INTERNATIONAL CIVIL AVIATION ORGANIZATION

TWENTY FIFTH MEETING OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING AND IMPLEMENTATION REGIONAL GROUP (APANPIRG/25)

Kuala Lumpur, Malaysia, 8 – 11 September 2014

Agenda Item 3: Performance Framework for Regional Air Navigation Planning and Implementation

3.3 RASMAG Report

RASMAG/19 OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of the Nineteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/19) held from 27-30 May 2014 in conjunction with the Third Meeting of the Future Air Navigation Systems Interoperability Team-Asia (FIT-Asia/3, 26 May 2014), at Pattaya, Thailand.

1. INTRODUCTION

1.1 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 at the time.

1.2 RASMAG/19 considered 32 Working Papers (WPs) and seven Information Papers (IPs), while there were 11 WPs and four IPs presented to FIT-Asia/3. RASMAG/19 agreed on five Draft Conclusions for APANPIRG's consideration.

2. DISCUSSION

Data-link Problem Reporting

2.1 New Zealand had provided an update to FIT-Asia/3 on the status of the Central Reporting Agency (CRA) Problem Reporting (PR) website maintained by Airways New Zealand for the Informal South Pacific ATS Coordination Group (ISPACG) to provide an on-line problem reporting capability of problems and facilitate continuous improvement of the system. 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.

2.2 The Secretariat had 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 CRAs for the technical analysis of data-link systems' performance.

2.3 The FIT-Asia/3 and RASMAG/19 meetings recalled 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.*

2.4 **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. The 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, as at May 2014

2.5 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.

2.6 Singapore had offered the funding for CRA services for the South East Asia region for three years, and this would end by September 2014. While Singapore would extend the funding for another year until September 2015, there needed to be an alternative funding model in place.

2.7 The FIT-Asia CRA (Boeing) provided a detailed presentation of data-link problem reports including Active, Open, Closed-as-dup and Closed status reports, for the period January 1 2013 to 21 May 2014. 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. The presentation provided relevant references from the Global Operational Data-link Document (GOLD), and urged states to utilize that document for guidance.

Data-link Performance

2.8 India, China and Singapore presented information on the observed ADS/CPDLC data link performance within their Flight Information Regions (FIRs) measured against the Required Communication Performance (RCP) and Required Surveillance Performance (RSP) guidelines contained in the GOLD. It was noted by FIT-Asia/3 that the Actual Communications Performance (ACP) for CPDLC per media type (Satellite, VHF and combined) met the 180 second transaction completion target (95% of transactions) but did not always meet the 99.9% target. 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.

2.9 Analysis by China identified a number of data link problem areas:

- failure of automatic CPCLC transfer functions caused by a mismatch between the operator's ICAO 3 letter designator and that registered in the CSP's operator list;
- non-replies to CPDLC requests in the Kunming FIR due to the availability of Very High Frequency (VHF) coverage and ATC preference;
- use of free text messages by ATC instead of the standardized practices recommended in the GOLD.

Regional Supplementary Procedures Supporting ADS-C/CPDLC Mandates

2.10 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. PfAs had been drafted that related 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.

2.11 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). The FIT-Asia-3 and RASMAG/19 meetings noted the PfAs, and did not suggest any modification or amendment.

Guidance Material for implementation of Data Link Systems

2.12 Australia provided guidance material (**Attachment A**) intended to guide implementation of data link systems to FIT-Asia/3. The RASMAG/19 meeting agreed to the following Draft Conclusion for APANPIRG's consideration:

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

That, the Data Link Implementation Strategy Guidance Material appended as **Attachment A** 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.

2.13 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 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

2.14 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.

AAMA Safety Report

2.15 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. 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 **3.43×10^{-9}** (5.0×10^{-9}).

2.16 The report showed that for Indonesian airspace, the TLS was met for the reporting period with the assessed risk calculated as **3.82×10^{-9}**. 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

2.17 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. 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}**.

2.18 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 RASMAG/19 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.

2.19 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. 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.

JASMA Vertical Safety Report

2.20 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 x 10^{-9}**.

2.21 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 ATS Inter-facility Data Link Communications (AIDC) messages being sent.

MAAR Safety Report

2.22 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.

2.23 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.

2.24 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.

2.25 The BOB RVSM airspace overall risk was estimated to be **13.47 x 10^{-9}**, which did not meet the TLS. **Figure 1** presents collision risk estimate trends during the period from January 2013 to December 2013.

