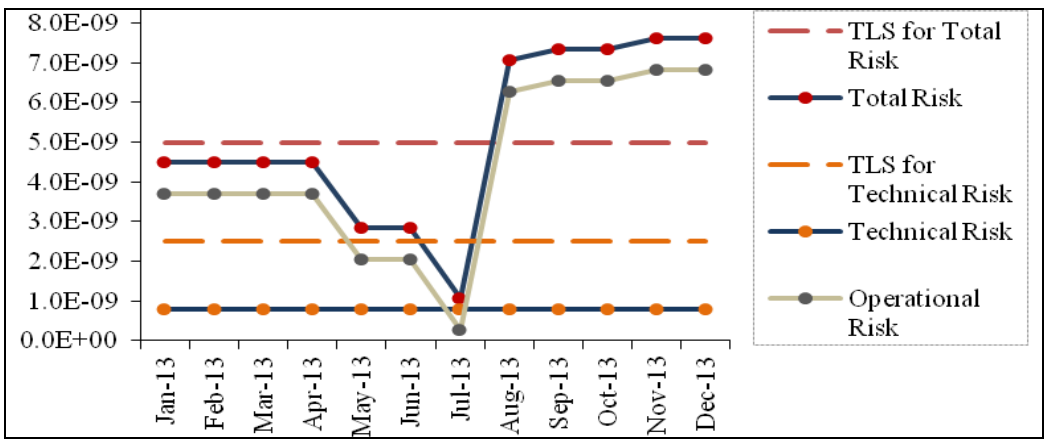

Figure 16: Mongolian Airspace RVSM Risk Estimate Trends

3.25 MAAR observed that the main hot spot within Mongolian airspace was the southwest boundary of the Ulaanbaatar FIR with the Beijing FIR at positions NIXAL and INTIK, where the main risk-bearing event of 14 minutes' duration occurred. China observed that this event had not been reported by Beijing Area Control Centre (ACC) so they would make enquiries as to the process followed in this instance.

PARMO Vertical Safety Report (WP07)

3.26 The Pacific Approvals Registry and Monitoring Organization (PARMO) presented a safety assessment of RVSM in portions of Pacific and North East Asia (Republic of Korea - ROK) airspace for the most recent reporting period of 01 January to 31 December 2013.

3.27 Pacific airspace total risk was estimated to be **8.05 x 10^{-9}**. **Figure 17** presents collision risk estimate trends during the period from 01 January 2013 to 31 December 2013.

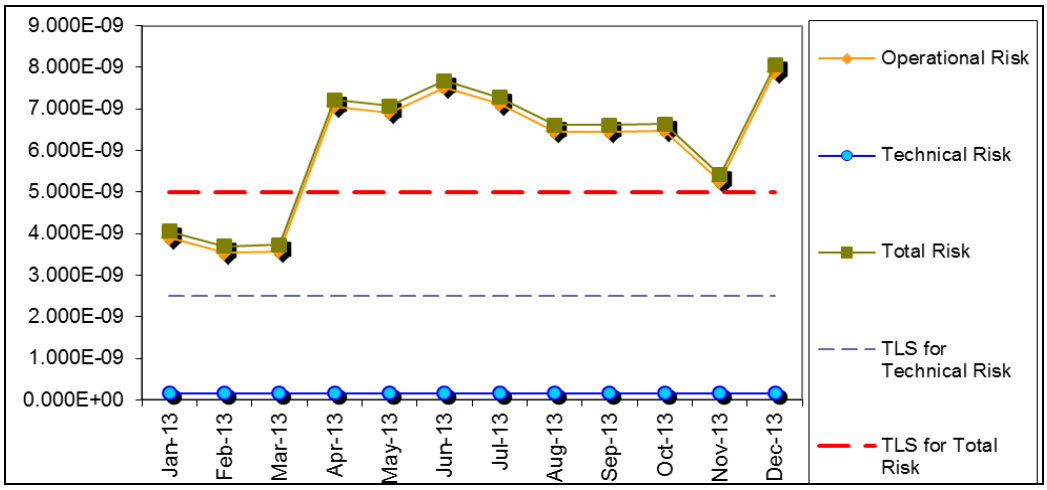

Figure 17: Pacific Airspace RVSM Risk Estimate Trends

3.28 The vertical collision risk estimate within Pacific airspace did not meet the TLS primarily due to the occurrence of two long duration events. One LHD event with a duration of 110 minutes was caused by an ATC loop error. In this case, the updated clearance information was not received by the aircraft, but was manually updated in the ATC automation system. The aircraft operated within the airspace at the incorrect flight level until it was transferred to the adjacent facility when the event was discovered. Another event had a duration of 55 minutes. In this case, communication between ATC and the aircraft was lost. The pilot did not adhere to the published lost communication procedures.

3.29 The Incheon FIR RVSM total risk was estimated to be **0.60 x 10^{-9}**. **Figure 18** presents collision risk estimate trends during the period from 01 January 2013 to 31 December 2013.

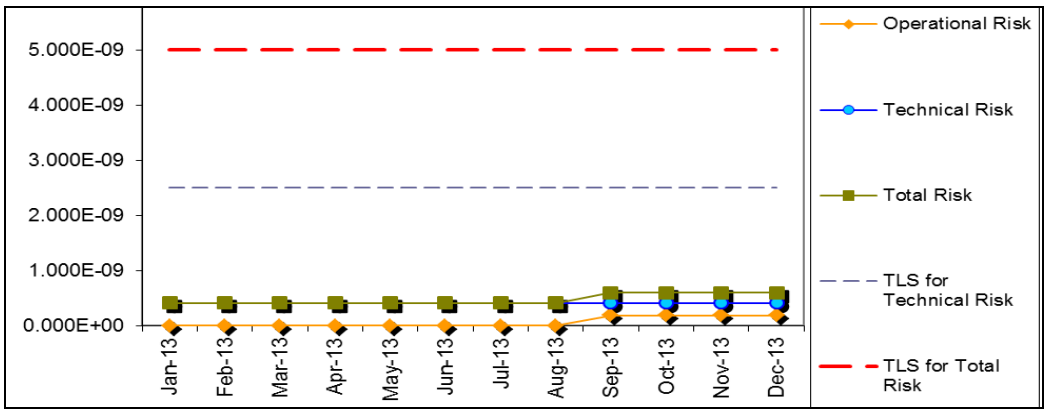

Figure 18: ROK Airspace RVSM Risk Estimate Trends

PARMO Horizontal Safety Report (WP08)

3.30 The USA presented the horizontal safety monitoring report for the Anchorage and Oakland FIRs for the period from 01 January until 31 December 2013. The report contained a summary of Large Longitudinal Errors (LLE) and Large Lateral Deviations (LLD) received by the PARMO.

3.31 The Anchorage and Oakland oceanic airspace horizontal risk estimates all comfortably met the 5.0 x 10^{-9} TLS with lateral risk estimated at **0.97 x 10^{-9}** (50NM) and **0.26 x 10^{-9}** (30NM) and longitudinal risk at **2.32 x 10^{-9}** (50NM) and **3.74 x 10^{-9}** (30NM). A summary of risk estimates for all EMAs is at WP24. **Figure 19** presents the lateral and longitudinal collision risk estimate trends for the Anchorage and Oakland oceanic airspace during the period 1 January 2013 to 31 December 2013.

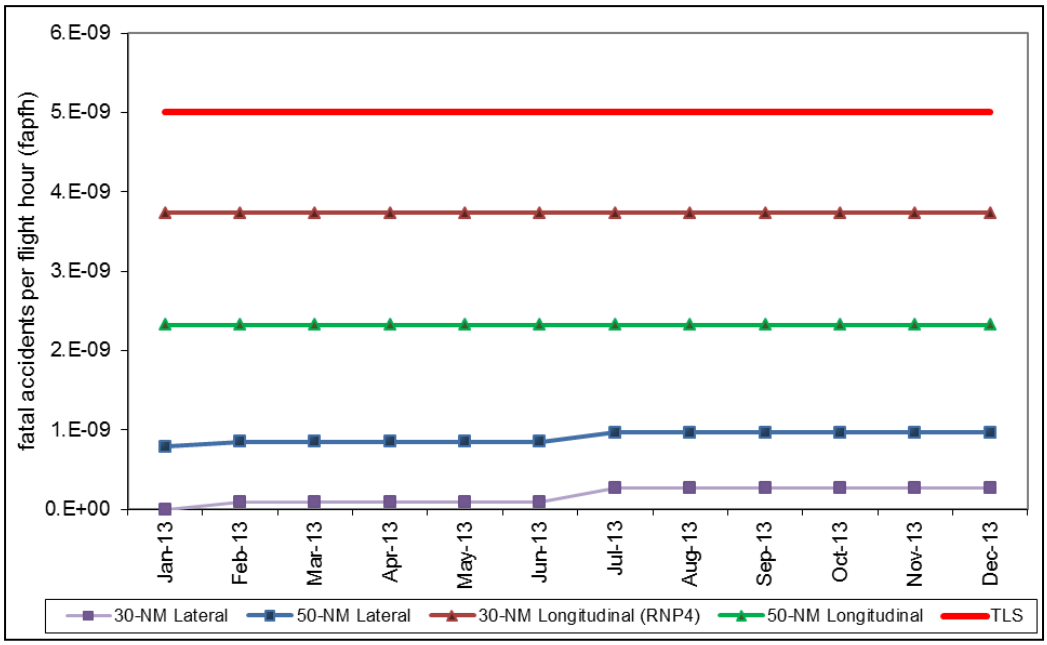

Figure 19: Anchorage and Oakland Oceanic Airspace Horizontal Risk Estimates

3.32 In November 2013, the USA initiated a pro-active safety management process to identify aircraft operations that had not provided ATC with an updated forward position estimate within the Oakland FIR. The goal of this activity is to reduce time errors which will help to improve airspace safety. During the first month of the automated tracking, 109 time error events were identified and reported as having not provided an updated forward estimate of position. Most, if not all, of these events involved operations using HF radio for communication and are not eligible for the reduced longitudinal separation minima. Therefore, these reports are not incorporated into the PARMO collision risk estimates for reduced longitudinal separation. As a result of this activity, noticeable improvement had been observed with a few operators. New procedures were initiated which include HF radio read-backs. The Federal Aviation Administration (FAA) was now collecting data resulting from this new process.

BOBASMA Safety Report (WP09)

3.33 India presented the horizontal safety monitoring report of the Bay of Bengal Arabian Sea Monitoring Agency (BOBASMA) for the period 01 January 2013 to 31 December 2013. The results of the safety assessment confirmed that the TLS was satisfied in the airspace concerned at **0.76 x 10^{-9}** (lateral) and **4.02 x 10^{-9}** (longitudinal).

JASMA Horizontal Safety Report (WP10)

3.34 Japan provided the results of the horizontal airspace safety assessment by JASMA of the time-based longitudinal, distance-based longitudinal and lateral collision risk in the North Pacific (NOPAC) route system within the Fukuoka FIR. The calculation yielded an overall safety estimate result of **0.000006 x 10^{-9}** (50 NM lateral) and **0.13 x 10^{-9}** (30 NM longitudinal), which achieved TLS. However JASMA highlighted their concern about the operational risk caused by LLD, noting that there were only three LLD reports, which were flight crew errors categorized as A, B and C according to the EMA HANDBOOK classification of navigation errors.

SEASMA Safety Report (WP11)

3.35 Singapore provided the horizontal safety assessment report from the South East Asia Safety Monitoring Agency (SEASMA) for operations on the six major ATS routes within the SCS from 01 January 2013 until 31 December 2013. The assessment concluded that the TLS was conservatively satisfied for the lateral (**0.055 x 10^{-9}**) and longitudinal (**1.18 x 10^{-9}**) separation standards.

Agenda Item 4: Airspace Safety Monitoring Documentation and Regional Guidance Material

Category E Large Height Deviation Illustration (WP12)

4.1 While undertaking safety assessment activities, MAAR found some disparities in the number of Category E LHD reports from States in the regions. In order to resolve the inconsistencies, MAAR created an illustration to promote a common understanding of such LHD, and presented it to the RASMAG/MAWG/1. The discussion in MAWG/1 was for a poster to be developed that could be distributed to States that clearly identified the process for reporting a Cat E LHD. MAAR incorporated the suggestions from the MAWG/1 meeting and reformatted the illustration into a poster suitable for distribution by RMAs and possibly to be included in the RMA Manual (**Figure 20**).

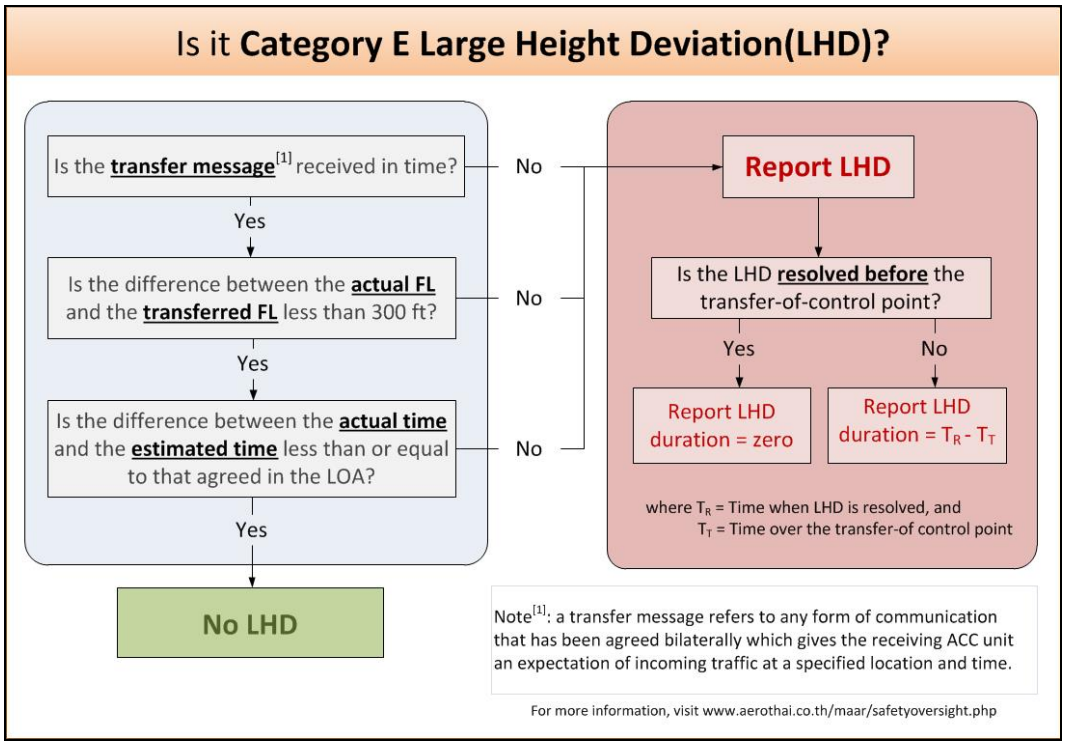

Figure 20: Category E LHD Illustration

4.2 RASMAG/19 discussed the illustration and agreed that there was merit in providing an image to clarify what an LHD was. However, the United States noted that the introduction of a longitudinal element in terms of the difference between actual time and the estimated time created the potential for confusion, particularly with LLE. Moreover, some of the text in the illustration could be improved. This was discussed with the RASMAG Chair off-line, and it was decided to further discuss the illustration at the next MAWG and/or RASMAG meeting.

