International Civil Aviation Organization

The Second Meeting of the APANPIRG ATM Sub-Group (ATM /SG/2)

Hong Kong, China, 04-08 August 2014

Agenda Item 3: Performance Frameworks and Metrics

FIT-ASIA/3 AND RASMAG/19 OUTCOMES

(Presented by the Secretariat)

SUMMARY

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

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.

2. DISCUSSION

Data-link Problem Reporting

2.1 New Zealand provided an update to FIT-Asia/3 on the status of the Central Reporting Agency (CRA) Problem Reporting (PR) website. 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.

2.2 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.

2.3 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 periods January 1 to December 31 2013, and January 1 to May 21 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 in the provision of data link services.

Problem Reports and CRA Arrangements

2.4 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.

2.5 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.

2.6 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*.

2.7 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.*

2.8 **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

2.9 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.

2.10 The meeting was reminded that GOLD Appendix D detailed performance data and data formats for post implementation monitoring, 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.

2.11 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.

Data-link Performance within the Chennai FIR

2.12 India presented the observed performance of the ADS/CPDLC data link within the Chennai Flight Information Region (FIR) during a five month period from December 2013 to April 2014. The system performance was measured against the Required Communication Performance (RCP) and Required Surveillance Performance (RSP) guidelines contained in the GOLD using the GPAT tool version 3. The ATM systems at Mumbai, Delhi and Kolkata were being upgraded.

2.13 **Figure 1** provided 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%.

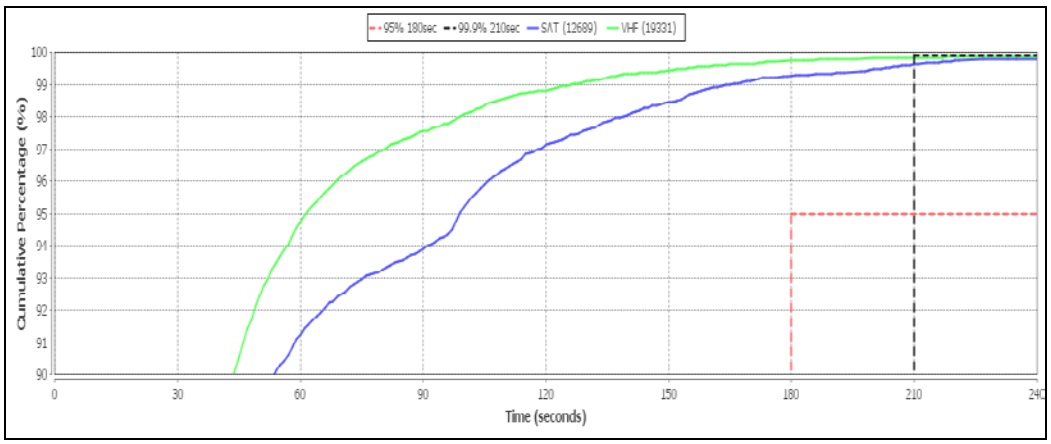

Figure 1: Chennai FIR CPCLC ACP by Data-Link Media Type

2.14 **Figure 2** presented information on 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.