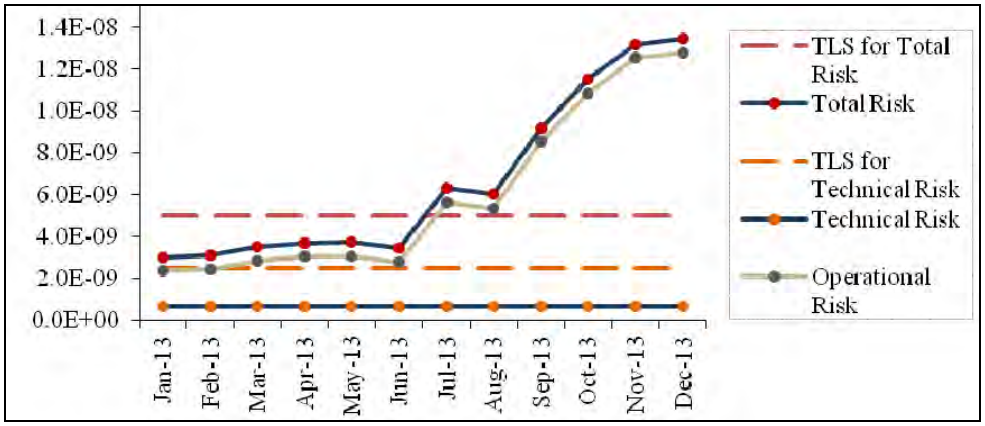

Figure 1: BOB Airspace RVSM Risk Estimate Trends

2.26 The RASMAG 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. Category E LHDs (ATC to ATC coordination errors as a result of human factors) were main contributor to the total operational risk.

2.27 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 may also be a factor that contributed to the duration of LHDs.

2.28 MAAR noted the distinctive group of LHDs prevalent within 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).

2.29 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. IATA particularly thanked MAAR for its proactive work and coordination with airlines.

2.30 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 were expected to be investigated during a Special Coordination Meeting (SCM) between the States concerned.

2.31 The West Pacific/South China Sea (WPAC/SCS) RVSM airspace total risk was estimated to be **5.22 x 10^{-9}**, which did not meet the TLS. **Figure 2** presents collision risk estimate trends during the period from January 2013 to December 2013.

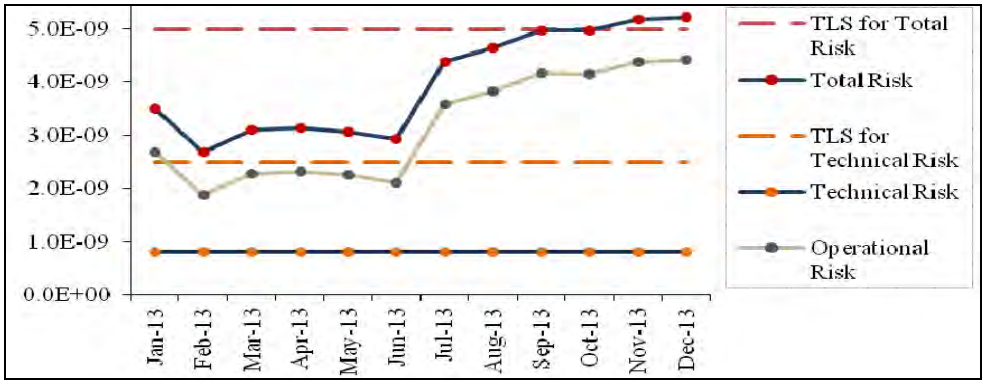

Figure 2: WPAC/SCS Airspace RVSM Risk Estimate Trends

2.32 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, with Category E and M LHDs being the main contributor to the total operational risk. The sudden increase in 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.

2.33 The Mongolian RVSM airspace total risk was estimated at **7.63 x 10^{-9}**, which did not meet the TLS. **Figure 3** presented collision risk estimate trends from January to December 2013.

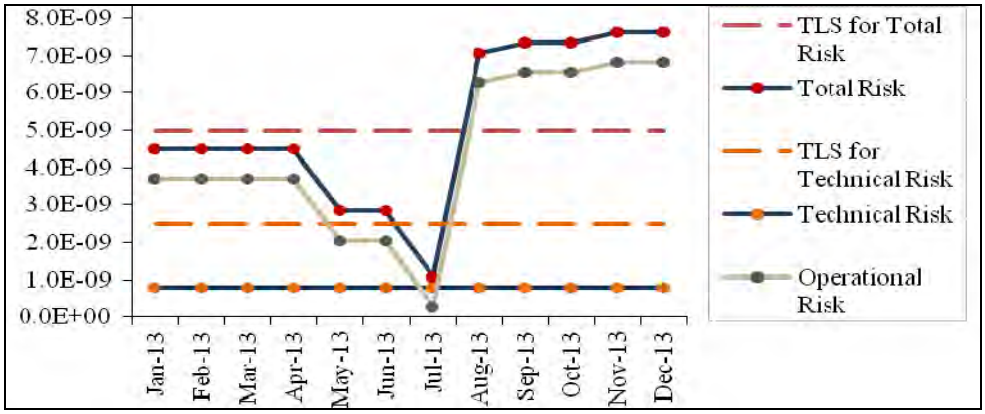

Figure 3: Mongolian Airspace RVSM Risk Estimate Trends

2.34 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 ACC so they would make enquiries as to the process followed in this instance.