LLE Category F and LHD Category E Error Descriptions (WP13)

4.3 The USA suggested a clarification for the category E description regarding LHDs when the ATC transfer error involved a time error, and for category F occurrences regarding LLEs. These changes were discussed and agreed by the MAWG/1 meeting and are detailed in **Table 7**:

Deviation due to navigational errors	
Code	**Cause of Deviation**
E	Coordination errors in the ATC-unit-to-ATC-unit transfer of control responsibility as a result of human factors issues (e.g. late~~/ or~~ non-existent coordination, or ~~incorrect~~ time estimate~~/actual~~, flight level, or ATS route information ~~etc~~ not in accordance with agreed parameters);
F	Navigation errors, including incorrect position estimate or equipment failure of which notification was not received by ATC or notified too late for action;

Table 7: Proposed changes to Code Descriptions

4.4 The meeting agreed that the LLE definition should be incorporated into the Asia/Pac EMA manual and the global EMA document that the ICAO Separation and Airspace Safety Panel (SASP) is developing.

4.5 The meeting agreed that the LHD definition for CAT E should be incorporated into the global RMA manual. The RASMAG Chair would ensure the update to the global documents was presented to the SASP and RMACG.

Agenda Item 5: Airspace Safety Monitoring Activities/Requirements in the Asia/Pacific Region

AAMA Assessment of Non-RVSM Approved Aircraft (WP14)

5.1 The AAMA continued to refine its comparative assessment to identify operators who appear to be flight planning with incorrect RVSM approval status. A comparison was made between the set of aircraft registrations seen in the total March 2014 flight plan data available to Airservices, and lists of RVSM-approved aircraft available from individual RMAs on the Knowledge Sharing Network (KSN) website. Only aircraft which flight planned into RVSM levels with a 'W' in the equipment field were compared. A number of the flights occurred outside the Melbourne and Brisbane FIRs.

5.2 In undertaking the comparison process, the AAMA was reliant on the quality of the data contained in the approvals databases provided by other RMAs. While for some States of registry, the AAMA comparison identified a large number of airframes, it was recognised that delays in processing approval information between the State authorities and RMAs could be a factor. The comparison for March 2014 identified **90** individual airframes in the data set compared to 98 as reported to RASMAG/18, with airframes from India showing the highest number (20). A regional comparison is at WP24.

5.3 MAAR stated that the procedure for RVSM approvals varied from State to State, with some imposing time limits and others with no expiration, which complicated the overall database maintenance process. The meeting noted that the European (EUR) RMA had advised the recent RMACG/9 meeting in Paris, that they intended to implement a list of aircraft operators that continually erroneously use 'W' in flight plans without a current RVSM approval. There was no agreement to use this method by all RMAs at the RMACG. However, given the APANPIRG Conclusion urging States to deny access to operators that are confirmed as non-RVSM approved, the RASMAG agreed that a similar system could be useful in Asia/Pacific, provided a number of procedural issues such as the need to take into account the different State approval systems were addressed. The system would need to ensure:

- identified operators had been specifically confirmed with the State as NOT having an approval; and
- that RMAs or the owner of the master online list, are able to regularly update the list (at least once a week).

5.4 The RASMAG Chair agreed to consider the manner in which a system for listing non-RVSM approved aircraft could be implemented in Asia/Pacific and report to APANPIRG in this respect as a follow-up to APANPIRG Conclusion 24/6.

China RMA Assessment of Non-RVSM Approved Aircraft (WP15)

5.5 China RMA provided the results of once-a-month comparison between the RMAs' approval databases and flight plans operated within the RVSM airspace of Chinese FIRs and Pyongyang FIR using flight plan data up to March 2014. DPR Korea started to provide monthly flight plan data from the beginning of 2014, and the data was shared on a three-month basis. Thus the China RMA was able to conduct the check for this region using the flight plan data for the whole year, not just the data of each December.

5.6 The China RMA assessment of Chinese FIRs and the Pyongyang FIR up until March 2014 identified a total of **33** non-RVSM approved aircraft, compared with a total of 43 airframes during the period December 2011 until February 2013.

JASMA Assessment of Non-RVSM Approved Aircraft (WP16)

5.7 The flight plan information utilized for the monthly examination was the actual record of the flight plans for the month extracted from JCAB (Japan Civil Aviation Bureau)'s Flight Data Processing System (FDPS). JASMA compared approximately 80,000 plans of RVSM flights with the global RMA's latest approval databases uploaded to the KSN website every month. Some operator-aircraft combinations were continuously detected as non-approved airframes. JASMA has identified **47** airframes which were flying in RVSM airspace of Fukuoka FIR with "W" on their flight plans but without a record found in RMAs' RVSM approval databases as of April 2014, compared to 40 reported to RASMAG/18.

MAAR Assessment of Non-RVSM Approved Aircraft (WP17)

5.8 The MAAR assessment of non-RVSM approved aircraft for RASMAG/19 was 130 (RASMAG/18 was 118).

5.9 The annual update of RVSM Approval Data for the period ending 2013 was not provided by Brunei Darussalam, India, Lao PDR, Malaysia, Maldives, Myanmar, Nepal and Vietnam, although periodic RVSM approvals updates and the TSD for all FIRs was received except for the Kuala Lumpur TSD.

PARMO Assessment of Non-RVSM Approved Aircraft (WP18)

5.10 PARMO requested an annual one-month traffic movement sample in addition to all of the large height deviation reports from the ATS providers in Pacific and North East Asia airspace. The TSD for December 2013 was received from five of the six FIRs under PARMO responsibility (Nadi – Fiji was unable to provide their TSD).

5.11 In the assessment of non-State-approved operators and aircraft type combinations using RVSM airspace overseen by PARMO for the period of December 2013, a total of **19** airframes from 12 States remained on the list of non-approved operations following the initial verification process, compared to 15 as reported to RASMAG/18.

AAMA LTHM Burden Estimate Update (WP19)

5.12 Australia presented the current Long Term Height-keeping Monitoring (LTHM) burden for aircraft registered and operated by Australia, Indonesia, the Solomon Islands and Papua New Guinea. The assessment noted that when applying the minimum monitoring requirements (MMR) to the total of approved aircraft, the result was a total monitoring burden of 302 aircraft. Taking into account the aircraft already successfully monitored, the current outstanding burden was **79** aircraft, a reduction of 23 airframes from that reported to RASMAG in 2013.

5.13 In relation to Indonesian registered RVSM approved aircraft, 34 aircraft remained overdue in terms of the MMR, representing 15 airline or International General Aviation (IGA) operators. Indonesia had experienced difficulties accessing Global Position System Monitoring Units (GMU) to allow monitoring in a timely way because a number of aircraft were not ADS-B equipped or did not operate outside the Indonesian FIRs. Recently the AAMA and DGCA Indonesia had reached agreement on ADS-B data provision that would enable the AAMA to extend ADS-B Based Height Monitoring System (AHMS) based monitoring to larger numbers of suitably equipped aircraft operating in the Indonesian airspace.

China RMA LTHM Burden Estimate Update (WP20)

5.14 China presented the current expected monitoring burden for aircraft registered by China and DPR Korea to meet the LTHM requirement, based on the RVSM approval database. China RMA was monitoring 51 Chinese operators (2012: 46) with 2367 aircraft (2012: 2,060), so the biennial monitoring number was 295 (2012: 252) airframes, indicating the rapid development of Chinese civil aviation.

5.15 For the DPRK, there were 10 aircraft and the biennial monitoring number was nine. The DPRK noted that some of the RVSM approved aircraft only conducted domestic flights below the RVSM stratum, so these aircraft had not been monitored.

5.16 Of the overall outstanding monitoring burden, a total of **87** aircraft remain, compared to 141 As reported to RASMAG/18.

JASMA LTHM Burden Estimate Update (WP21)

5.17 JASMA determined that when applying the MMR to the total of 699 RVSM approved aircraft the resultant total monitoring burden was 127 airframes. Taking into account aircraft already successfully monitored, the current outstanding burden was **16** airframes.

MAAR LTHM Burden Estimate Update (WP22)

5.18 MAAR presented the estimated monitoring burden for aircraft registered or operated by operators under States within MAAR's responsibility to meet Annex 6 monitoring requirements. The monitoring burden for the 2,246 aircraft from 21 States that were the responsibility of MAAR was 663 airframes. As at 01 May 2014, **200** airframes remained to be monitored.

5.19 MAAR noted that some State Civil Aviation Authorities (CAA) may still lack an understanding of RVSM requirements. MAAR planned to visit CAAs under its aegis to raise awareness of such requirements and ensure a continuous line of communication between the CAA and the RMA until matters were resolved. MAAR had visited Cambodia and the Philippines, which were the first States to respond to MAAR's visit request.

PARMO LTHM Burden Estimate Update (WP23)

5.20 PARMO provided an assessment of the monitoring burden associated with the LTHM requirements for airframes for which the PARMO was the responsible RMA, as observed in the PARMO approval database. A total of 479 airframes resulted in a monitoring burden of 122, of which **37** remain to be monitored.

Regional Safety Monitoring Assessment (WP24)

5.21 The Secretariat presented an overview of safety assessment results from a regional perspective. **Figure 18** indicated the regional Asia/Pacific regional RVSM TLS compliance as reported to RASMAG/18, and **Figure 19** indicated the status as reported to RASMAG/19.

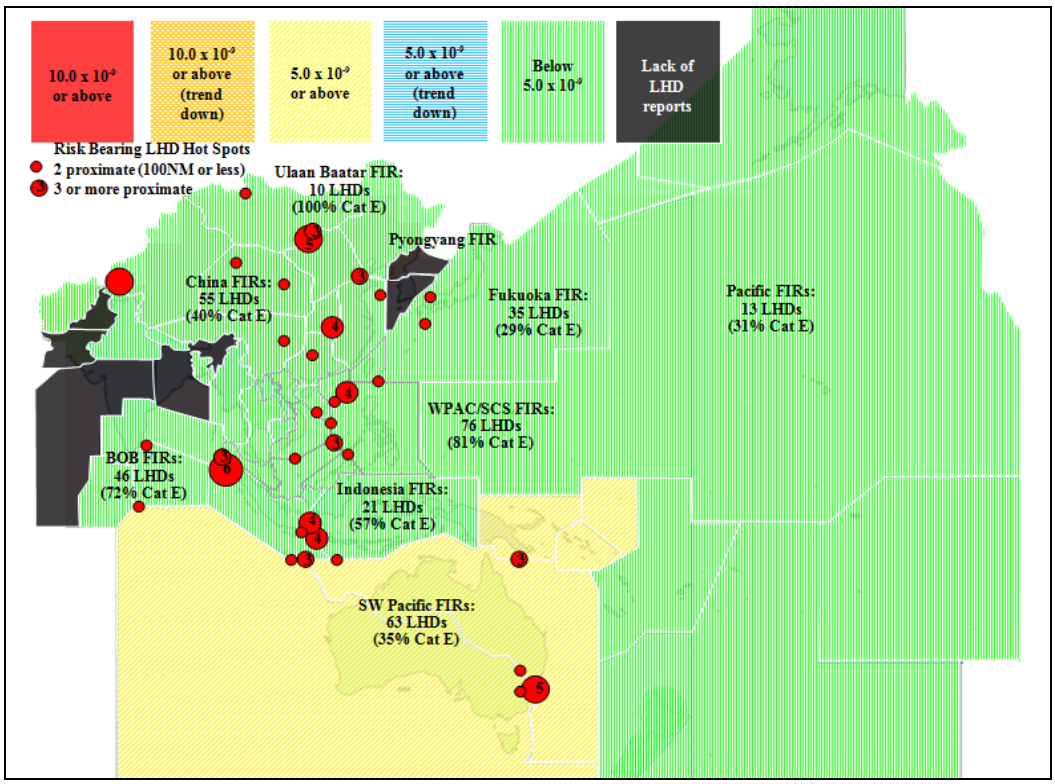

Figure 18: Asia/Pacific TLS compliance reported to RASMAG/18

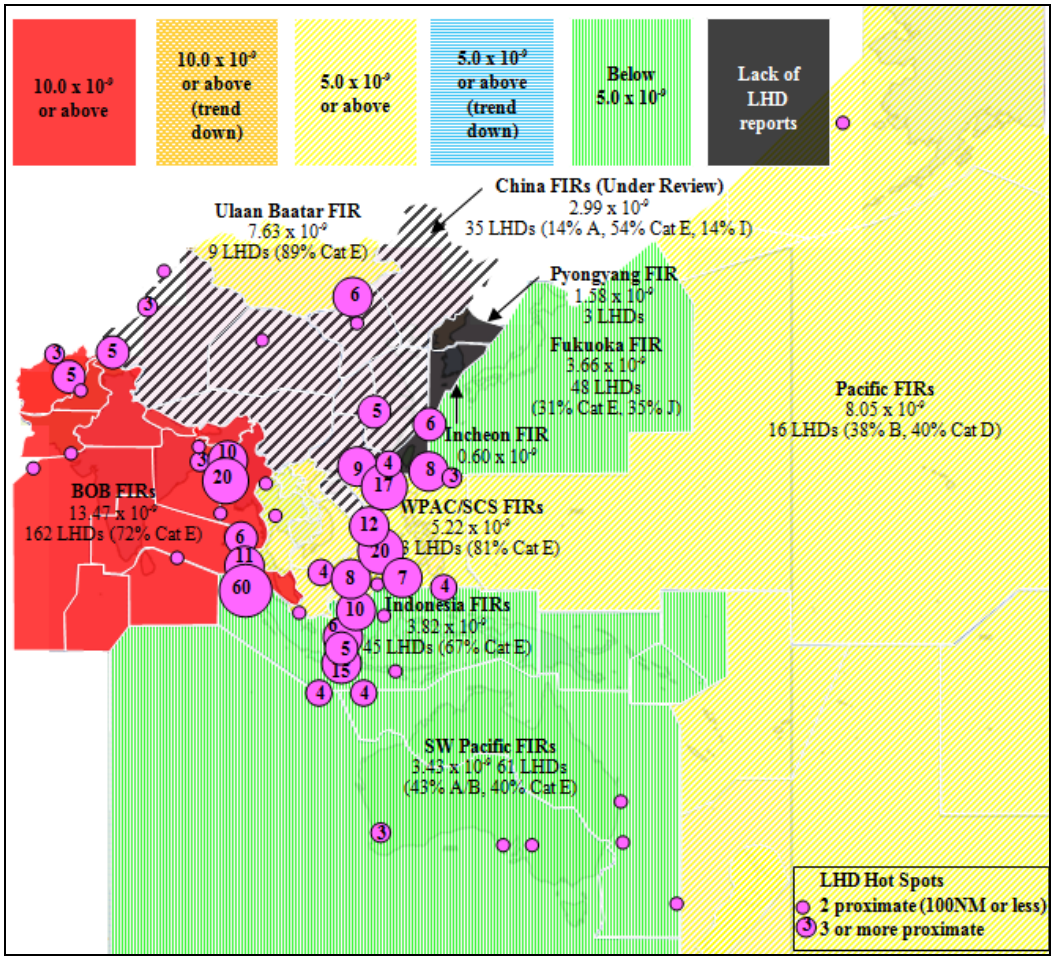

Figure 19: Asia/Pacific TLS compliance reported to RASMAG/19

5.22 **Figure 19** indicated the following sub-regional regional trends.