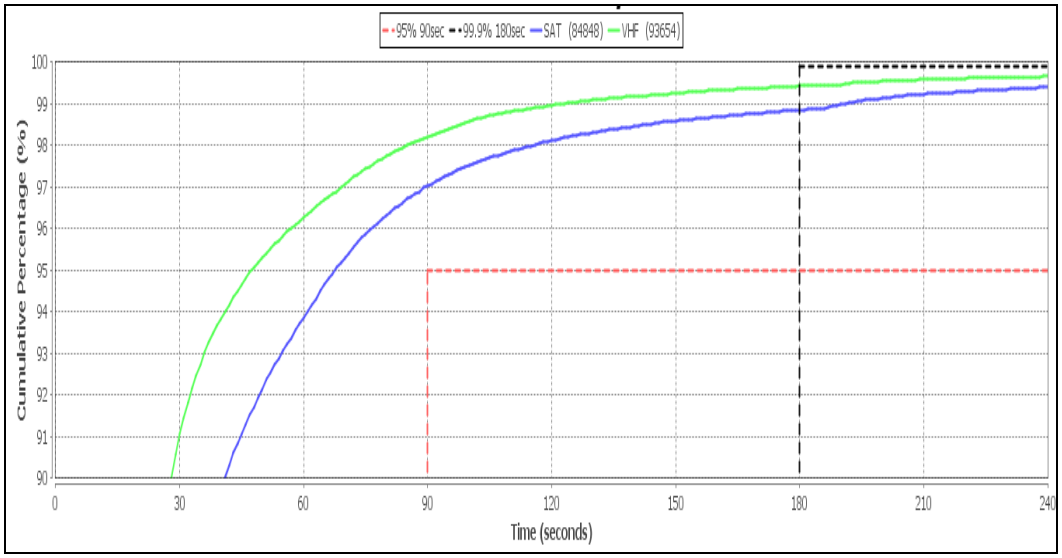

Figure 2: Chennai FIR ADS-C Downlink Latency by Data-Link Media Type

2.15 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.

China Investigation Airbus A380 FANS on L888

2.16 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.

2.17 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.

2.18 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.

2.19 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.

2.20 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.

2.21 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

2.22 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.

2.23 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.

2.24 **Figure 3** provided CPDLC ACP, and **Figure 4** provided ADS-C downlink latency measurement by media type.