PARMO Vertical Safety Report

2.35 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.

2.36 Pacific airspace total risk was estimated to be **8.05 x 10^{-9}**, which did not meet the TLS. **Figure 4** presents collision risk estimate trends during the period from 01 January 2013 to 31 December 2013.

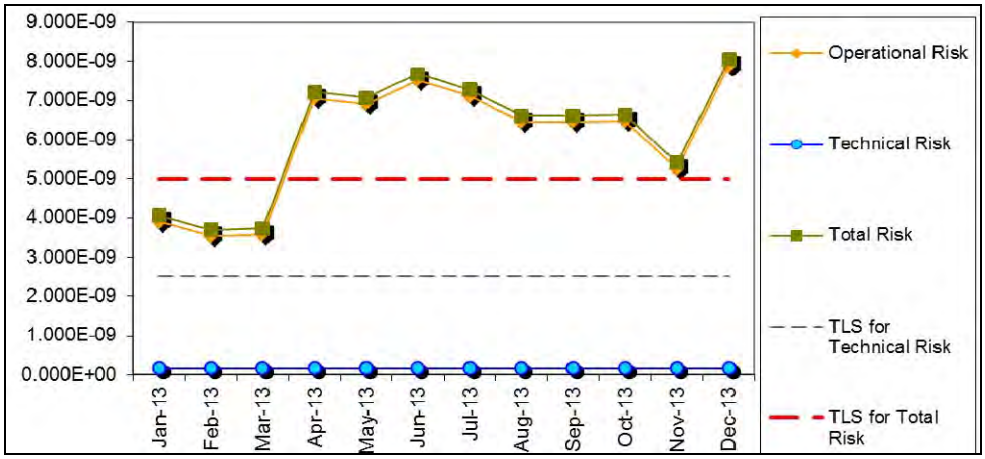

Figure 4: Pacific Airspace RVSM Risk Estimate Trends

2.37 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 (duration 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. One LHD had a duration of 55 minutes, when communication between ATC and the aircraft was lost. The pilot did not adhere to the published lost communication procedures.

2.38 The Incheon FIR RVSM total risk during the period from 01 January 2013 to 31 December 2013was estimated to be **0.60 x 10^{-9}**.

PARMO Horizontal Safety Report

2.39 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.

2.40 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).

BOBASMA Safety Report

2.41 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 **0.76×10^{-9}** (lateral) and **4.02×10^{-9}** (longitudinal).

JASMA Horizontal Safety Report

2.42 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 **0.000006×10^{-9}** (50 NM lateral) and **0.13×10^{-9}** (30 NM longitudinal), which achieved TLS.

SEASMA Safety Report

2.43 Singapore provided a 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 (**0.055×10^{-9}**) and longitudinal (**1.18×10^{-9}**) separation standards.

AAMA Assessment of Non-RVSM Approved Aircraft

2.44 The AAMA continued to refine its comparative assessment to identify operators who appear to be flight planning into RVSM levels with a 'W' in the equipment field with incorrect RVSM approval status. A comparison was made between aircraft registrations in the 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.

2.45 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).

2.46 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, RASMAG agreed that a similar system could be used in the Asia/Pacific, provided a number of issues such as the need to take into account 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).

2.47 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

2.48 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.

2.49 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

2.50 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

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

2.52 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

2.53 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).

2.54 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.

Regional Safety Monitoring Assessment

2.55 ICAO presented an overview of safety assessment results from a regional perspective. **Figure 5** indicated the regional Asia/Pacific regional RVSM TLS compliance as reported to RASMAG/18, and **Figure 6** indicated the status as reported to RASMAG/19.