- **South Asia** (and in particular India) dramatically increased its reporting rate, resulting in a large increase in estimated risk (reflecting the true nature of risk). This revealed the extent of interface problems between Indian FIRs and Bangladesh, Myanmar, Malaysia and Indonesian FIRs. Apart from the implementation of AIDC between the States concerned, significant urgent action appeared to be necessary to reduce ATC operational errors and to increase communications and ATS surveillance coverage/data exchange.

  In particular, the meeting noted that a Special Coordination Meeting (SCM) should be conducted involving Bangladesh, India, Indonesia, Malaysia, and Myanmar to, *inter alia*, investigate the installation of ADS-B, VHF communications and sharing data from a site on Great Nicobar Island, which was close to the Indian, Indonesian and Malaysian FIR boundaries. The States involved agreed that a SCM would be useful to expedite planning for enhanced ATS communications and surveillance facilities and ATC procedural improvements to mitigate risk in the area.

- **Southeast Asia** had not met the TLS, which was largely connected with two major interface problems. The first was between Indonesian airspace and Singapore and Philippines airspace, and continued internal problems within Indonesian airspace between the Jakarta FIR and the Ujung Pandang FIR. The second was between the Philippines airspace and Singapore, Malaysian, Viet Nam, Hong Kong and Japanese airspace. The increased reporting by Indonesia was a positive. The level of continued operational errors involving interfaces with both the Indonesian and the Philippines airspace remains deeply concerning.

  Greater effort and urgency appears to be required by both States to investigate and reduce ATC operational errors, and implement full AIDC capability. In the case of AIDC, the meeting agreed that it would be beneficial to form a short-term ATS Inter-facility Data-link Communications (AIDC) Implementation Task Force that focused on the SCS and BOB. Noting APANPIRG Conclusion 24/17: *AIDC Implementation* and Conclusion 24/27: *Prioritization of AIDC Implementation to Address LHDs*, and the continued incidence of LHDs in the BOB and SCS area, RASMAG agreed to the following Draft Conclusion for consideration by the ATM/SG, CNS Sub-Group (CNS/SG) and APANPIRG:

  RASMAG Draft Conclusion 19-4: Asia/Pacific AIDC Implementation Task Force

  That, an ATS Inter-facility Data-link Communications (AIDC) Implementation Task Force be established that reports to the CNS/SG, to facilitate the urgent expedition of AIDC in the Asia/Pacific, focussed on the Bay of Bengal and South East Asia area.

  Note: Terms of Reference for the Asia/Pacific AIDC Task Force (APATF) should be developed by the CNS/SG, in consultation with the ATM/SG.

- **East Asia** Mongolia had not met the TLS, largely because of the interface between Mongolian and Chinese airspace. This could be discussed at a forthcoming Eurasia Special Coordination Meeting. Japan had met TLS, as had the ROK and China. However, there was concern regarding the lack of LHDs from the DPRK (although their flight hours were very low), ROK and China that may indicate a lack of a mature reporting culture (see paragraph 5.24).

- **Southwest Pacific** had maintained an downwards trend from RASMAG/18 to be consistently below the TLS during the 12 months to end of December 2013. The AAMA reports a monthly risk value in an attempt to provide real-time information on actual risk without reliance on historical high-time errors resident within the 12 month data sample. This data shows the monthly risk for the Southwest Pacific airspace was well below the average monthly risk which gives an annual risk of 5.0 x $10^{-9.}$

  There were a number of LHD hot spots, including the interface between Australia and Indonesian airspace (particularly Jakarta FIR), and also between Australia and Papua New Guinea airspace.

- **Pacific** airspace had not satisfied TLS but this was mainly due to a single long duration LHD event.

5.23 **Table 8** provided a comparison of Asia/Pacific RVSM risk as a measure against the TLS, either by RMA 'sub-region[1]', or by FIRs. There had been significant deterioration in the region meeting the TLS overall, which has been partially caused by improved reporting.

	RASMAG16	RASMAG17	RASMAG18	RASMAG19
RMA 'sub-regions'	67%	78%	89%	22%
FIRs	73%	73%	90%	16.3%

Table 8: Comparison of Sub-Regional and Regional RVSM TLS Achievement

5.24 **Table 9** provides a comparison of the estimated flight hours for airspace analysed by an RMA, divided by the reported LHDs at RASMAG/18 and RASMAG/19, in order to assess the levels of occurrence reporting that might be expected.

Airspace	**RASMAG 18 LHDs**	**RASMAG 19 LHDs**	**RASMAG 19 Flight Hours**	**RASMAG 18 Reporting Ratio**	**RASMAG 19 Reporting Ratio**
SW Pacific	63	61	599,990	1: 9,524	1: 9,835
Mongolia	10	9	-3% 108,773	1: 11,230	1: 10,876
India/BOB	46	162	+51% 1,869,508	1: 26,917	1: 11,540
WPAC/SCS	94	133	+34% 1,581,192	1: 12,590	1: 11,889
Indonesia	21	45	+5% 761,390	1: 34,508	1: 18,570
Japan	35	48	+8% 1,195,776	1: 24,495	1: 22,947
China	55	35	+6% 2,537,923	1: 43,436	**1:72,512**
ROK	0	3	*492,360	0	**1:164,120**
Pyongyang	0	0	+85% 5,970	0	0
Total	324	496	+54% 11,323,399	1: 22,684	1:22,829
Pacific	13	16	+7% 1,250,084	1: 89,536	1: 78,130

Table 9: Comparison of Estimated Flight Hours and Reported LHDs (*2012 figure)

[1] (1) Melbourne, Brisbane, Nauru, Honiara FIRs (AAMA); (2) Port Moresby FIR (AAMA); (3) Indonesian FIRs (AAMA); (4) Sovereign airspaces of China (China RMA); (5) Fukuoka FIR (JASMA); (6) Bay of Bengal FIRs (MAAR); (7) Western Pacific/South China Sea FIRs (MAAR); (8) Pacific Area (PARMO); and (9) North-East Asia Incheon FIR (PARMO).

5.25 From the comparison in **Table 9** (separating the Pacific portion of airspace because it was largely oceanic in nature and not directly comparable), the average LHD occurred approximately every 22,829 flight hours. The number of reported LHDs has increased in the Indian and Indonesian FIRs. As approximately two-thirds of these were category E ATC errors, this could be largely attributed to improved reporting, which was noted by the meeting as a more accurate reflection of incidents. The meeting congratulated India and Indonesia for their efforts in promoting a higher reporting culture.

5.26 An analysis of the United States' database revealed that in one of the world's busiest environments (11.1 million flight hours in 2012) utilising the most sophisticated ATC operating tools designed to reduce human error and risk, the ratio of LHDs to flight hours was 1:31,267 in 2012.

5.27 Thus in comparison, the meeting noted that it was unlikely that the Asia/Pacific would have ratios greater than this and the true rate of LHDs in Chinese and ROK airspace was probably much more than was currently being reported. In particular, the reports for Beijing, Incheon, Sanya, and Shenyang FIRs appear to be well below what would be expected, given the very busy traffic in those airspaces. China acknowledged that, relative to the flight hours, the LHD reporting ratio of China and DPRK was quite low, with possible existence of underestimation in these regions. The meeting urged China to improve its mechanism of LHD reporting and develop a plan to establish an open reporting culture as part of a 'just culture' element of its safety management system by conducting a review, and requested China to report to APANPIRG/25 progress made.

Note: significant increases in reporting of LHDs in Indonesian (214%) and BOB (352%) airspace occurred after action was taken to improve reporting.

Non-RVSM Approved Aircraft

5.28 The meeting noted that Asia/Pacific States with the majority of non-RVSM airframes identified by the Asia/Pacific RMAs to be operating within the RVSM stratum without proof of RVSM approval, were from China, India, Indonesia, Pakistan and the Philippines. **Table 10** compares the number of non-RVSM airframes reported by each RMA:

Report	AAMA	China RMA	JASMA	MAAR	PARMO
RASMAG/18	98	43	47	118	15
RASMAG/19	90	33	40	130	19

Table 10: Trend of Non-RVSM airframes Observed by Asia/Pacific RMAs

5.29 Overall, the number of non-RVSM aircraft had marginally reduced by 3% in the past year. This indicated that there was considerable work to do and APANPIRG Conclusion 24/6 *Repetitive Non-RVSM Approved Aircraft Operating as RVSM Approved Flights* which encouraged States to deny entry to operate within RVSM airspace for aircraft that have been confirmed as non-RVSM approved over a significant length of time, or by intensive checking, except where a specific non-RVSM operation was authorized, had not yet been effective.

Long Term Height Keeping Monitoring Burden

5.30 **Table 11** compares the outstanding monitoring burden reported by each RMA:

Report	AAMA	China RMA	JASMA	MAAR	PARMO
RASMAG/18	102	141	29	189	118
RASMAG/19	79	87	16	200	37

Table 11: Outstanding Monitoring Burden of Asia/Pacific RMAs

5.31 **Table 11** indicates that all the RMAs had managed to reduce their monitoring burden, except for MAAR, which may require collaborative assistance from States to share ADS-B data to help reduce the burden for States/operators effectively. The overall total remaining Asia/Pacific regional monitoring burden had decreased from 579 (RASMAG/18) to 419 as reported to RASMAG/19, a 38% reduction, which followed a 32% reduction since 2009.

5.32 The following Asia/Pacific EMAs reported horizontal risk assessments as follows, which all satisfied the TLS of 5.0×10^{-9} (**Table 12**). The lateral risk for 50NM separation as calculated by JASMA is notably lower than other implementations.

Separation Standard	EMA	Estimated Risk
50NM Lateral Risk	BOBASMA	0.76×10^{-9}
	JASMA	0.000006×10^{-9}
	PARMO	0.97×10^{-9}
	SEASMA	0.055×10^{-9}
30NM Lateral Risk	PARMO	0.26×10^{-9}
50NM Longitudinal Risk	BOBASMA	4.02×10^{-9}
	PARMO	2.32×10^{-9}
	SEASMA	1.18×10^{-9}
30NM Longitudinal Risk	JASMA	0.13×10^{-9}
	PARMO	3.74×10^{-9}

Table 12: Comparison of Horizontal Risk Assessments

RNP4 Safety Assessment (WP25)

5.33 India had proposed that States first introduce 30 NM longitudinal separation on existing BOB RNAV routes in a phased manner in 2013, and then progress to reducing the lateral separation to 30NM. As a first step, India expressed its readiness to implement 30NM longitudinal separation between aircraft with FANS/1A data link capability on an opportunity basis on four routes N571, M300, P570 & P574.

5.34 The safety assessment assessed the 30NM lateral separation as easily satisfying the TLS at **0.90×10^{-9}**, and the 30NM longitudinal separation at **1.62×10^{-9}**.

5.35 The Secretariat emphasised that for human factors and efficiency reasons, PBN-based separation standards should be implemented on an airspace basis, and not on a route by route basis. This was acknowledged at the SAIOACG meeting by the Indian representatives, who confirmed that they would allow ATC to utilise 30NM on an opportunity basis, even on conventional routes being used by RNP4 approved aircraft. The Secretariat also advised that the existence of a FANS-1/A installation did not necessarily mean the aircraft and its crew was RNP-4 approved.

Safety Assessment of RNAV ATS Routes Y711 and Y722 (WP26)

5.36 The Republic of Korea (ROK) presented a safety assessment analysis for near parallel RNAV routes Y711 and Y722, which were approximately 8-12NM apart, and which were operated above FL140. ATS routes Y711 and Y722 were classified into two portions. The northern portions of the routes were designated as RNAV2, and the southern portions extending towards Jeju Island had been designated as RNAV5.

5.37 All operations on the routes were monitored by radar. The total number of flights in the Incheon FIR was 622,033 in 2013 and the rate of total air traffic had increased by about 6% compared to 2012, while the largest volume of air traffic was 55,554 flights in August. An estimated lateral collision risk of **0.004×10^{-9}** (Y711) and **0.001×10^{-9}** (Y722) was calculated, which easily met the TLS.

5.38 The meeting congratulated the ROK on the analysis, noting that this work could be used to assist EMAs and other States in their determination of safe separation standards utilising RNAV2 within ATS surveillance coverage.