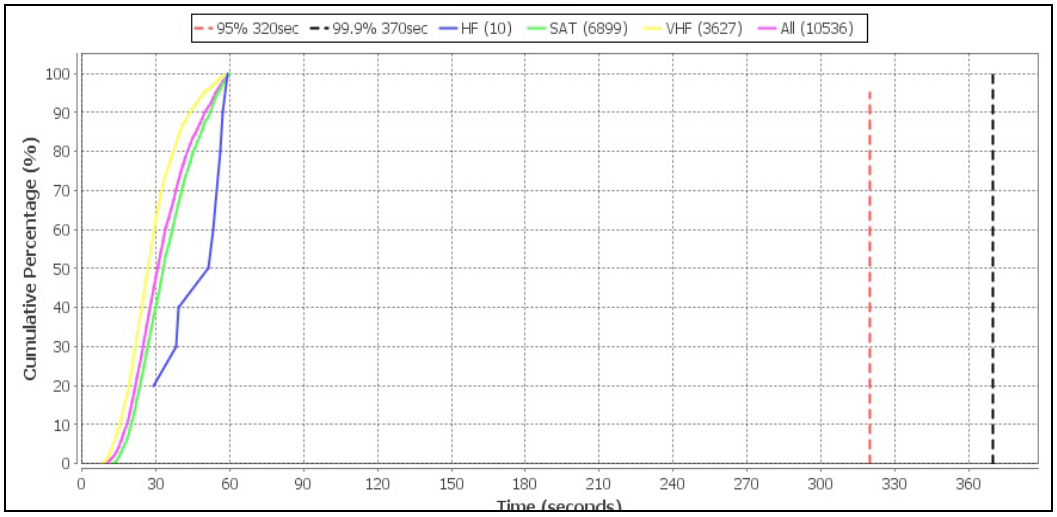

Figure 3: ACP by Data Link Media Type of L888 route

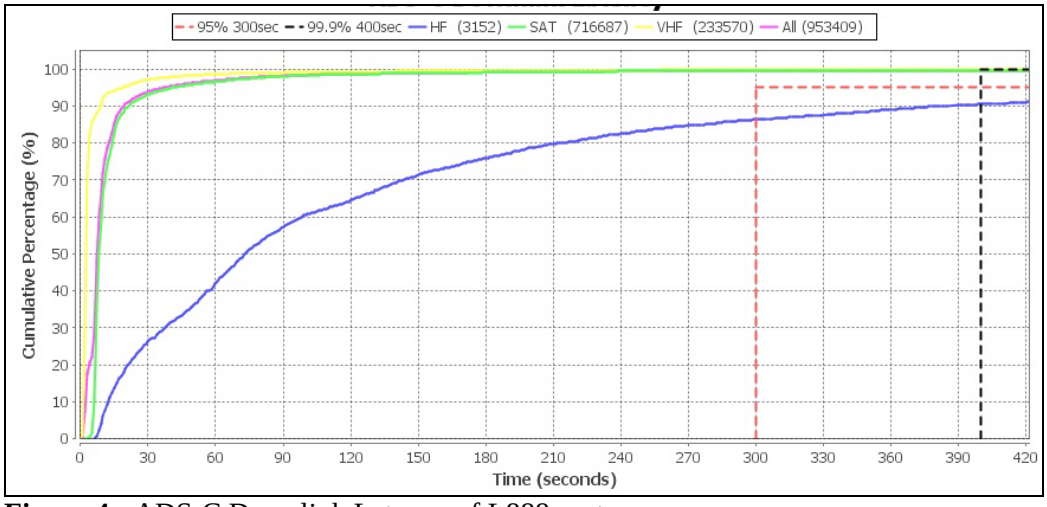

Figure 4: ADS-C Downlink Latency of L888 route

2.25 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

2.26 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.

2.27 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.

2.28 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.

Implementation of New Functionality by an ATS Unit

2.29 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. A suggested strategy for the implementation of data link was provided to FIT-Asia/3, and the meeting subsequently agreed to a draft Conclusion for RASMAG's consideration.

Regional Supplementary Procedures Supporting ADS-C/CPDLC Mandates

2.30 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.

2.31 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.

2.32 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).

2.33 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.

FIT/Asia/3 Report to RASMAG/19

2.34 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.

2.35 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

2.36 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

2.37 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}).

2.38 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

2.39 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 2.5×10^{-9} and 5.0×10^{-9} fatal accidents per flight hour, with an overall risk estimate of **2.99×10^{-9}**.

2.40 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.

2.41 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 **1.58×10^{-9}** fatal accidents per flight hour, which satisfied the globally agreed TLS value of 5×10^{-9} fatal accidents per flight hour.

JASMA Vertical Safety Report

2.42 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.

2.43 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

2.44 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.

2.45 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.

2.46 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.

2.47 The BOB RVSM airspace overall risk was estimated to be **13.47 x 10^{-9}**, which did not meet the TLS. **Figure 5** presents collision risk estimate trends during the period from January 2013 to December 2013.