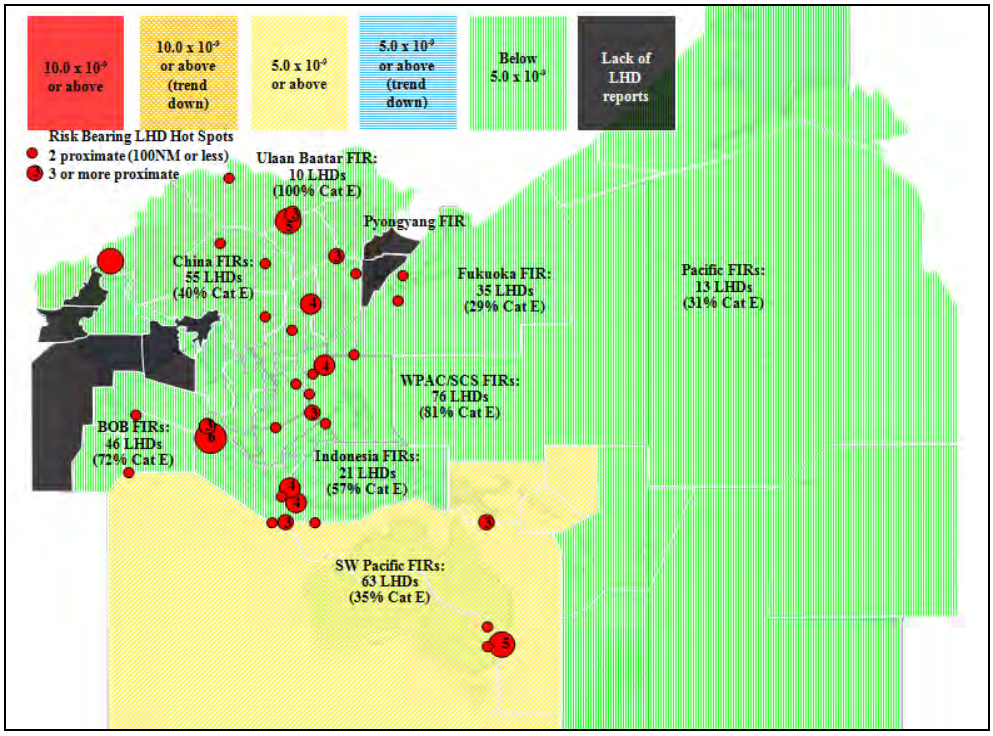

Figure 5: Asia/Pacific TLS compliance reported to RASMAG/18

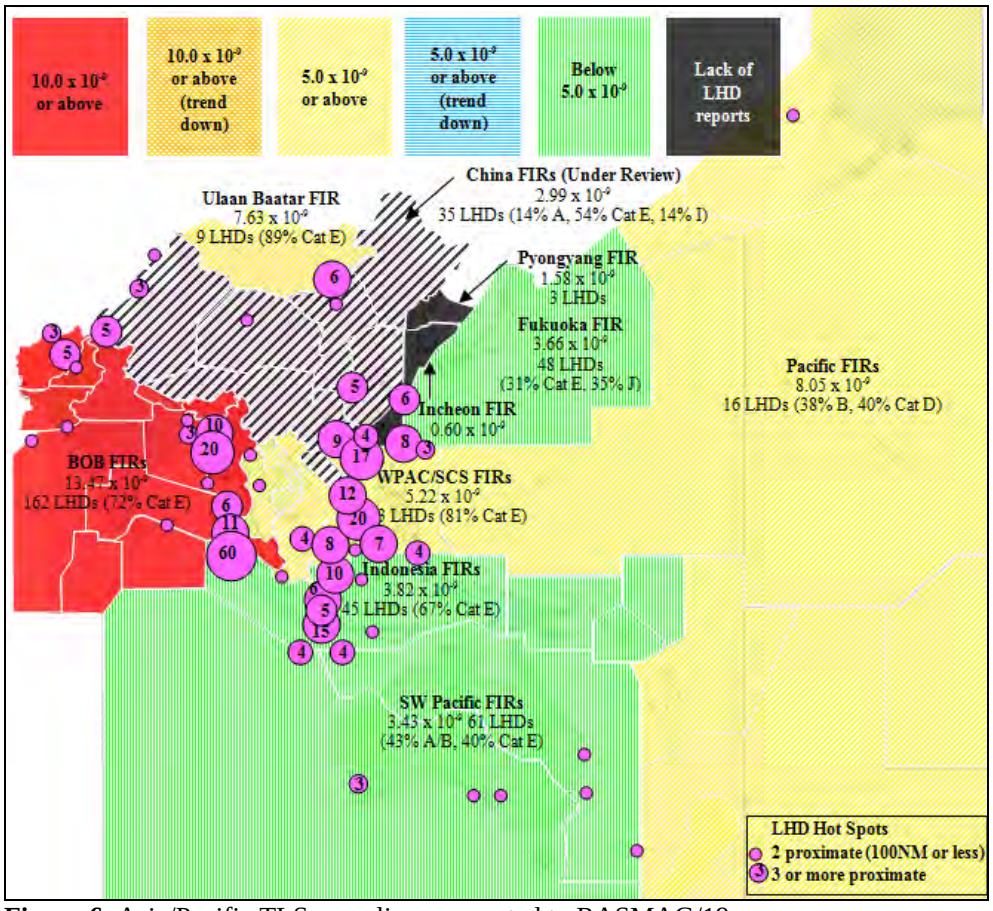

Figure 6: Asia/Pacific TLS compliance reported to RASMAG/19

2.56 **Figure 6** indicated the following sub-regional regional trends.