Pre-implementation RNP4 Safety Assessment (WP27)

5.39 Singapore provided their pre-implementation horizontal safety assessment for RNP 4 operations (30NM lateral and 30NM longitudinal separation) report for operations on the six major air traffic service routes within the SCS for the period 1 Jan 2013 through 31 Dec 2013. The assessment concluded that the TLS for 30NM lateral (**0.255×10^{-9}**) and 30NM longitudinal (**0.705×10^{-9}**) separation standards based on the ADS-C reporting interval of 10 minutes, were satisfied during the period examined.

Comparison of Average ASE for Aircraft Monitoring Groups (WP28)

5.40 In WP28 the USA compared results of the average estimated ASE for aircraft monitoring groups obtained from the AGHME, Automatic Dependent Surveillance – Broadcast (ADS-B) geometric height data, GPS-based Monitoring System (GMS), Height Monitoring Units (HMU) in Japan and Europe, and ADS-B geometric height data from Australia.

5.41 There were four HMUs – one at Setouchi, Japan, and four in Europe (one in the United Kingdom). The HMU produced direct estimates of Total Vertical Error (TVE), ASE and Assigned Altitude Deviation (AAD).

5.42 The AGHME system estimated only aircraft geometric height. TVE, ASE, and AAD were estimated through post-processing using meteorological and Mode S data. Currently, there were six AGHME systems operational in North America, four in the United States and two in Canada.

5.43 For ADS-B, an aircraft's GPS antenna sends the geometric height information in a message, which allows the ASE to be directly computed. Since the geometric height does not need to be estimated, it produces a slightly more accurate estimate of the TVE, ASE and AAD.

5.44 The EGMU was a portable device that collected GPS data file during flight. Upon completion of a monitoring flight, the data was processed post-flight and then transmitted to the FAA for further processing to calculate the aircraft's ASE.

5.45 The plots of the means of the contributing groups showed very good correlation. The exceptions were apparent differences between the HMU and AGHME regarding the Airbus A300 and the Piaggio P180 (which also showed in the GMU and AGHME comparison). This undermined the underlying assumption that an aircraft monitoring group was composed of a uni-modal, exponentially decreasing probability distribution. The performance difference had been brought to the attention of Airbus and Piaggio.

5.46 The meeting congratulated the United States on this analysis, and urged other RMAs to conduct comparisons where possible.

JASMA ASE Seasonal Variation Study (WP29)

5.47 Japan presented the outcome of a study to determine whether a seasonal ASE variation occurred by using monthly geometric height data from the Setouchi HMU between April 2012 and April 2014 (**Figure 20**).

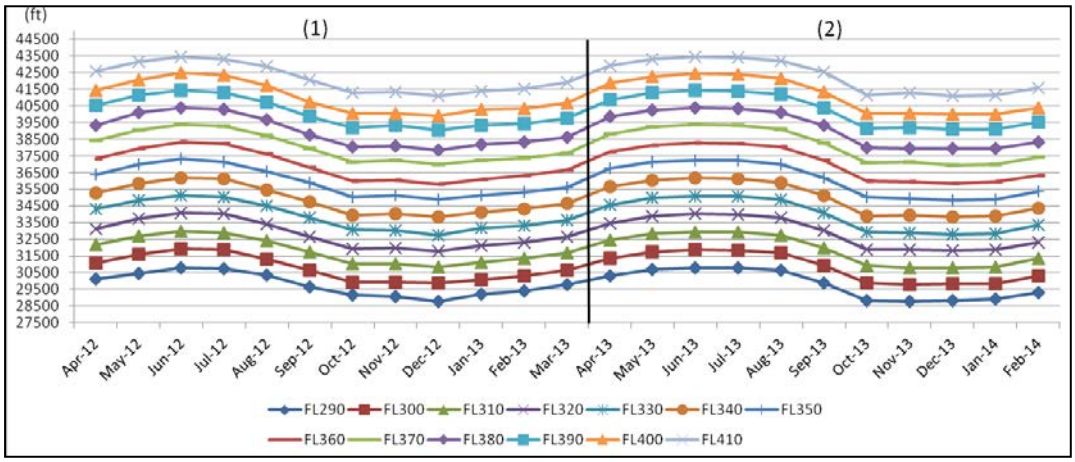

Figure 20: Monthly Geometrical Height (APR 2012 to FEB 2014)

5.48 The difference between the geometric height of monitoring data and geometric height was calculated with pressure altitude and meteorological data (**Figure 21**). The geometric height of aircraft obtained from the HMU was greater than that of geometric height calculated with pressure altitude and meteorological data.

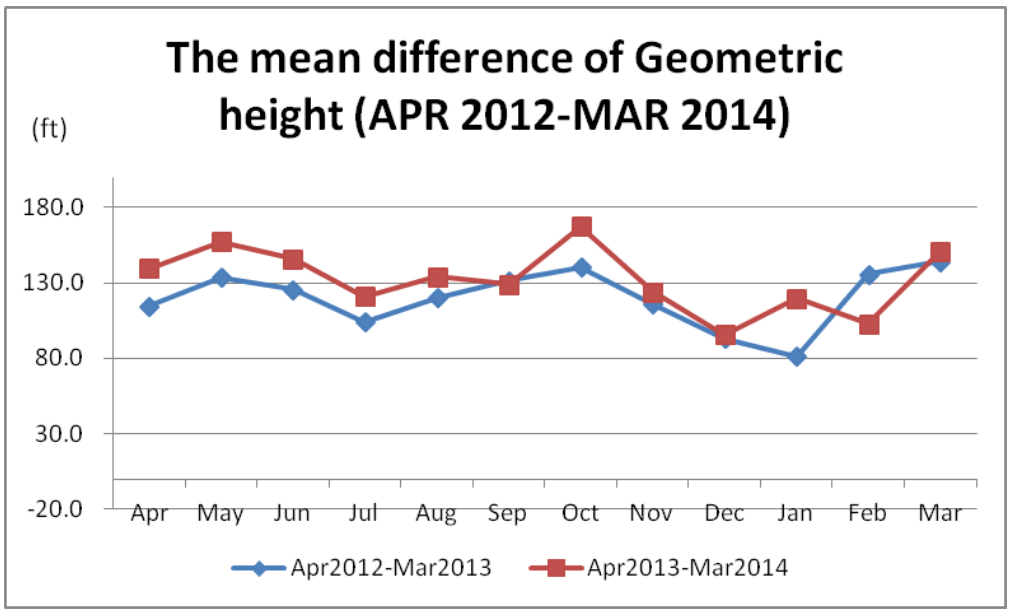

Figure 21: Mean Difference of Geometric Height (April 2012- March 2014)

5.49 In general, although there was a tendency that larger deviations occurred in winter than the summer temperature lapse rate, the complexities of factors such aircraft position to HMU and atmospheric temperature decreases with increasing altitude meant that a relationship between the season and variations of ASE could not be assessed with certainty.

Latest Monitoring Results of Setouchi HMU (IP05)

5.50 Japan provided a summary of the latest height monitoring results obtained from Setouchi HMU for the period between 16 June 2013 and 15 April 2014. The ASE + 3SD value of the B744-10 monitoring group exceeded the absolute 245ft height keeping requirement. **Figure 22** indicated the mean ASE of each monitoring group from June 2013 until March 2014.

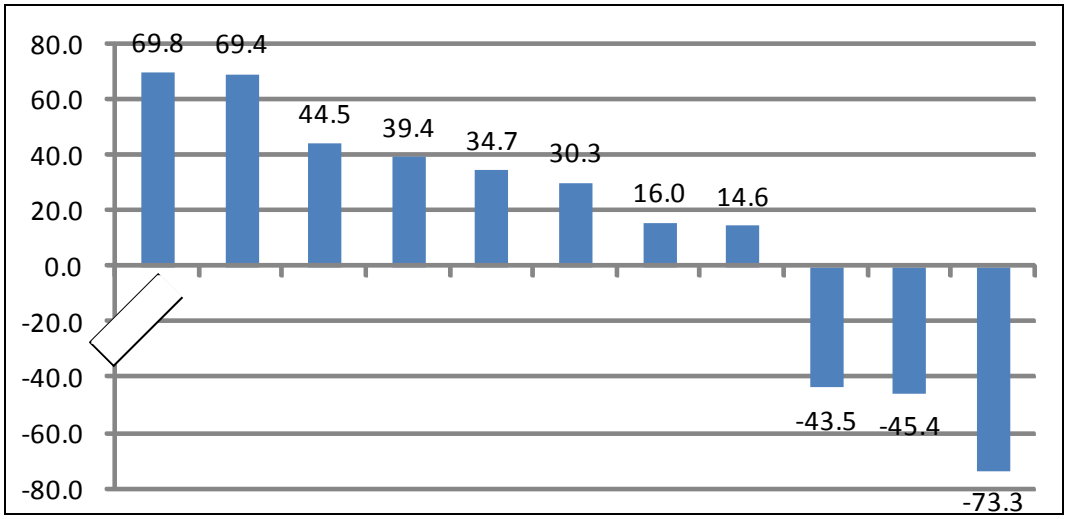

Figure 22: Setouchi HMU – Mean ASE of Monitoring Groups (ft)

ADS-B Height Monitoring Report by China RMA (IP02)

5.51 China RMA had provided an AHMS height monitoring service using ADS-B data from the beginning of 2014 and all AHMS analysis results had been shared to the KSN website. This information paper presented the common monitoring report template, which introduced the background for the monitoring, and the AHMS monitoring and statistical analysis results for the target operator. China RMA would send the AHMS monitoring result to domestic aircraft operators based on this template. China RMA would also make a special report template for the aircraft having large ASE results.

AAMA Height Monitoring Results (IP07)

5.52 Australia provided a paper that was presented by the AAMA to the Ninth Meeting of the Regional Monitoring Agencies Coordination Group (RMACG/9, Paris, 19-23 May 2014). All 13 ICAO endorsed RMAs were in attendance at the RMACG/9.

5.53 The AAMA had monitored 85% of all Australian registered RVSM approved aircraft and approximately 99% of all major Australian airline fleets using the ADS-B network.

Progress on MAAR's AHMS (IP03)

5.54 Thailand presented MAAR's progress on their ADS-B based AHMS. MAAR's AHMS processed ADS-B data from Aeronautical Radio of Thailand (AEROTHAI) and Air Navigation and Weather Services (ANWS), a subordinate agency of CAA of Taiwan, on a monthly basis. MAAR also received a fixed period of ADS-B data from Singapore, which allowed MAAR to identify the correct height assumptions more effectively. Singapore was currently coordinating with MAAR to collect and share ADS-B data on a monthly basis. As at March 2014, the system had observed 4,875 airframes with 85.76% of those having an identified geoid (height reference).

5.55 **Figure 23** illustrated the ADS-B tracks of an airframe which appeared in the data obtained from AAMA, China RMA, and MAAR. Such a wide range of geoid difference allowed MAAR to identify the correct height assumption more effectively.

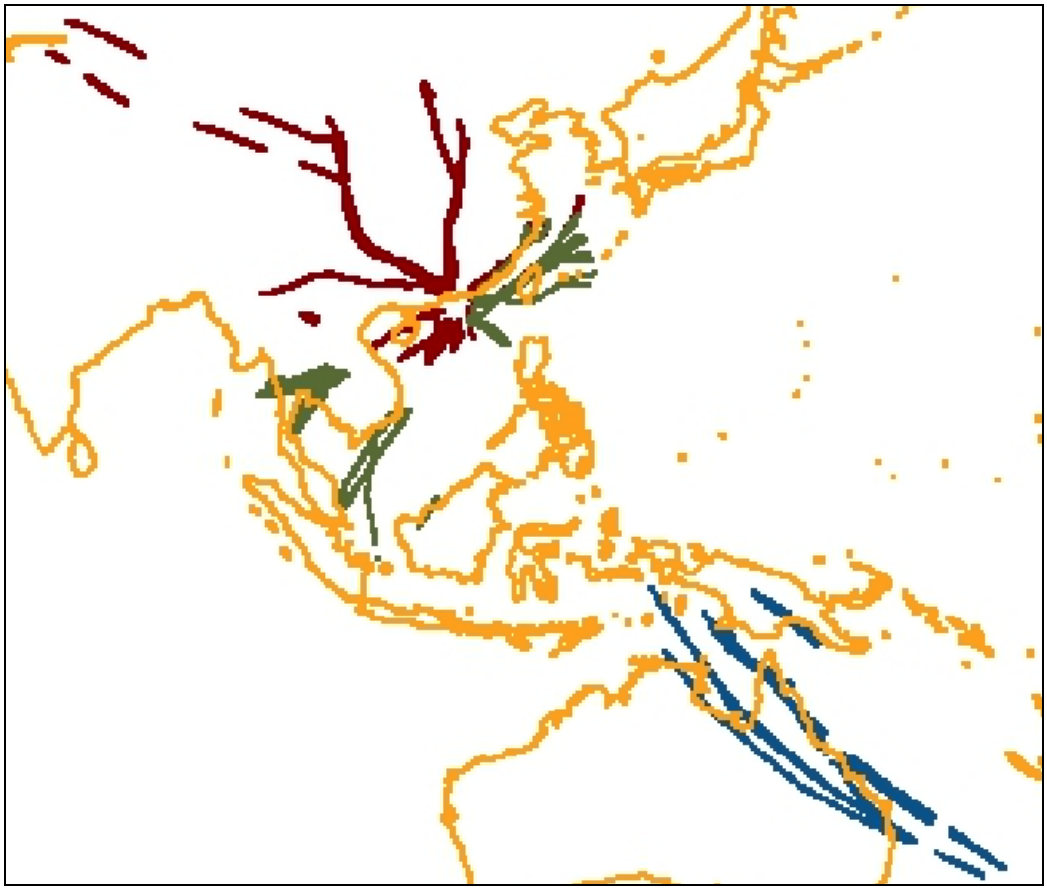

Figure 23: Airframe ADS-B Data – AAMA (blue), China RMA (red), MAAR (green)

PARMO RNP Database Status (IP04)

5.56 IP04 provided a status of the PARMO RNP database. The PARMO was entering Required Navigation Performance (RNP) type information on the existing RVSM database for United States operators to scrutinise whether those aircraft filing RNP in their flight plans had obtained the appropriate RNP approvals. The purpose of these checks was to identify operations erroneously filing a RNP type in the flight plan.

5.57 The meeting discussed the possibility of a global database that contained not only RNP approval status, but other airspace or route performance equipage requirements such as ADS-B. IATA noted that there was an ICAO global database based on Airline Operating Certificates (AOC) that could be utilised for such a purpose, but as yet the database was not yet robust enough.