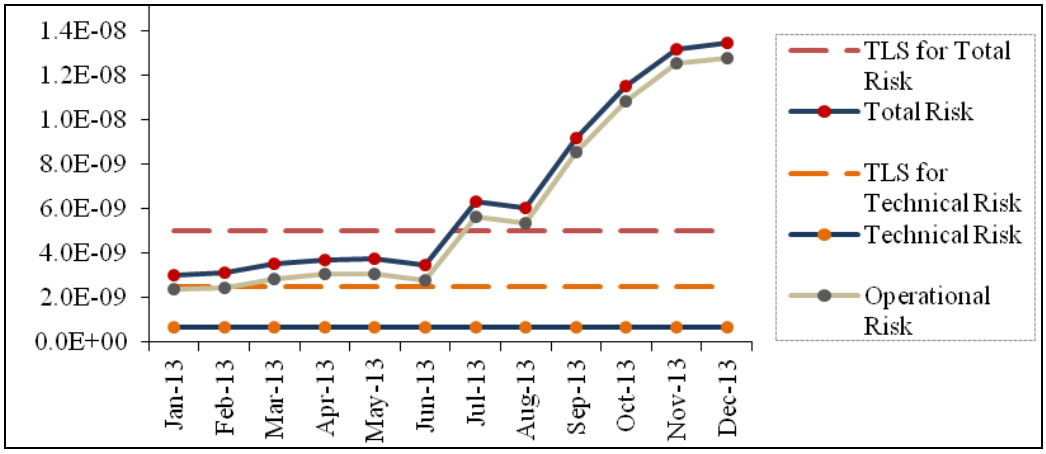

Figure 5: BOB Airspace RVSM Risk Estimate Trends

2.48 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 6** 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.

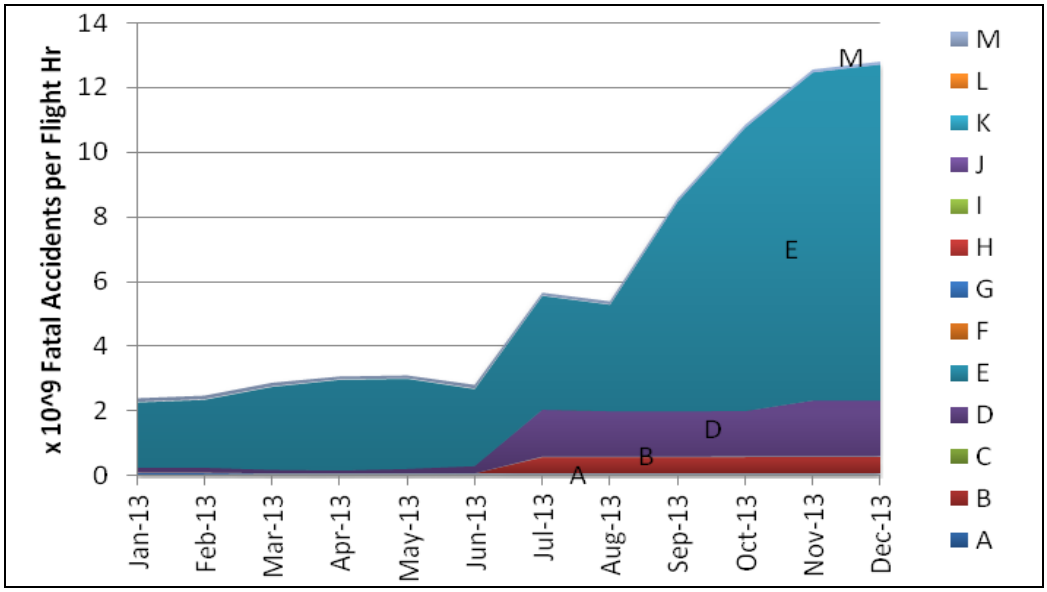

Figure 6: Trends of Operational Risk by LHD Category for BOB Airspace

2.49 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 7**) 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).

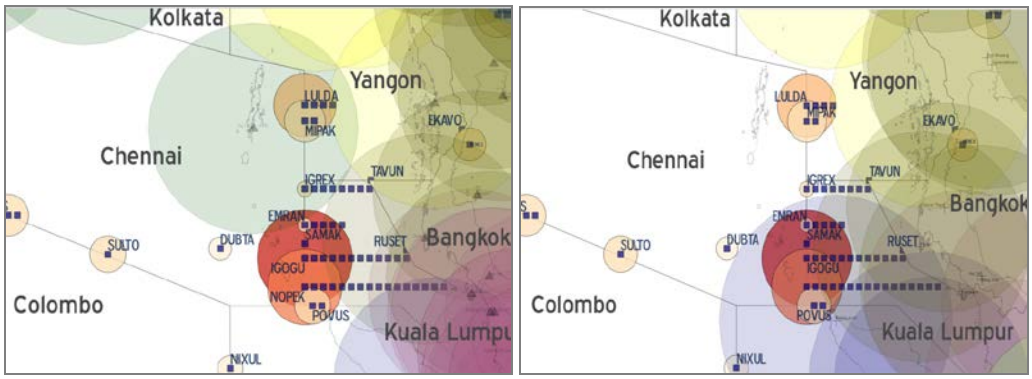

Figure 7: VHF and SSR coverage, BOB Hot Spot Analysis

2.50 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).