- **South Asia** (and in particular India) had 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 SCM should be conducted involving India, Bangladesh, 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 in the area (**Attachment B**).

- **Southeast Asia** had not met the TLS, which was largely connected with two major interface problems. The first involved Indonesian airspace between the Jakarta FIR and the Ujung Pandang FIR and – Singapore and Philippines airspace. The second was between the Philippines airspace and – Singapore, Malaysian, Viet Nam, Hong Kong and Japanese airspace. Increased reporting by Indonesia was a positive. The level of continued operational errors involving interfaces with both the Indonesian and the Philippines airspace remained 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)[1] 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.

[1] This Draft Conclusion became subsumed by a CNS/SG Decision (*Draft Decision 18/3 AIDC Implementation Task Force*) and thus it was unnecessary to present the RASMAG Raft Conclusion to APANPIRG/25.

- **Southwest Pacific** had maintained a downwards trend to be consistently below the TLS during the 12 months to end of December 2013. The AAMA reported 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 $5.0 \times 10^{-9.}$

  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 <u>not</u> satisfied TLS but this was mainly due to two long duration LHD event.

2.57 **Table 2** 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%

Table 2: Comparison of Sub-Regional and Regional RVSM TLS Achievement

2.58 **Table 3** provided 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 ratio that might be expected.

Airspace	**RASMAG 18 LHDs**	**RASMAG 19 LHDs**	**RASMAG 19 Flight Hours**	**RASMAG 18 Ratio**	**RASMAG 19 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 3: Comparison of Estimated Flight Hours and Reported LHDs (*2012 figure)

2.59 From the comparison in **Table 3** (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.

[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).

2.60 The number of reported LHDs had increased in the Indian (214%) and Indonesian FIRs (352%). As approximately two-thirds of these were category E ATC errors, this could be largely attributed to an improvement in reporting, which was noted as being a more accurate reflection of incidents. RASMAG congratulated India and Indonesia for their efforts in promoting a higher reporting culture.

2.61 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.

2.62 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 any progress made.

Non-RVSM Approved Aircraft

2.63 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 4** 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 4: Trend of Non-RVSM airframes Observed by Asia/Pacific RMAs

2.64 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

2.65 **Table 5** 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 5: Outstanding Monitoring Burden of Asia/Pacific RMAs

2.66 **Table 5** 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.

2.67 The following Asia/Pacific EMAs reported horizontal risk assessments as follows, which all satisfied the TLS of 5.0×10^{-9} (**Table 6**). 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 6: Comparison of Horizontal Risk Assessments

PARMO RNP Database Status

2.68 RASAG/19/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.

2.69 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

2.70 New Zealand presented RASMAG19/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*.

2.71 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.

2.72 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).

2.73 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.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) note the FIT-Asia States that had not registered for the FIT-Asia CRA (paragraph 2.4);

c) discuss Draft Conclusion RASMAG/19-1: Data Link Implementation Strategy Guidance (paragraph 2.12);

d) discuss Draft Conclusion RASMAG/19-2: Contact Details for Airspace User Reporting of ADS-C/CPDLC Problems to ANSPs (paragraph 2.13);

e) note the issue of LHDs between the Lahore and Urumqi FIRs (paragraph 2.18);

f) discuss RASMAG Draft Conclusion 19-3: Submission of FPLs as Traffic Sample Data (TSD, paragraph 2.24);

g) note the LHD hot spot between the Samarkand and Kabul FIRs (paragraph 2.28);

h) note the airspaces that did not meet the TLS for vertical risk and the decline in TLS achievement from 90% to 16%, largely due to improved reporting (paragraph 2.56);

i) note the results of the Special Coordination Meeting involving Bangladesh, India, Indonesia, Malaysia, and Myanmar due to the large number of LHDs (paragraph 2.56);

j) note that RASMAG Draft Conclusion 19-4: Asia/Pacific AIDC Implementation Task Force was incorporated into a CNS/SG Draft Decision (paragraph 2.56);

k) discuss the apparent lack of occurrence reporting in certain FIRs (paragraph 2.62);

l) discuss the lack of progress in eliminating non-RVSM approved airframes from the RVSM stratum (paragraph 2.63);

m) discuss Draft Conclusion RASMAG/19-5: Flights in RVSM Airspace by non-approved State Aircraft (paragraph 2.71); and

n) discuss any other relevant matters as appropriate.