RVSM Approvals and Authorisations (WP30)

5.58 New Zealand presented WP30, which provided information on the need for coordination between military and civil authorities for authorisation of flights by State aircraft within RVSM airspace, and on the importance of ensuring that States maintain up-to-date details of RVSM approvals with their responsible RMA. The 55th Meeting of the European Air Navigation Planning Group (EANPG) raised several points of interest regarding RVSM approvals, resulting in EANPG Conclusion 55/27 - *Flights in RVSM Airspace by non-approved State designated aircraft*, and EANPG Conclusion 55/28 - *Validation of RVSM Approvals and Confirmation of RVSM Points of Contact*.

5.59 Asia/Pacific RMAs had reported instances of State aircraft operating in RVSM airspace without authorisation and, as in Europe, a consistent policy within the Asia/Pacific Region would help to alleviate this problem. Greater coordination between civil and military authorities, particularly on RVSM operational requirements, would support such a policy. Accordingly, RASMAG/19 agreed to the following Draft Conclusion for APANPIRG's consideration:

Draft Conclusion RASMAG/19-5 – Flights in RVSM Airspace by non-approved State Aircraft

That, Asia/Pacific States are urged to ensure close cooperation between civilian and military authorities, so that all RVSM operational requirements are clearly understood and complied with by State aircraft.

5.60 New Zealand noted that, despite a number of previous APANPIRG Conclusions and subsequent State Letters, a number of States within the Asia/Pacific Region still failed to take action with their RMA to:

a) provide point of contact details and complete RVSM approval data;

b) provide, on a monthly basis, details of all flight plans filed showing RVSM approval (to update RMA data on RVSM approved aircraft); and

c) take appropriate action regarding non-compliant aircraft, on the basis of the data provided by their RMA (respond to, and take action regarding RMA queries on long-term data indicating that aircraft were not approved).

5.61 The meeting noted that the first action in such cases would be for the RMA to coordinate with the State concerned, but if the problem persisted, then those States should be identified in RMA reports, and the ICAO Regional Office may also be requested to contact the State.

Competent Airspace Safety Monitoring Organizations List Review (WP31)

5.62 The Secretariat presented the RASMAG *List of Competent Airspace Safety Monitoring Organizations* for review and update (**Appendix G**).

Agenda Item 6: Review and Update RASMAG Task List

RASMAG Task List (WP32)

6.1 The meeting reviewed and updated the RASMAG task list (**Appendix H** to this report).

Agenda Item 7: Any Other Business

7.1 There was no other business under this agenda item.

Agenda Item 8: Date and Venue of the Next RASMAG Meeting

8.1 The next RASMAG meeting was tentatively planned to be held in the period April to May 2015 at Bangkok, Thailand.

Closing of the Meeting

9.1 In closing, the Moderator thanked participants for their contributions to the meeting.

List of Participants

	Name		Title/Organization	TEL/FAX/E-MAIL
1.	**BANGLADESH (3)**			
	1.	Mr. Md. Saiful Haque Shah (FIT-Asia/3 and RASMAG/19)	Assistant Director Civil Aviation Authority of Bangladesh Room-418, Headquarters Kurmitola, Dhaka – 1229 Bangladesh	Tel: +880-2-8901419 Fax: +880- 2-8901418 E-mail: saif-aeld@yahoo.com
	2.	Mr. Md. Mizanur Rahman (FIT-Asia/3 and RASMAG/19)	Assistant Director Civil Aviation Authority of Bangladesh House#29, Road #14, Sector#13 Uttara Model Town, Dhaka Bangladesh	Tel: +880-1-911529066 Fax: +880- 2-8901428 E-mail: azad-mizan@yahoo.com
	3.	Mr. Umme Kulsum (FIT-Asia/3 and RASMAG/19)	Senior Aerodrome Officer Civil Aviation Authority of Bangladesh Area Control Center, Operation Building Hazrat Shahjalal International Airport Dhaka Bangladesh	Tel: +880-1-715153873 Fax: +880- 2-8901924 E-mail: kulsum1976@yahoo.com
2.	**CAMBODIA (1)**			
	4.	Mr. Chhun Sivorn (FIT-Asia/3 and RASMAG/19)	Director Air Navigation Standard and Safety Department Air Aviation Authority of Cambodia 62 Norodom Blvd, SSCA Cambodia	Tel: +855-23-22 42 58 Fax: +855-23-22 42 59 E-mail: ans.ssca@gmail.com
3.	**CHINA (6)**			

	Name		Title/Organization	TEL/FAX/E-MAIL
	5.	Mr. Jin Kaiyan (RASMAG/19)	Engineer, China Regional Monitoring Agency Air Traffic Management Bureau of CAAC 14th floor, Bai Yan Building No. 238 Bei Si Huan Zhong Lu Hai Dian District, Beijing 100191 People's Republic of China	Tel: +86-10-8232 5050 ext. 6947 Fax: +86-10-8232 8710 E-mail: jinky@adcc.com.cn; RMAChina@gmail.com
	6.	Mr. Tang Jinxiang (RASMAG/19)	Manager, China Regional Monitoring Agency ATC Division of ATMB. CAAC No. 12, Dong San Huan Road Middle Haidian District, Beijing 100191 Peoples' Republic of China	Tel: +86 (10) 8232 5050 Ext. 6944 Fax: +86 (10) 8232 8710 E-mail: tangjx@adcc.com.cn
	7.	Mr. Li Jingwei (RASMAG/19)	Assistant, China Reginal Monitoring Agency ATC Division of ATMB. CAAC No. 12, Dong San Huan Road Middle Haidian District, Beijing 100191 Peoples' Republic of China	Tel: +86 (10) 8778 6828 Fax: +86 (10) 8778 6810 E-mail: lijingwei@atmb.net.cn
	8.	Ms. Zhao Jun (FIT-ASIA/3)	China RMA Coordinator China Reginal Monitoring Agency Floor 14, Bai Yan Building Bei Sihuan Zhong Road Hai Dian District, Beijing 100191 Peoples' Republic of China	Tel: +86 (10) 8232 5050 Ext. 6943 Fax: +86 (10) 8232 8710 E-mail: zhaoj@adcc.com.cn

	Name		Title/Organization	TEL/FAX/E-MAIL
	9.	Mr. Tan Xi Jing (FIT-ASIA/3)	Manager Aviation Data Communication Corporation Floor 14, Baiyan Building No. 238, Bei Sihuan Zhong Road Hai Dian District, Beijing 100191 Peoples' Republic of China	Tel: +86 (10) 8232 5050 Ext. 6126 Fax: +86 (10) 8232 8710 E-mail: tanxi@adcc.com.cn
	10.	Mrs. Liu Xin (FIT-ASIA/3)	Engineer Aviation Data Communication Corporation Floor 14, Baiyan Building No. 238, Bei Sihuan Zhong Road Hai Dian District, Beijing 100191 Peoples' Republic of China	Tel: +86 (10) 8232 5050 Ext. 6929 Fax: +86 (10) 8232 8710 E-mail: liux@adcc.com.cn
4.	**INDIA (4)**			
	11.	Mr. Arindam Ghosh (FIT-Asia/3 and RASMAG/19)	Assistant General Manager (ATM) NSCBI Airport Airports Authority of India Kolkata India	Tel: +91 9831 697 396 Fax: - E-mail: arindam@aai.aero
	12.	Mr. Sisir Kumar De (FIT-Asia/3 and RASMAG/19)	Jt. General Manager (CNS) NSCBI Airport Airports Authority of India Kolkata India	Tel: +91 9433 007 222 Fax: - E-mail: skde@aai.aero

	Name		Title/Organization	TEL/FAX/E-MAIL
	13.	Mr. Arcot Palaninathan Udayanarayanan (FIT-Asia/3 and RASMAG/19)	Joint General Manager (ATM) Chennai Airport Airports Authority of India Chennai India	Tel: +91 4422 561 235 Fax: - Email: udaya01@aai.aero
	14.	Mr. Sumanthu Erothi (FIT-Asia/3 and RASMAG/19)	Manager (ATM) Chennai Airport Airports Authority of India Chennai India	Tel: Fax: E-mail: sumane1010@yahoo.in
5.	**INDONESIA (1)**			
	15.	Mr. Yadi I. Sutanandika (FIT-Asia/3 and RASMAG/19)	Deputy Assistant for Strategic Coordination on Foreign Political Affairs Coordinating Ministry for Political, Legal and Security Affairs Jalan Medan Merdeka Barat No. 15 Jakarta Pusat 110101 Indonesia	Tel: +62-21-344 1365 Mob: +62-817 449 234 Fax: +62-21-351 3561 E-mail: yadihawk@yahoo.com
6.	**JAPAN (2)**			
	16.	Mr. Takashi Imuta (RASMAG/19)	Special Assistant to the Director Japan Civil Aviation Bureau (JCAB) Ministry of Land, Infrastructure, Transport and Tourism 2-1-3, Kasumigaseki, Chiyoda-ku Tokyo 100-8918 Japan	Tel: +81-3-5253 8750 Fax: +81-3-5253 1664 E-mail: imuta-t07j7@mlit.go.jp

	Name		Title/Organization	TEL/FAX/E-MAIL
	17.	Mr. Akio Sakae (RASMAG/19)	Deputy Director Air Traffic Association, Japan K1, Bld. 1-6-6 Haneda-Kuko Ota-ku Japan 144-0041 Japan	Tel: +81-3-3747 1685 Fax: +81-3-3747 0856 E-mail: sakae@atcaj.or.jp
7.	**LAO PDR (2)**			
	18.	Mr. Sohnsacksit Khamkeo (FIT-Asia/3 and RASMAG/19)	Deputy Director Air Navigation Division Department of Civil Aviation of Lao PDR Souphanouvong Road P.O. Box 119 Wattay International Airport Vientiane Lao PDR	Tel: +856 (21) 513 163 Fax: +856 (21) 520 237 E-mail: saykhamkeo@gmail.com; sohnsacksit@yahoo.com
	19.	Mr. Amdounla Salinthone (FIT-Asia/3 and RASMAG/19)	Director of Air Traffic Center Air Traffic Management Wattay International Airport PO Box 2985 Vientiane Capital	Tel: +856 (21) 512006 Fax: +856 (21) 512216 E-mail: amdounla@hotmail.com
8.	**MALAYSIA (1)**			
	20.	Mr. Abdul Rali Bin Kassim (FIT-Asia/3 and RASMAG/19)	Senior Assistant Director Department of Civil Aviation Air Traffic Control Complex 47200 Subang Selangor Malaysia	Tel: +60-3-7846 5233 ext. 113 Mob: +60-12 639 0506 Fax: +60-3-7845 6590 E-mail: abdulrali@dca.gov.my
9.	**REPUBLIC OF KOREA (3)**			

	Name		Title/Organization	TEL/FAX/E-MAIL
	21.	Mr. Lim Hong Mug (FIT-Asia/3 and RASMAG/19)	National Airspace and Procedure Designer Republic of Korea Office of Civil Aviation Ministry of Land, Transport and Maritime Affairs (MLTM) 11 Doum-ro 6 Sejong Special Self-governing City 339-012 Republic of Korea	Tel: +82 44 201 4300 Fax: +82 44 201 5631 E-mail: limhm1629@korea.kr
	22.	Mr. Hyeong-Taek Park (FIT-Asia/3 and RASMAG/19)	Chairman Hi-tech Center No. 710, Inha University Inha-ro 1, Nam-gu Incheon 402 751 Republic of Korea	Tel: +82 10 5022-2110 Fax: +82 32 864 4136 E-mail: htkpark@yahoo.com
	23.	Mr. Jae-Hyun Han (FIT-Asia/3 and RASMAG/19)	Director The Korea Transport Institute 315 Goyangdaero, Ilsanseo-gu, Goyang-si Gyeonggi-do 411 701 Republic of Korea	Tel: +82 10 2559 8566 Fax: +82 31 910 3221 E-mail: jhhan@koti.re.kr
10.	**THAILAND (15)**			
	24.	Mr. Udomsak Chaipet (FIT-Asia/3 and RASMAG/19)	Director, Network Operations Department Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-285 9148 Fax: +66-2-287 8645 E-mail: udomsak.ch@aerothai.co.th

	Name		Title/Organization	TEL/FAX/E-MAIL
	25.	Mr. Koson Loyliw (FIT-ASIA/3 and RASMAG/19)	Engineering Manager Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8637 Fax: +66-2-287 8645 E-mail: koson.lo@aerothai.co.th
	26.	Cpo 1 Chaichana Kujareanpaisal (FIT-ASIA/3 and RASMAG/19)	Engineering Manager Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8259 Fax: +66-2-287 8645 E-mail: chaichana.ku@aerothai.co.th
	27.	Mr. Mana Ladthawanidphan (FIT-ASIA/3 and RASMAG/19)	Executive Engineer Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8126 Fax: +66-2-285 9125 E-mail: mana.la@aerothai.co.th
	28.	Mr. Chainan Chaisompong (FIT-ASIA/3 and RASMAG/19)	Engineering Manager Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8391 Fax: +66-2-287 8645 E-mail: chainan.ch@aerothai.co.th
	29.	Mr. Pongpob Mongkolpiyathana (FIT-ASIA/3 and RASMAG/19)	Executive Officer, System Engineering Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8704 Fax: +66-2-287 8645 E-mail: pongpob.mo@aerothai.co.th

	Name		Title/Organization	TEL/FAX/E-MAIL
	30.	Mr. Dudsadee Sungthong (FIT-ASIA/3 and RASMAG/19)	Administration Officer Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 9407 Fax: +66-2-287 8645 E-mail: thichakorn.ku@aerothai.co.th
	31.	Ms. Rinthida Jorntes (RASMAG/19)	Senior Administration Officer Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8608 Fax: +66-2-287 8375 E-mail rinthida.jo@aerothai.co.th
	32.	Mr. Dolsarit Somseang (RASMAG/19)	Engineer Aeronautical Radio of Thailand Limited 102 Ngarmduplee, Rama IV Road Tungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8918 Fax: +66-2-287 8645 E-mail: dolsarit.so@aerothai.co.th
	33.	Ms. Saifon Obromsook (RASMAG/19)	Engineering Manager Aeronautical Radio of Thailand Limited 102 Ngamduplee, Rama IV Road Thungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8291 Fax: +66-2-287 8645 E-mail: saifon.ob@aerothai.co.th
	34.	Dr. Paisit Herabat (FIT-ASIA/3)	Expert Aeronautical Radio of Thailand Limited 102 Ngamduplee, Rama IV Road Thungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-285 9191 Fax: + 662 2878645 E-mail: paisit.he@aerothai.co.th