2.51 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.

2.52 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.

2.53 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.

2.54 The WPAC/SCS RVSM airspace total risk was estimated to be **5.22 x 10^{-9}**, which did not meet the TLS. **Figure 8** presents collision risk estimate trends during the period from January 2013 to December 2013.

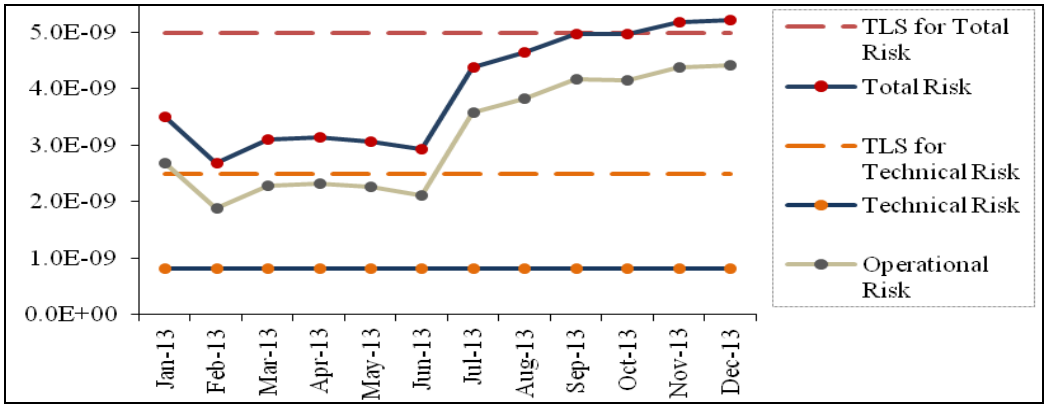

Figure 8: WPAC/SCS Airspace RVSM Risk Estimate Trends

2.55 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.

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

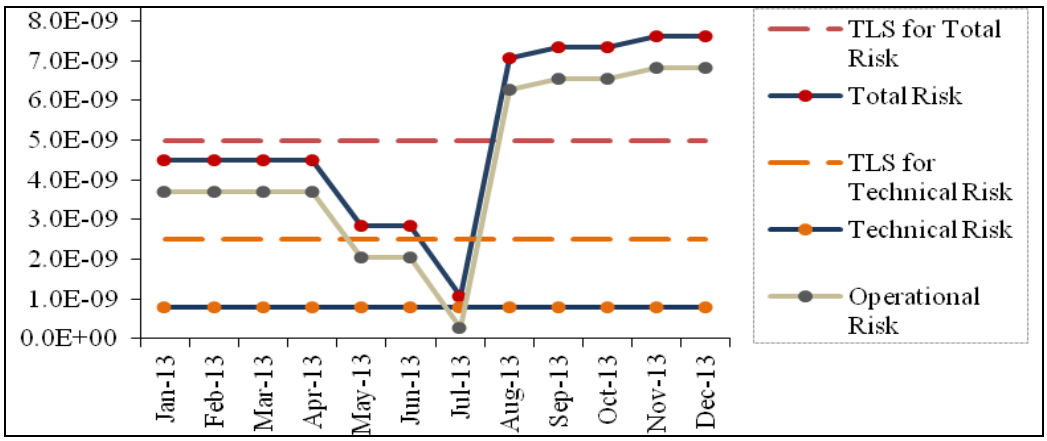

Figure 9: Mongolian Airspace RVSM Risk Estimate Trends

2.57 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

2.58 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.