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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

— END —

Attachment B: Malaysia, India, Myanmar and Indonesia Special Coordination Meeting Summary Report

1. INTRODUCTION

1.1 The Nineteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/19, Pattaya, Thailand, 27-30 May 2014) noted that the Monitoring Agency for Asia Region (MAAR) had provided the results of the airspace safety oversight for the Reduced Vertical Separation Minimum (RVSM) operation in the Bay of Bengal (BOB). The BOB RVSM airspace overall risk was estimated to be **13.47 x 10^{-9}**, which did not meet the Target Level of Safety (TLS). **Figure 1** presents collision risk estimate trends during the period from January 2013 to December 2013.

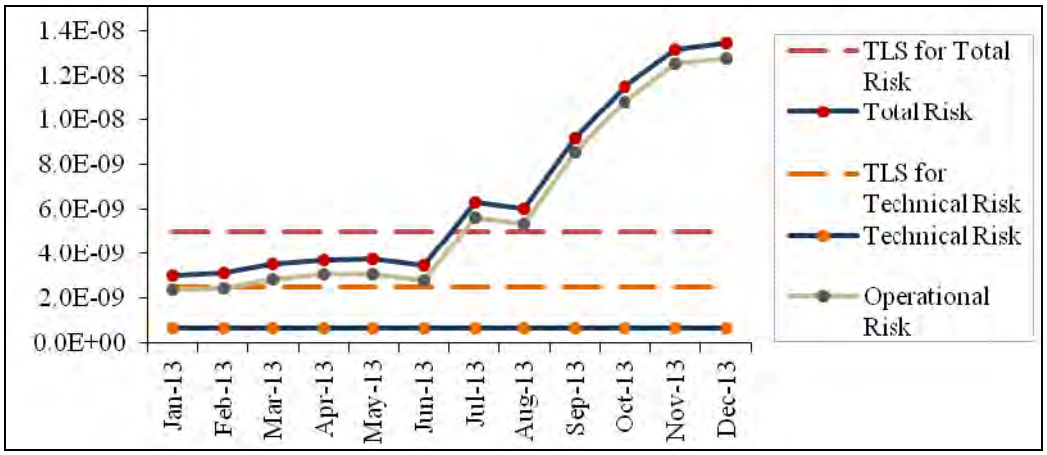

Figure 1: BOB Airspace RVSM Risk Estimate Trends

1.2 The RASMAG/19 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 2** provides the 12-month cumulative operational risk by Large Height Deviation (LHD) category for BOB airspace from January 2013 to December 2013.

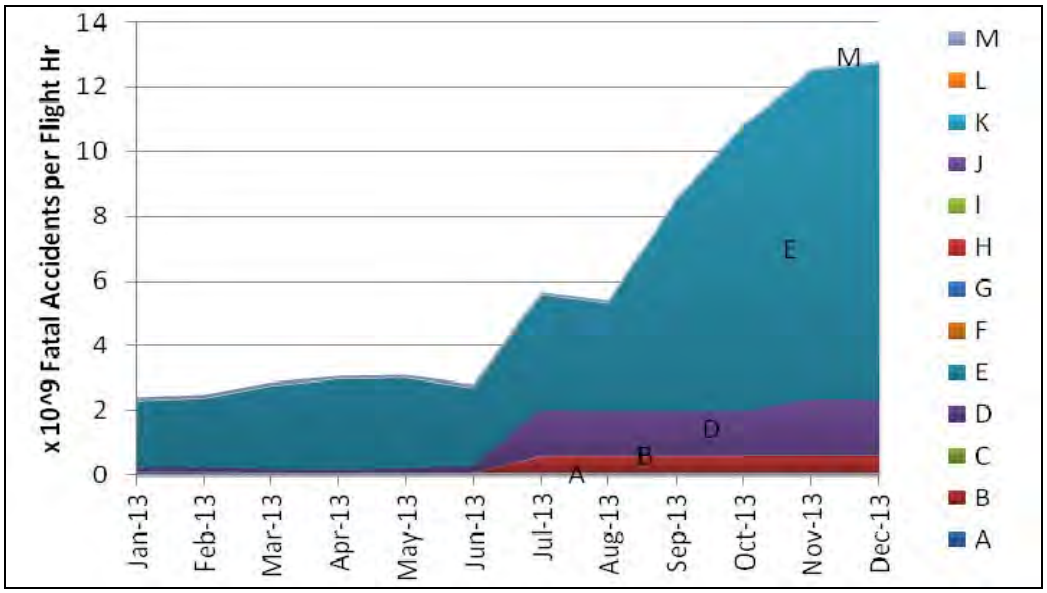

Figure 2: Trends of Operational Risk by LHD Category for BOB Airspace

1.3 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 Area Control Centre (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 3**) may also be a factor that contributed to the duration of LHDs (see Figure 3 regarding Very High Frequency (VHF) communications and Secondary Surveillance Radar (SSR).