	Name		Title/Organization	TEL/FAX/E-MAIL
	35.	Mr. Chumnan Ruechai (RASMAG/19)	Director, Safety Management Department Aeronautical Radio of Thailand Limited 102 Ngamduplee, Rama IV Road Thungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8422 Fax: +66-2-287-8645 E-mail: chumnan.ru@aerothai.co.th
	36.	Ms. Vichuporn Bunyasiriphant (RASMAG/19)	Information Technology Manager Aeronautical Radio of Thailand Limited 102 Ngamduplee, Rama IV Road Thungmahamek, Sathorn Bangkok 10120 Thailand	Tel: +66-2-287 8154 Fax: +66-2-287 8645 E-mail: vichuporn.bu@aerothai.co.th
	37.	Mr. Prasart Virotesiri (RASMAG/19)	Chief, Aircraft Engineer Flight Technical Engineering Department Thai Airways International PCL. 333/2 Moo 1 Nong Prue, Bangphil, Samutprakarn Thailand	Tel: +66-2-1375116 Fax: +66-2-1376910 E-mail: Prasart.v@thaiairways.com
	38.	Mr. Anurak Chankana (FIT-Asia/3 and RASMAG/19)	Transport Technical Officer Department of Civil Aviation 71 Soi Ngamduplee, Rama IV Road Tungmahameak Bangkok Thailand	Tel: +66-2-2868159 Fax: +66-2-2868159 E-mail: anurak.c@aviation.go.th
11.	**UNITED STATES (1)**			
	39.	Mr. Brian D Bagstad (FIT-Asia/3 and RASMAG/19)	Federal Aviation Administration Air Traffic Organization International Senior ATO Representative Asia-Pacific Region	(+65) 6476 9320 (Office) (+65) 9228 6216 (Mobile) brian.bagstad@faa.gov
12.	**VIETNAM (4)**			

	Name		Title/Organization	TEL/FAX/E-MAIL
	40.	Mr. Nguyen The Hung (FIT-Asia/3 and RASMAG/19)	Deputy Director Air Navigation Department Civil Aviation Authority of Vietnam 119 Nguyen Son Street Long Bien District Hanoi Vietnam	Tel: +844 3872 3600 Fax: +844 3827 4194 E-mail: hungand@caa.gov.vn, Hungand_caav@yahoo.cm
	41.	Mr. Tran Manh Cuong (FIT-Asia/3 and RASMAG/19)	Deputy Chief Air Traffic Management Corporation (VATM) Hochiminh ACC Northern ATS	Tel: Fax: E-mail:
	42.	Mr. Nguyenn Hong Hiep (FIT-Asia/3 and RASMAG/19)	Expert CNS Department Air Traffic Management Corporation (VATM)	Tel: Fax: E-mail:
	43.	Mr. Cao Thanh Phuc (FIT-Asia/3 and RASMAG/19)	Expert ATS Department Air Traffic Management Corporation (VATM)	Tel: Fax: E-mail:
13.	**IATA (1)**			
	44.	Mr. Owen Dell (FIT-Asia/3 and RASMAG/19)	Manager International Operations IATA/Cathay Pacific Airways Limited International Affairs Department 9th Floor, Central Tower, Cathay Pacific City Hong Kong International Airport Lantau Hong Kong, China	Tel: +852-2747 8829 Fax: +852-2141 3818 E-mail: owen_dell@cathaypacific.com
14.	**IFATCA (1)**			

	Name		Title/Organization	TEL/FAX/E-MAIL
	45.	Mr. John Wagstaff (RASMAG only)	Representative Asia/ Pacific IFATCA 68 Niche, Soi 38 Pracha Songkhro Huay Khwang Bangkok	Tel: 852-9034 1561 Fax: - E-mail: john.wags@gmail.com
15.	**ICAO (2)**			
	46.	Mr. Len Wicks	Regional Officer, Air Traffic Management ICAO Asia and Pacific Office 252/1 Vibhavadi Rangsit Road Chatuchak, Bangkok 10900 Thailand	Tel: 66-2-537 8189 ext. 152 Fax: 66-2-537 8199 E-mail: LWicks@icao.int
	47.	Mr. Shane Sumner	Regional Officer, Air Traffic Management ICAO Asia and Pacific Office 252/1 Vibhavadi Rangsit Road Chatuchak, Bangkok 10900 Thailand	Tel: 66-2-537 8189 ext. 159 Fax: 66-2-537 8199 E-mail: SSumner@ icao.int

TENTATIVE LIST OF WORKING AND INFORMATION PAPERS

FIT-ASIA WORKING PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
WP01	1	Provisional Agenda	Secretariat
WP02	2	Problem Reports and CRA Arrangements	Secretariat
WP03	3	Data Link Performance in Chennai FIR	India
WP04	3	Use of FANS 1/A Capability to Implement 30NM Longitudinal Separation	India
WP05	3	Regional Supplementary Procedures Supporting ADS-C/CPDLC Mandates	Secretariat
WP06	3	CPDLC Automatic Handoff Procedures	Boeing CRA IATA
WP07	2	CRA Website Status	New Zealand
WP08	2	Investigation on the Reported Airbus A380 FANS Operations on L888	China
WP09	2	Data Link Performance Report for L888 Route	China
WP10	5	FIT-Asia Task List	Secretariat
WP11	5	FIT-Asia Tasks 2/2, 2/5 and 2/7	IATA

FIT-ASIA INFORMATION PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
IP01	-	List of Working Papers (WPs) and Information Papers (IPs)	Secretariat
IP02	6	Identifying and Validating Competent CRA	Secretariat
IP03	3	Data Link Performance Report for Singapore FIR	Singapore
IP04	4	Implementation of New Functionality by an ATS Unit	Australia

RASMAG WORKING PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
WP01	1	Provisional Agenda	Secretariat
WP02	2	Relevant Meeting Outcomes	Secretariat
WP03	3	AAMA Safety Report	Australia
WP04	3	China Vertical Safety Report	China
WP05	3	JASMA Vertical Safety Report	Japan
WP06	3	MAAR Safety Report	Thailand
WP07	3	PARMO Vertical Safety Report	USA
WP08	3	PARMO Horizontal Safety Report	USA
WP09	3	BOBASMA Safety Report	India

NUMBER	AGENDA	TITLE	PRESENTED BY
WP10	3	JASMA Horizontal Safety Report	Japan
WP11	3	SEASMA Horizontal Safety Report	Singapore
WP12	4	Category E Large Height Deviation Illustration	Thailand
WP13	4	LLE Category F And LHD Category E Error Descriptions	USA
WP14	5	AAMA Assessment of Non-RVSM Approved Aircraft	Australia
WP15	5	China RMA Assessment of Non-RVSM Approved Aircraft	China
WP16	5	JASMA Assessment of Non-RVSM Approved Aircraft	Japan
WP17	5	MAAR Assessment of Non-RVSM Approved Aircraft	Thailand
WP18	5	PARMO Assessment of Non-RVSM Approved Aircraft	USA
WP19	5	AAMA LTHM Burden Estimate Update	Australia
WP20	5	China RMA LTHM Burden Estimate Update	China
WP21	5	JASMA LTHM Burden Estimate Update	Japan
WP22	5	MAAR LTHM Burden Estimate Update	Thailand
WP23	5	PARMO LTHM Burden Estimate Update	USA
WP24	5	Regional Safety Monitoring Assessment	Secretariat
WP25	5	RNP4 Safety Assessment	India
WP26	5	Safety Assessment of RNAV ATS Routes Y711 and Y722	Republic of Korea
WP27	5	Pre-implementation RNP4 Safety Assessment	Singapore
WP28	5	Comparison of Average ASE for Aircraft Monitoring Groups	USA
WP29	5	JASMA ASE Seasonal Variation Study	Japan
WP30	5	RVSM Approvals and Authorisations	New Zealand
WP31	5	Competent Airspace Safety Monitoring Organizations List Review	Secretariat
WP32	6	RASMAG Task List	Secretariat

RASMAG INFORMATION PAPERS

NUMBER	AGENDA	TITLE	PRESENTED BY
IP01	-	List of Working Papers (WPs) and Information Papers (IPs)	Secretariat
IP02	5	ADS-B Height Monitoring Report by China RMA	China
IP03	5	Progress on MAAR's AHMS	Thailand
IP04	5	PARMO RNP Database Status	USA
IP05	5	Latest Monitoring Results of Setouchi HMU	Japan
IP06	2	RASMAG/MAWG/1 Report	Australia
IP07	5	AAMA Height Monitoring Results	Australia

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Data link Implementation Strategy

Develop and define a Data link Concept of Operations

- Where will CPDLC be used (i.e. what airspace within the FIR will CPDLC be used in?)
- Is the implementation a "trial", or permanent? If it is a trial, it should not extend longer than is necessary, and have a defined start and finish date. Will the trial be H24?

- Will CPDLC be used for primary communications, or as a backup to HF (or VHF)?

- What services will CPDLC be used for?
  - Vertical clearances?
  - Route clearances?
  - Weather deviations?
  - Issuing SSR codes?
  - Frequency transfers?
  - Everything?

- What services will ADS-C be used for?
  - Situational awareness?
  - Separation service?
  - Conformance monitoring?
  - Replacement for voice position reporting?

- What separation standards will be supported by ADS-C
  - 10 minutes?
  - 50NM?
  - 30NM?
  - Establishing lateral separation?

Procedures

- Will the procedures as outlined in the GOLD be adopted?
  - If so, consider liaising with the GOLD Editors to include the ATS Unit in the list of data link users

- Define logon procedures – these will be affected by:
  - Where is CPDLC to be used (see Concept of Operations)
  - Will the use of PDC by CPDLC be implemented? (This affects the timing of logons for departing aircraft)

- Develop specific CPDLC procedures in accordance with local requirements. Airlines will expect these to be in accordance with existing procedures in other regions

- Develop specific ADS-C procedures in accordance with local requirements.

- Be aware of voice phraseologies associated with the use of ADS-C and CPDLC

Documentation

- Publish data link information in AIP, including:
  - logon codes;
  - logon procedures;
  - required flight crew procedures
  - Standardised free text message elements in use;
  - Position reporting procedures;
  - Are there any specific CPDLC message elements not supported?

- Controller documents
  - Develop and publish ATC procedures

Data Adaptation

The ATS Units' adaptation data needs to be defined in order to support the use of data link described in the Concept of Operations. Some specific data to consider include:

- ACARS address will need to be defined

- Are CPDLC Connections to be established automatically or manually?
  - Manual ==> ATC controls who uses CPDLC and when
  - Automatic ==> reduced ATC workload, but also means it is more difficult to control when CPDLC is used by flight crew

- Will data link transfers be effected to adjoining units?
  - Yes ==> Need to define ACARS addresses of surrounding ATS units

- Will data link transfers be a manual or automatic process?
  - Manual ==> Controller training/scanning issue
  - Automatic ==> Data needs to be defined (NDA & Address Forwarding)

- Will CPDLC termination be automatic or manual?
  - Manual ==> Controller training/scanning issue
  - Automatic ==> Data needs to be defined (Auto EOS).

- Controller's CPDLC interface – define the layout (the capability to do this will vary depending on the ATM system):
  - Message categories
  - Message elements within each message category. Will the entire CPDLC message set be available?
  - Determine required standardised free text message elements
  - Define standardised free text messages in AIP

- ADS-C data
  - Define ADS-C periodic reporting rates – ensure that they are "reasonable" (i.e. not excessive), and are appropriate for the services being applied;
  - Define parameters for ADS-C event contracts

- Adaptation data must be 'controlled'
  - Changes to data adaptation must be properly authorized;
  - Prevent proliferation of non-standard standardised free text message elements

Coordination

- Airlines

  - To assist in a smooth transition to data link operations, the major data link operators throughout the region should be contacted directly
  - Are LOAs currently held with airlines? If so, do they need to be updated?
  - Determine appropriate points of contact with airlines to rapidly address data link related problems with flight crews

- Adjoining data link capable ATSUs
  - Are data link transfers from adjoining units for inbound aircraft required?
  - Letters Of Agreement may need to be updated
  - Determine appropriate points of contact with adjoining units to rapidly resolve data link transfer problems

- Regulator
  - Is liaison with, or approval from, the regulator required?
  - Is regulator approval required for other State aircraft to operate data link in the airspace?

- HF operators
  - Need to be aware of how the implementation of data link will affect them;
  - Are SELCAL checks still required?
  - Will controllers issue CPDLC frequency transfers. If the frequency transfer is to an HF frequency, do controllers have access to up to date HF frequencies?

Controller training

- All aspects of ADS-C and CPDLC must be covered in controller training
  - Standardisation in these areas is extremely important

Licencing

- Will data link be included in the existing controller licence, or an addition to it?
  - Does the licence structure in use by the ATS Unit need to be updated?

- Update any controller written assessment questions to include data link related questions

- Update check controller procedures to include data link during the assessment

Data link Service Provider

- Determine preferred data link service provider

Data link performance monitoring

- Technical performance
  - Routine performance data analysis
  - Decoding CPDLC ACARS data
  - Decoding ADS-C ACARS data
  - Data link problem reporting

- Controller performance
  - CPDLC routine sampling?

International Forums

- Establish contacts with other data link user groups
    - There are lots of lessons to be learned (GOLD contains a number of them)

- Establish contact with one of the established Central Reporting Agencies (CRA) to report data link problems. It is important to report them, as some problems are very easy to solve!