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

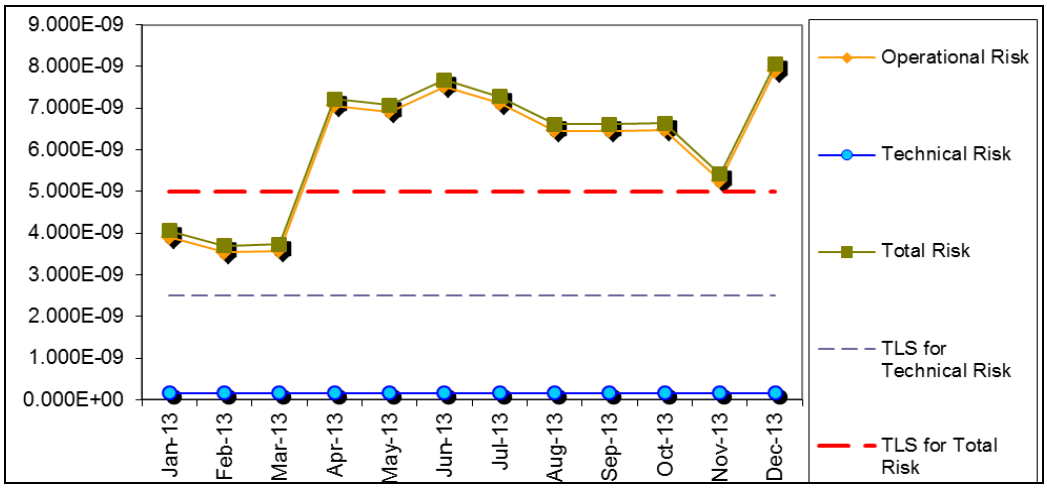

Figure 10: Pacific Airspace RVSM Risk Estimate Trends

2.60 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. 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.

2.61 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

2.62 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.

2.63 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

2.64 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

2.65 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

2.66 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

2.67 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.

2.68 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).

2.69 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).

2.70 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

2.71 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.

2.72 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

2.73 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

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

2.75 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

2.76 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).

2.77 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

2.78 The Secretariat presented an overview of safety assessment results from a regional perspective. **Figure 11** indicated the regional Asia/Pacific regional RVSM TLS compliance as reported to RASMAG/18, and **Figure 12** indicated the status as reported to RASMAG/19.