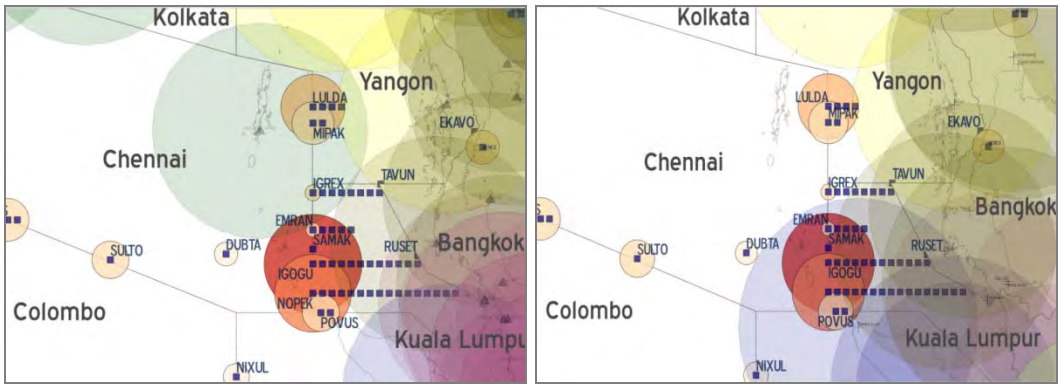

Figure 3: VHF and SSR coverage, BOB Hot Spot Analysis

1.4 MAAR provided the RASMAG/19 meeting with a number of recommendations regarding operational risk mitigation measures, including ATC-to-ATC communication, ATS surveillance, Automatic Dependent Surveillance-Contract/Controller Pilot Data Link Communications (ADS-C/CPDLC), reporting procedures for flight crews prior to entering Flight Information Regions (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 FIRs may be problematic. IATA particularly thanked MAAR for its proactive work and coordination with airlines.

1.5 MAAR noted that they had observed problems with the voice coordination 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.

2. SPECIAL COORDINATION MEETING

2.1 The Malaysia, India, Myanmar and Indonesia Special Coordination Meeting (MIMI SCM) was held as a separate agenda item at the end of the First Bangladesh, India, Myanmar and Thailand ATM Coordination Meeting (BIMT/1, Bangkok, Thailand, 18-19 August 2014). The MIMI SCM was supported by participants from MAAR and IATA. The meeting was moderated by Mr.Chandan Sen, General Manager (ATM), Kolkata , India, with Secretariat support provided by Mr. Len Wicks, Regional Officer Air Traffic Management, ICAO Asia/Pacific Office. A list of participants is provided at **Appendix A**.

2.2 The MIMI SCM focused on the two LHD ‘hot spots’ that were identified by RASMAG/19, with a view to determining the current status of Air Traffic Services communications (ATS COM), ATS surveillance (SUR) and future planning for ATM improvements in the area. The meeting also discussed any mitigating measures for the safety risks noted by MAAR, including for human performance issues.

2.3 **Table 1** identifies the status and planning for the hot spot near the Andaman Islands, while **Table 2** identifies the status and planning for the hot spot near the Nicobar Islands. If an items was advised as 'operational' or 'operationally capable' this was indicated with an '**O**', or if it was 'planned' then this was indicated with a '**P**', if it was under consideration' then this was indicated with a '**U**' and if it was not being considered or not applicable this was indicated with an '**N**' (note: AIDC = ATS Inter-facility Data Link Communications, and HF = High Frequency).

Andaman Islands	**ATS COM**	**ATS SUR**	**Human Performance**
India	• VHF = **N** • HF = **O** • CPDLC: **O** • Land lines (direct speech circuits) = **O** • AIDC = **O**, Malaysia trial to restart, Myanmar no trials yet • COM data sharing: **UC**, in principle India was already capable	• ADS-B: Port Blair = **O**, a mandate being considered with regulator • ADS-C: = **O** • SSR = **N**, military radar at Port Blair data sharing being pursued by AAI • Data sharing = **O**	• Quality of the landline was not good (loud but not clear). The landline was provided via satellite by local telecom companies • The speed of voice delivery (needs to be slow enough to understand) could be an issue • The ground-ground COM had a high controller workload, MAAR to highlight LHD reports in this area to India/Myanmar for in-depth investigation, education and training, with safety teams • India requested Myanmar to acknowledge the initial AFTN transfer message by AFTN or voice, but Myanmar workload precluded this
Myanmar	• VHF = **N** • HF = **O** • CPDLC = **O** • Land lines = **O** using IDD phone; the direct speech circuit provided by Tata and Myanmar Post and Telecom was frequently out of service; a joint 30 day monitoring was planned; there was a direct line only with Kolkata, not Chennai • AIDC = **O**, but a EUROCAT upgrade is required, trials possible with Chennai before the end of 2014 • Data sharing = U	• ADS-B = **P** (December 2014) ADS-B: Co Co Island and Sitwe coverage by the end of 2014 • ADS-C: **O** • SSR=N • Data sharing = **P,** early 2015 from Co Co Island to Kolkata • Other (MLAT, etc.): FY2014/15 a flight plan conflict probe will be enabled	• Quality of the landline is not good (loud but not clear). The landline is provided by satellite telecoms • Speed of voice delivery is important – voice communication needs to be slow enough to understand • Ground-ground communication with controller workload, MAAR to highlight LHD reports in this area to India/Myanmar for in-depth investigation, education and training, safety teams • Harmonised procedure with controllers using their initials to identify themselves for investigation is a possible issue