Safety monitoring

Ensure that a means of reporting data link related occurrences is available, and that there are staff who are trained to investigate data link related occurrences

FIT-ASIA — TASK LIST

(last updated 26 May 2014)

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
1/1	Notice to remind pilots of the importance to check that a logon was completed correctly and to periodically check to ensure the data-link connection was maintained.	FIT/2	United States to forward copy of NOTAM	~~Open~~ Closed	
1/2	Provide an average availability outcome for ADS-C in the same manner as the CPDLC analysis.	FIT/2	Japan	Closed	Japan is not a member of FIT-Asia
1/3	Development of a template for the provision of data-link performance data, such as Actual Communications Technical Performance (ACTP), Actual Communications Performance (ACP), Pilot Operational Response Time (PORT) and surveillance latency information	FIT/2	ICAO	Closed	
2/1	Investigate the issue of identifying and validating competent CRAs, and related coverage and jurisdiction issues TO BE AMENDED PER MEETING REPORT	FIT-Asia/3	Secretariat	~~Open~~ Closed	
2/2	Draw to the attention of airspace users the importance of reporting data-link problems and the lack of such reports, and ask that attention be paid to improved reporting.	FIT-Asia/3	IATA	~~Open~~ Closed	
2/3	Make changes to the ISPACG CRA website to facilitate its use by FIT-Asia.	FIT-Asia/4	New Zealand	Open	FIT-Asia States can register to the website. Final changes to the interface are expected to be completed July 2014. Final changes to the interface are expected to be completed July 2014
2/4	States to inform Regional Office of current data-link service status, and/or provide update on planned implementation	FIT-Asia/3	FIT-Asia States/Secretariat	Open	Secretariat to send reminder via State Letter (FIT-Asia/3)
2/5	Draw to the attention of airspace users the safety implications of incorrect downlinking of BACK	FIT-Asia/3	IATA	~~Open~~ Closed	

ACTION ITEM	DESCRIPTION	TIME FRAME	RESPONSIBLE PARTY	STATUS	REMARKS
	ON ROUTE message				
2/6	Remind airspace users of the requirements for correct CPDLC logon, the procedures in the event of logon rejection, and the requirement to notify affected ATSUs in the event of any amendment to information in the original flight plan	FIT-Asia/3	IATA	~~Open~~ Closed	
3/1	Seek appropriate expert advice on the operational significance of 99.9% performance criteria, and what can be done to meet it in cases of ACP, ACTP and ADS-C Downlink Latency "just" failing to meet the standard	FIT-Asia/4	Secretariat	Open	
3/2	Provide feedback to G-PAT technical authority/expert regarding a) data for dates more than 12 months old being combined into month 1 performance data b) lack of a G-PAT tool to de-identify the operator (currently done manually)	FIT-Asia/4	Secretariat	Open	Response to be circulated to FIT-Asia States on receipt.
3/3	Editorial review of performance reporting template (including the use of ">" where "<" should be used.	31 July 2014	Secretariat	Open	
3/4	Register on FIT-Asia CRA Website	31 December 2014	ALL FIT-Asia States/Administrations	Open	In accordance with APANPIRG Conclusion 24/24
3/5	Provide and promulgate in AIP the point of contact for airspace users to report ADS-C/CPDLC problems to the State/Air Navigation Service Provider	31 December 2014	ALL FIT-Asia States/Administrations	Open	Draft Conclusion FIT-Asia 3/2

Proposal for Amendment of
Regional Supplementary Procedures ICAO Doc 7030/5
(Serial No. APAC-S 14/09 – MID/ASIA/PAC)

a) **Regional Supplementary Procedures, Doc 7030/5:** MID/ASIA and PAC

b) **Proposing State:** ICAO

c) **Proposed Amendment:** 5. On page MID/ASIA 5-3 dated 30/11/07

5.4 Automatic Dependent Surveillance – Contract (ADS–C)

Insert the following text on 5.4.1:

5.4.1 Carriage and operation of ADS–C

5.4.1.1 All aircraft operating within the following FIRs shall carry and operate a serviceable ADS – C facility within designated portions of airspace and the conditions mandated by the State with responsibility for the FIR concerned: Auckland Oceanic, Bangkok, Beijing, Brisbane, Chennai, Colombo, Delhi, Dhaka, Fukuoka, Guangzhou, Hanoi, Ho Chi Minh, Honiara, Hong Kong, Incheon, Jakarta, Kabul, Karachi, Kathmandu, Kolkata, Kota Kinabalu, Kuala Lumpur, Kunming, Lahore, Lanzhou, Male, Manila, Melbourne, Mumbai, Nauru, Phnom Penh, Port Moresby, Pyongyang, Sanya, Shanghai, Shenyang, Singapore, Taibei, Ujung Pandang, Ulan Bator, Urumqi, Vientiane, Wuhan, Yangon.

5.4.1.2 The portions of airspace referred to in 5.4.1.1 may only be designated after the following actions had been undertaken:

a) appropriate consultation with affected airspace users and affected Air Traffic Control (ATC) units;

b) conduct of a safety case, which includes, *inter alia*, a human factors review and the integration of data into the ATC workstation;

c) appropriate pilot and ATC training;

d) the ability to provide an enhanced service delivery; and

e) promulgation of the airspace mandate with appropriate notice, and in accordance with the provisions of Annex 15.

6. On page PAC 5-3 dated 30/11/07

5.4 Automatic Dependent Surveillance – Contract (ADS–C)

Insert the following text on 5.4.1:

5.4.1 Carriage and operation of ADS–C

5.4.1.1 All aircraft operating within the following FIRs shall carry and operate a serviceable ADS–C facility within designated portions of airspace and the conditions mandated by the State with responsibility for the FIR concerned: Anchorage Oceanic, Auckland Oceanic, Nadi, Tahiti.

5.4.1.2 The portions of airspace referred to in 5.4.1.1 may only be designated after the following actions had been undertaken:

a) appropriate consultation with affected airspace users and affected Air Traffic Control (ATC) units;

b) conduct of a safety case, which includes, *inter alia*, a human factors review and the integration of data into the ATC workstation;

c) appropriate pilot and ATC training;

d) the ability to provide an enhanced service delivery; and

e) promulgation of the airspace mandate with appropriate notice, and in accordance with the provisions of Annex 15.

d) **Proposers' Reasons for Amendment:**

Since 2011, the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) has agreed to a number of Conclusions designed to facilitate the enhancement of Air Navigation Services (ANS) within performance-based airspace. In essence, APANPIRG endorsed the concept of airspace mandates to improve the safety and efficiency of airspace, as long as there was appropriate consultation and a performance benefit to airspace users. The development of the Seamless ATM Plan in 2013 was the main mechanism for States to improve ANS and airspace performance on a region-wide basis. The Conclusions are as follows:

APANPIRG/23 (2012)

Conclusion 23/5 – Asia/Pacific Air Navigation Concept of Operations Mandates
That, States intending to implement Performance-Based Navigation and Safety Nets may, after appropriate

consultation with airspace users, designate portions of airspace within their area of responsibility:
a) as providing priority for access to such airspace for aircraft with prescribed Performance-Based Navigation (PBN) specifications and supporting data-link equipage (ADS-C/CPDLC); and/or
b) mandating the carriage and use of an operable Automatic Dependent Surveillance-Contract/Controller Pilot Data-link Communications Systems (ADS-C/CPDLC) system, and mode A/C and/or mode S transponder.

While it is recognised that States may introduce restrictions and performance-based measures over their sovereign territory, mandates over the High Seas need to be implemented in line with regional air navigation agreements; in this case through APANPIRG. Thus it is necessary to introduce an amendment to the Regional Supplementary Procedures (ICAO Doc 7030) for Asia/Pacific FIRs that allows States to designate portions of performance-based airspace when they are able to provide the performance benefit and in accordance with aircraft equipage and capability.

The level of ANS capability and aircraft equipage varies throughout the Asia/Pacific, so it is intended that States will designate airspace when possible, in either exclusive or 'non-exclusive' (mixed mode with lower priority for non-equipped aircraft), as appropriate.

e) **Proposed Implementation Date of the Amendment:** Upon approval of the Council

f) **Proposal Circulated to the Following States and International Organizations:**

Afghanistan	Mongolia
Australia	Myanmar
Bangladesh	Nauru
Brunei Darussalam	New Zealand
Cambodia	Palau, Republic of
China	Papua New Guinea
(cc: Hong Kong, China)	Philippines
(cc: Macao, China)	Republic of Korea
Cook Islands	Samoa
Democratic People's Republic of Korea	Singapore
Fiji	Solomon Islands
France	Sri Lanka
Indonesia	Thailand
Japan	Timor-Leste
Kiribati	Tonga
Lao People's	United States
	Vanuatu

Democratic Republic Malaysia Maldives Marshall Islands Micronesia, Federated States of	Viet Nam IATA IFALPA IFATCA

g) **Secretariat Comments:** The amendment of Doc 7030 in respect of ADS-B, ADS-C, ACAS II and Mode S transponders, together with amendment proposals APAC-S 14/07 and 14/08 for MID/ASIA and PAC Regions, provides a framework for the state to establish performance based airspace, with consideration of such matters as existing and proposed airspace user equipages, mandate timing, definition of airspace volumes (both vertical and horizontal), exclusive or non-exclusive application, exemption provisions and management of State aircraft.

The amendment is specifically intended to enable States to promulgate airspace mandates over the High Seas, and to encourage a regional approach to the establishment of such mandates, where it is appropriate to do so and recognizing that it is not practical for the Asia/Pacific Region to establish Sub-Regional or Region-wide simultaneous mandates. This is in accordance with the concept of the Seamless ATM and performance-based approaches, as well as the Aviation System Block Upgrade (ASBU) initiative and Global Air Traffic Management Operational Concept (ICAO Doc 9854).

Proposal for Amendment of
Regional Supplementary Procedures ICAO Doc 7030/3
(Serial No. APAC-S 14/07 – MID/ASIA/PAC)

a) **Regional Supplementary Procedures, Doc 7030/3:** MID/ASIA and PAC

b) **Proposing State:** ICAO

c) **Proposed Amendment:**

1. On page MID/ASIA 3-2 dated 25/08/09

Insert the following text on 3.3.1:

3.3 Controller-Pilot Data Link Communications (CPDLC)

3.3.1 All aircraft operating within the following FIRs shall carry and operate a serviceable CPDLC facility within designated portions of airspace and the conditions mandated by the State with responsibility for the FIR concerned: Auckland Oceanic, Bangkok, Beijing, Brisbane, Chennai, Colombo, Delhi, Dhaka, Fukuoka, Guangzhou, Hanoi, Ho Chi Minh, Honiara, Hong Kong, Incheon, Jakarta, Kabul, Karachi, Kathmandu, Kolkata, Kota Kinabalu, Kuala Lumpur, Kunming, Lahore, Lanzhou, Male, Manila, Melbourne, Mumbai, Nauru, Phnom Penh, Port Moresby, Pyongyang, Sanya, Shanghai, Shenyang, Singapore, Taibei, Ujung Pandang, Ulan Bator, Urumqi, Vientiane, Wuhan, Yangon.

3.3.2 The portions of airspace referred to in 3.3.1 may only be designated after the following actions had been undertaken:

a) appropriate consultation with affected airspace users and affected Air Traffic Control (ATC) units;

b) conduct of a safety case, which includes, *inter alia*, a human factors review and the integration of data into the ATC workstation;

c) appropriate pilot and ATC training;

d) the ability to provide an enhanced service delivery; and

e) promulgation of the airspace mandate with appropriate notice, and in accordance with the provisions of Annex 15.

2. On page PAC 3-2 dated 30/11/07

Insert the following text on 3.3.1:

3.3 Controller-Pilot Data Link Communications (CPDLC)

3.3.1 All aircraft operating within the following FIRs shall carry and operate a serviceable CPDLC facility within designated portions of airspace and the conditions mandated by the State with responsibility for the FIR concerned: Anchorage Oceanic, Auckland Oceanic, Nadi, Tahiti.

3.3.2 The portions of airspace referred to in 3.3.1 may only be designated after the following actions had been undertaken:

a) appropriate consultation with affected airspace users and affected Air Traffic Control (ATC) units;

b) conduct of a safety case, which includes, *inter alia*, a human factors review and the integration of data into the ATC workstation;

c) appropriate pilot and ATC training;

d) the ability to provide an enhanced service delivery; and

e) promulgation of the airspace mandate with appropriate notice, and in accordance with the provisions of Annex 15.

d) **Proposers' Reasons for Amendment:**

Since 2011, the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) has agreed to a number of Conclusions designed to facilitate the enhancement of Air Navigation Services (ANS) within performance-based airspace. In essence, APANPIRG endorsed the concept of airspace mandates to improve the safety and efficiency of airspace, as long as there was appropriate consultation and a performance benefit to airspace users. The development of the Seamless ATM Plan in 2013 was the main mechanism for States to improve ANS and airspace performance on a region-wide basis. The Conclusions are as follows:

APANPIRG/23 (2012)

Conclusion 23/5 – Asia/Pacific Air Navigation Concept of Operations Mandates

That, States intending to implement Performance-Based Navigation and Safety Nets may, after appropriate consultation with airspace users, designate portions of airspace within their area of responsibility:
a) as providing priority for access to such airspace for

aircraft with prescribed Performance-Based Navigation (PBN) specifications and supporting data-link equipage (ADS-C/CPDLC); and/or
b) mandating the carriage and use of an operable Automatic Dependent Surveillance-Contract/ Controller Pilot Data-link Communications Systems (ADS-C/CPDLC) system, and mode A/C and/or mode S transponder.

While it is recognised that States may introduce restrictions and performance-based measures over their sovereign territory, mandates over the High Seas need to be implemented in line with regional air navigation agreements; in this case through APANPIRG. Thus it is necessary to introduce an amendment to the Regional Supplementary Procedures (ICAO Doc 7030) for Asia/Pacific FIRs that allows States to designate portions of performance-based airspace when they are able to provide the performance benefit and in accordance with aircraft equipage and capability.

The level of ANS capability and aircraft equipage varies throughout the Asia/Pacific, so it is intended that States will designate airspace when possible, in either exclusive or 'non-exclusive' (mixed mode with lower priority for non-equipped aircraft), as appropriate.

e) **Proposed Implementation Date of the Amendment**

Upon approval of the Council

f) **Proposal Circulated to the Following States and International Organizations:**

Afghanistan
Australia
Bangladesh
Brunei Darussalam
Cambodia
China
(cc: Hong Kong, China)
(cc: Macao, China)
Cook Islands
Democratic People's Republic of Korea
Fiji
France
Indonesia
Japan
Kiribati
Lao People's Democratic Republic
Malaysia
Maldives
Marshall Islands
Micronesia, Federated States of
Mongolia
Myanmar
Nauru
New Zealand
Palau, Republic of
Papua New Guinea
Philippines
Republic of Korea
Samoa
Singapore
Solomon Islands
Sri Lanka
Thailand
Timor-Leste
Tonga
United States
Vanuatu
Viet Nam
IATA
IFALPA
IFATCA

g) **Secretariat Comments:** This Doc 7030 amendment proposal in respect of CPDLC, together with amendment proposals APAC-S 14/08 and 14/09 for MID/ASIA and PAC Regions, provides a framework for the state to establish performance based airspace, with consideration of such matters as existing and proposed airspace user equipages, mandate timing, definition of airspace volumes (both vertical and horizontal), exclusive or non-exclusive application, exemption provisions and management of State aircraft.