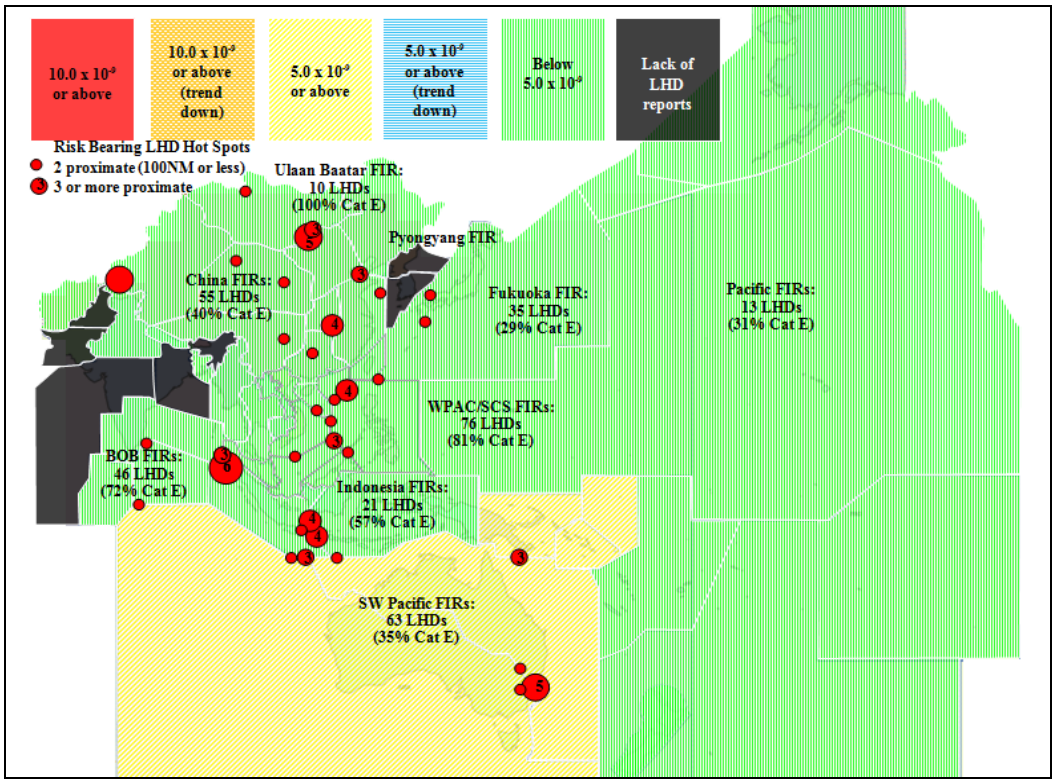

Figure 11: Asia/Pacific TLS compliance reported to RASMAG/18

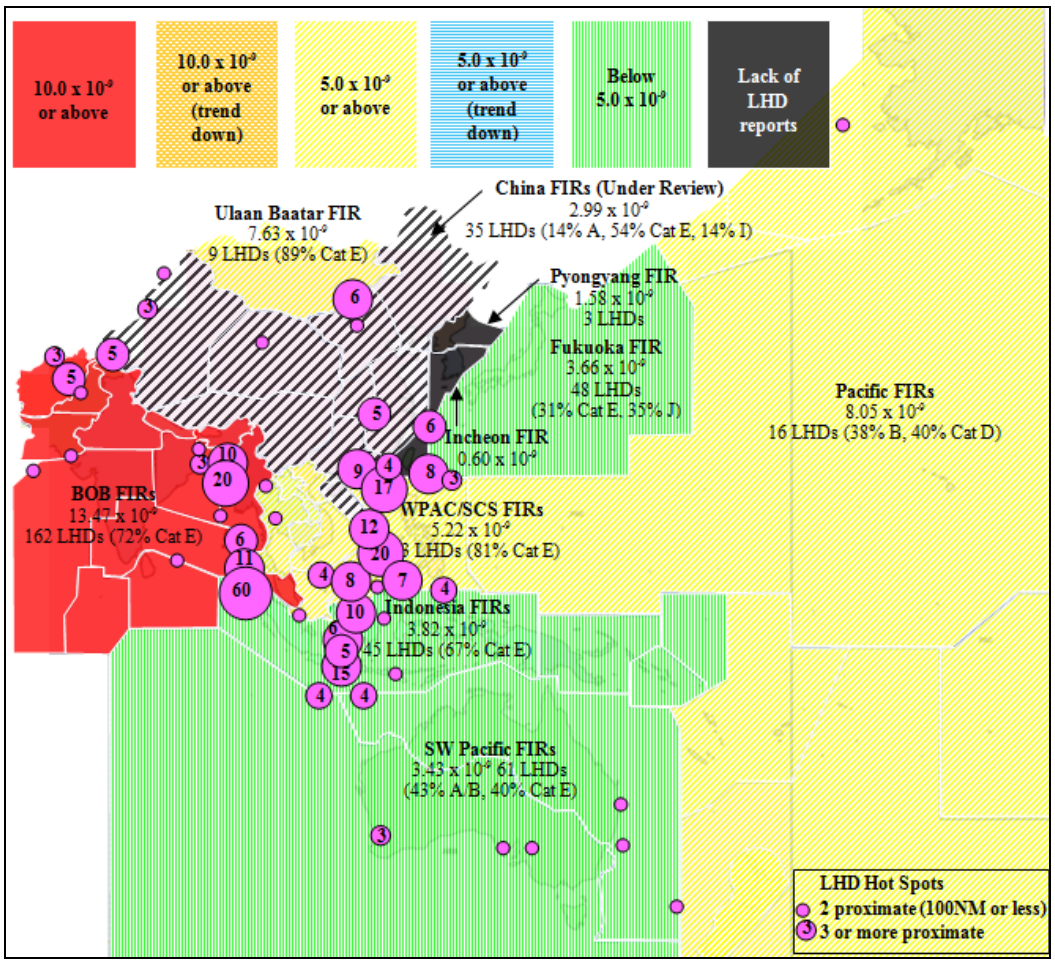

Figure 12: Asia/Pacific TLS compliance reported to RASMAG/19

2.79 **Figure 12** 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 2.83).

- **Southwest Pacific** had maintained a 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.

2.80 **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

2.81 **Table 3** 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 3: 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).

2.82 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. 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.

2.83 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.

2.84 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

2.85 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

2.86 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

2.87 **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

2.88 **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.

2.89 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

RNP4 Safety Assessment

2.90 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.