Table 1: Andaman Islands Hot Spot Analysis

Nicobar Islands	**COM**	**SUR**	**Human Performance**
India	• VHF = **N** • HF = **O** • CPDLC: **O** • Land lines = **O** • AIDC = **O**, Malaysia trial to restart September for two months, and there could be possible AIDC operations in the October/November timeframe • Data sharing: **UC**, in principle India was already capable	• ADS-B and mandates: Port Blair = O, mandate being considered with regulator • ADS-C (integrated): = O • SSR = **N**, military radar at Port Blair data sharing being pursued by AAI, Campbell Bay Island (south of Greta Nicobar) is a possible site for ADS-B/VHF – there is an official meeting with the Indian Navy for ADS-B soon, India to advise outcomes of preliminary discussions • Data sharing = **O**	• Quality of landline is OK • LHDs have been with Malaysia, not so much with Indonesia
Indonesia	• VHF = **O** • HF = **O** • CPDLC = **N** – the system was not integrated into the ATC workstation, but it was not used operationally in this area and it was only relevant for Colombo FIR traffic • Land lines (direct speech circuits) = **O** • AIDC = **P**, 2015 • COM Data collaboration = **O** , this is already enabled with Singapore	• ADS-B (presentation) = **O**, for situational awareness, 2015 for separation • ADS-C = **N** (not integrated) • SSR = **O** (coverage from Aceh) • SUR data = **UC** (collaboration with Australia and Singapore already, with the possibility of adding Malaysia later, and Indonesia will consider data collaboration with India	• No major issues

Nicobar Islands	**COM**	**SUR**	**Human Performance**
Malaysia	• VHF = **N** Malaysia can transmit but not receive at their FIRB so they use HF or CPDLC • HF = **O** • CPDLC = **O** • Land lines = **O** • AIDC = **P**, India trial to restart soon, possible operational capability at the end of 2014 • Data sharing = **N**	• ADS-B = **N** • ADS-C: = **O** • SSR = **N** • Data sharing = **N**	• No major issues identified

Table 2: Nicobar Islands Hot Spot Analysis

3. CONCLUSIONS

3.1 The LHD hot spot near the Andaman Islands was already covered by the surveillance of the new Indian Port Blair ADS-B facility, but this would be enhanced by the advent of Myanmar's Co Co Island ADS-B station and further, by data sharing between the two States.

3.2 The major remaining problem in this area is the poor ground-ground communications facilities, which are apparently frequently out of service and which does not provide clear voice communications. A 30 day monitoring assessment would be conducted shortly, but it may require the intervention of ICAO and the ITU to ensure that the COM systems are sufficient for safety-of-life services. It should be noted that the implementation of AIDC between India and Myanmar after the EUROCAT upgrade at Yangon will also greatly improve the communications risks. In the meantime, the States would emphasize manual checks, emphasis on human factors and the need to provide MAAR with quick responses to LHD occurrences in the Andaman Islands area.

3.3 The LHD hot spot near the Andaman Islands was already partially covered by the surveillance from Indonesia's Aceh ADS-B and SSR facilities, and as the interface issue was mainly between India and Malaysia in this area (not Indonesia), a collaborative arrangement for surveillance data to India and Malaysia was a good safety mitigation strategy. Indonesia was already in discussions with Malaysia, and had existing collaborative arrangements with Australia and Singapore, so an early improvement for this hot spot by the end of 2014 was possible.

3.4 In addition, India was seriously considering the possibility of establishing a new ADS-B site at Campbell Bay on Great Nicobar Island (N 07 00 23, E 93 54 18), which would provide complimentary overlapping SUR coverage with Port Blair (291NM north) and Aceh (124 NM southeast). If this site shared data with Indonesia and Malaysia it would allow significantly improved redundancy, efficiency and safety.

3.5 Regarding communications, this could be improved by the use of VHF data sharing from the potential new site at Campbell Bay to Malaysia and Indonesia, as well as Indonesia having a collaborative arrangement with India and Malaysia for VHF sited at Aceh. The use of AIDC between Malaysia and India is imminent, and was possible between India and Indonesia in 2015 when Jakarta plans this to be implemented.