The amendment is specifically intended to enable States to promulgate airspace mandates over the High Seas, and to encourage a regional approach to the establishment of such mandates, where it is appropriate to do so and recognizing that it is not practical for the Asia/Pacific Region to establish Sub-Regional or Region-wide simultaneous mandates. This is in accordance with the concept of the Seamless ATM and performance-based approaches, as well as the Aviation System Block Upgrade (ASBU) initiative and Global Air Traffic Management Operational Concept (ICAO Doc 9854).

APANPIRG Asia/Pacific Airspace Safety Monitoring

RASMAG LIST OF COMPETENT AIRSPACE SAFETY MONITORING ORGANIZATIONS

The Regional Airspace Safety Monitoring Advisory Group of APANPIRG (RASMAG) is required by its terms of reference to recommend and facilitate the implementation of airspace safety monitoring and performance assessment services and to review and recommend on the competency and compatibility of airspace monitoring organizations. In order to assist in addressing these requirements, RASMAG updates and distributes the following list of competent airspace safety monitoring organizations for use by States requiring airspace safety monitoring services. In the context of the list, abbreviations have meanings as follows:

- RMA – Regional Monitoring Agency – safety assessment and monitoring in the vertical plane (i.e. RVSM);
- EMA – En-route Monitoring Agency – safety assessment and monitoring in the horizontal plane (i.e. RVSM, RNAV10, RNP4);
- CRA – Central Reporting Agency – technical performance of data link systems (i.e. ADS/CPDLC); and
- FIT – FANS 1/A Interoperability/Implementation Team – parent body to a CRA.

(Last updated 30 August 2012)

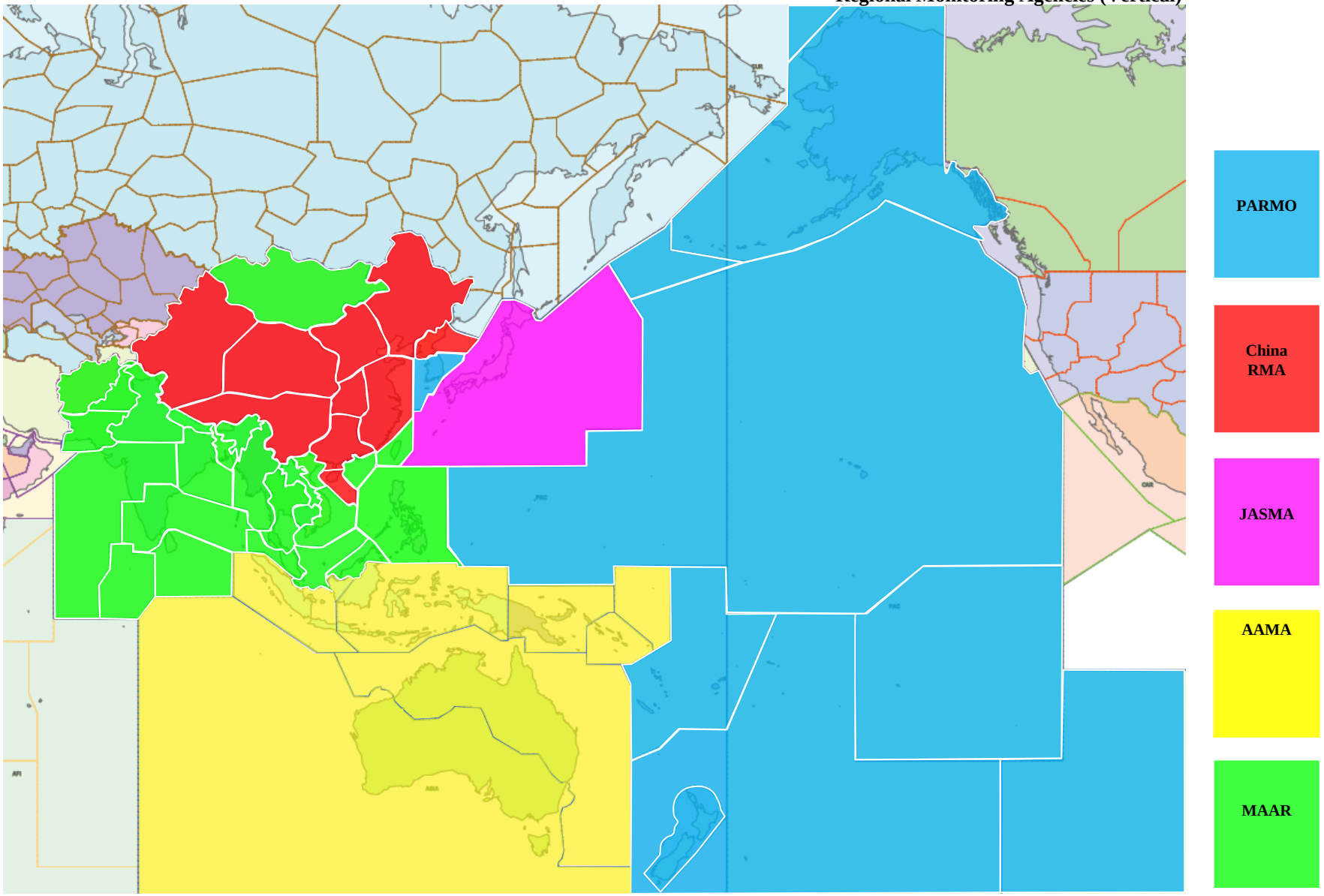
Organisation *(including contact officer)*	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
Australian Airspace Monitoring Agency (AAMA) - Airservices http://www.airservicesaustralia.com/organisations/aama/default.asp Mr. Robert Butcher, Operational Analysis Manager, Safety and Assurance Group email: robert.butcher@airservicesaustralia.com or aama@airservicesaustralia.com	Australia	RMA	Current	Brisbane, Honiara, Jakarta, Melbourne, Nauru, Port Moresby and Ujung Pandang (including Timor-Leste) FIRs
		EMA	Current	Brisbane, Melbourne, Honiara and Nauru FIRs

Organisation *(including contact officer)*	**State**	**Competency**	**Status**	**Airspace assessed (FIRs)**
China RMA - **Air Traffic Management Bureau, (ATMB) of Civil Aviation Administration of China (CAAC)** http://www.chinarma.cn Mr. Tang Jinxiang, Manager China RMA ADCC, ATMB, email: tangjx@adcc.com.cn	China	RMA	Current	Beijing, Guangzhou, Kunming, Lanzhou, Pyongyang, Sanya, Shanghai, Shenyang, Urumqi, and Wuhan FIRs.
India Bay of Bengal Arabian Sea Indian Ocean Safety Monitoring Agency (BOBASMA) http://www.aai.aero/public_notices/aaisite_test/bobasma_index.jsp Mr. A. P. Udayanarayanan Joint General Manager (ATM) Phone No:+ 91 44 22561253 Fax No: +91 44 22561740 Email: bobasmachennai@gmail.com : bobasma@aai.aero	India	EMA	Current	Chennai, Colombo, Delhi, Dhaka, Kabul, Karachi, Kolkata, Lahore, Male, Mumbai, Yangon,
Japan Airspace Safety Monitoring Agency (JASMA) Mr. Takashi Imuta, Special Assistant to the Director, Flight Procedures and Airspace Program Office, Japan Civil Aviation Bureau, email: imuta-t07j7@mlit.go.jp CRA function: Mr. Natsuki IBE, Special Assistant to the Director, Air Navigation Services Planning Division, Civil Aviation Bureau of Japan email: ibe-n24hy@mlit.go.jp	Japan	RMA, EMA and CRA	Current	Fukuoka FIR

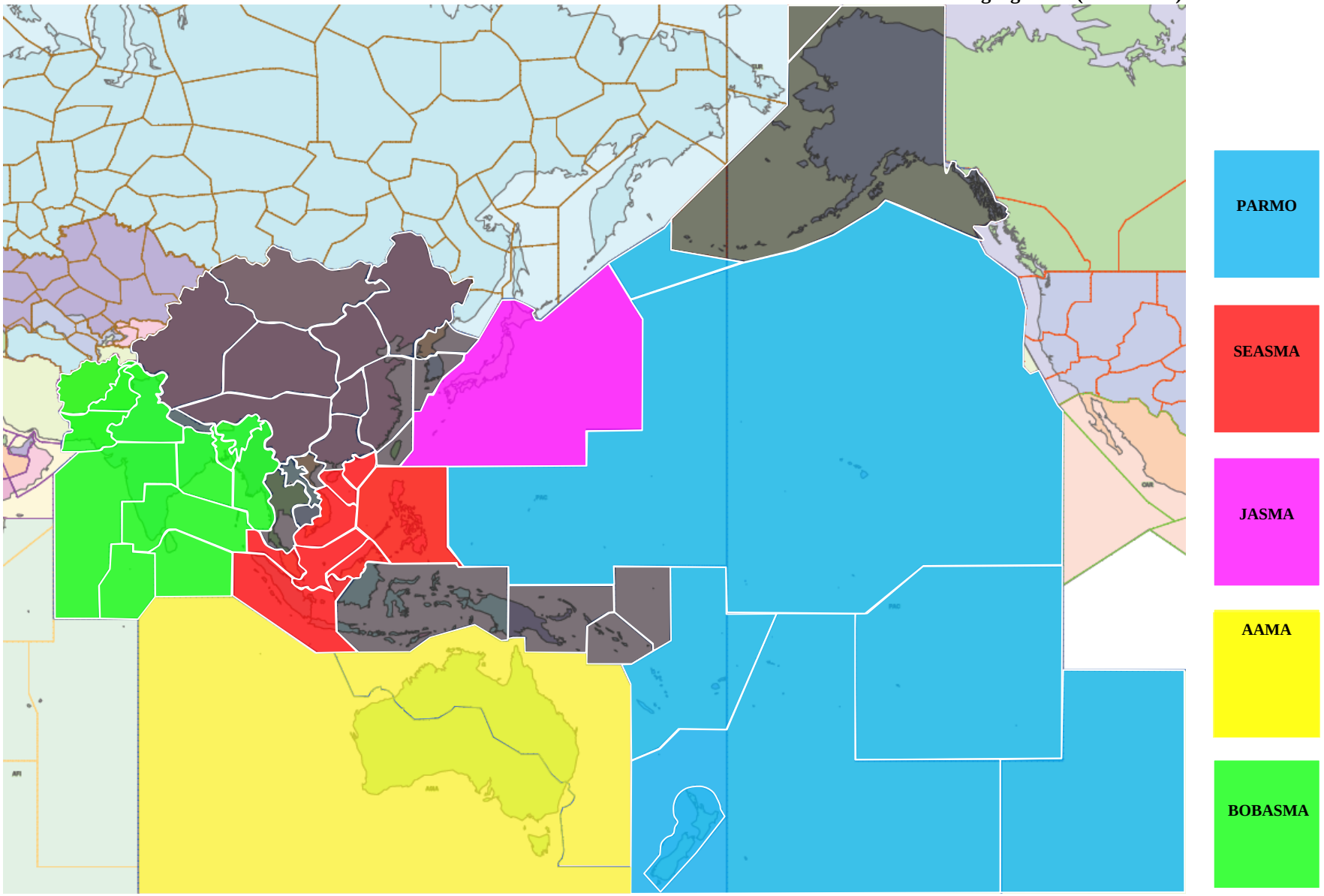
Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
web site: http://www.jasma.jp				
Monitoring Agency for the Asia Region (MAAR) **Aeronautical Radio of Thailand LTD** (AEROTHAI) http://www.aerothai.co.th/maar Mr. Chumnan Ruechai Director, Safety Management Department & MAAR AEROTHAI Email: maar@aerothai.co.th	Thailand	RMA	Current	Bangkok, Kolkata, Chennai, Colombo, Delhi, Dhaka, Hanoi, Ho Chi Minh, Hong Kong, Kabul, Karachi, Kathmandu, Kota Kinabalu, Kuala Lumpur, Lahore, Male, Manila, Mumbai, Phnom Penh, Singapore, Taibei, Ulaan Bataar, Vientiane, Yangon FIRs
Pacific Approvals Registry and Monitoring Organization (PARMO) – Federal Aviation Administration (US FAA) http://www.faa.gov/air_traffic/separation_standards/parmo/ Mr. Dale Livingston, Manager, Separation Standards Analysis Team, FAA, email: dale.livingston@faa.gov or aparmo@faa.gov	USA	RMA and EMA	Current	RMA for Anchorage Oceanic, Auckland Oceanic, Incheon, Nadi, Oakland Oceanic, New Zealand, Tahiti FIRs EMA for Anchorage Oceanic, Oakland Oceanic
South East Asia Safety Monitoring Agency (SEASMA) - Civil Aviation Authority of Singapore (CAAS) Mr. Kuah Kong Beng, Director Air Traffic Services, email: KUAH_Kong_Beng@caas.gov.sg	Singapore	EMA and CRA	Current	EMA for Hong Kong, Ho Chi Minh, Kota Kinabalu, Kuala Lumpur, Manila, Jakarta, Sanya and Singapore FIRs CRA for Singapore, Viet Nam and Philippines

Organisation *(including contact officer)*	State	Competency	Status	Airspace assessed (FIRs)
FIT-ASIA Mr. Bradley Cornell, Boeing Engineering email: Bradley.D.Cornell@Boeing.Com	Boeing USA	FIT	Current	FIRs in the Asian Region not covered by IPACG/FIT and ISPACG/FIT
IPACG/FIT Mr. Natsuki IBE, JCAB Co-Chair, email: ibe-n24hy@mlit.go.jp and To be advised (FAA Co-Chair) email: to be advised	Japan and USA	FIT & CRA	Current	North & Central Pacific (Oceanic airspace within Fukuoka FIR, and Anchorage & Oakland FIRs)
ISPACG/FIT Mr. Bradley Cornell, Boeing Engineering email: Bradley.D.Cornell@Boeing.Com	Boeing USA	FIT & CRA	Current	South Pacific FIRs and members of the Informal South Pacific ATS Coordination Group (ISPACG)

Regional Monitoring Agencies (Vertical)



En-route Monitoring Agencies (Horizontal)



Central Reporting Agencies and FITs (Data-link)