2.91 The safety assessment assessed the 30NM lateral separation as easily satisfying the TLS at $\mathbf{0.90 \times 10^{-9}}$, and the 30NM longitudinal separation at $\mathbf{1.62 \times 10^{-9}}$.

2.92 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

2.93 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 RNAV 2, and the southern portions extending towards Jeju Island were RNAV 5.

2.94 All operations 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 $\mathbf{0.004 \times 10^{-9}}$ (Y711) and $\mathbf{0.001 \times 10^{-9}}$ (Y722) was calculated, which easily met the TLS. The meeting congratulated the ROK on the analysis, noting that it could be used to assist EMAs and States in their determination of separation standards utilising RNAV 2 within ATS surveillance coverage.

Comparison of Average ASE for Aircraft Monitoring Groups

2.95 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.

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

JASMA ASE Seasonal Variation Study

2.97 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 13**).

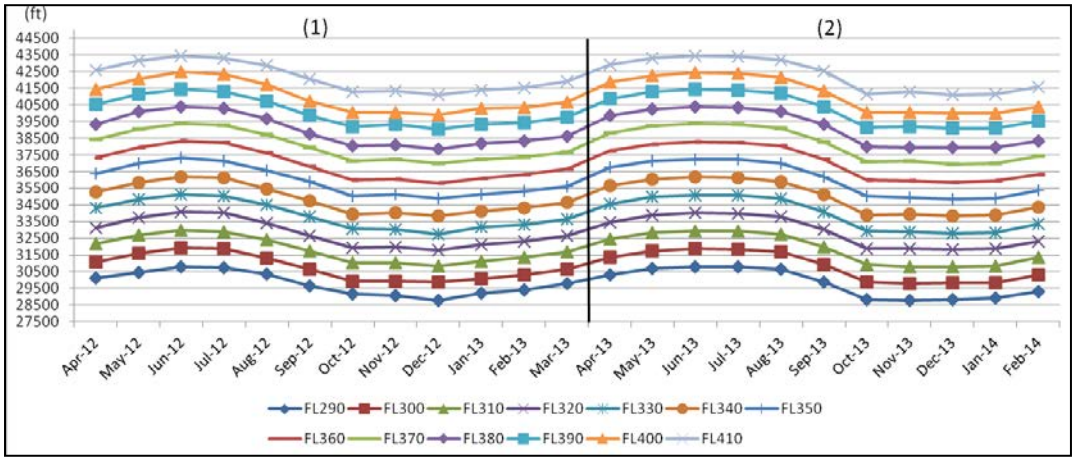

Figure 13: Monthly Geometrical Height (APR 2012 to FEB 2014)

2.98 The difference between the geometric height of monitoring data and geometric height was calculated with pressure altitude and meteorological data (**Figure 14**).

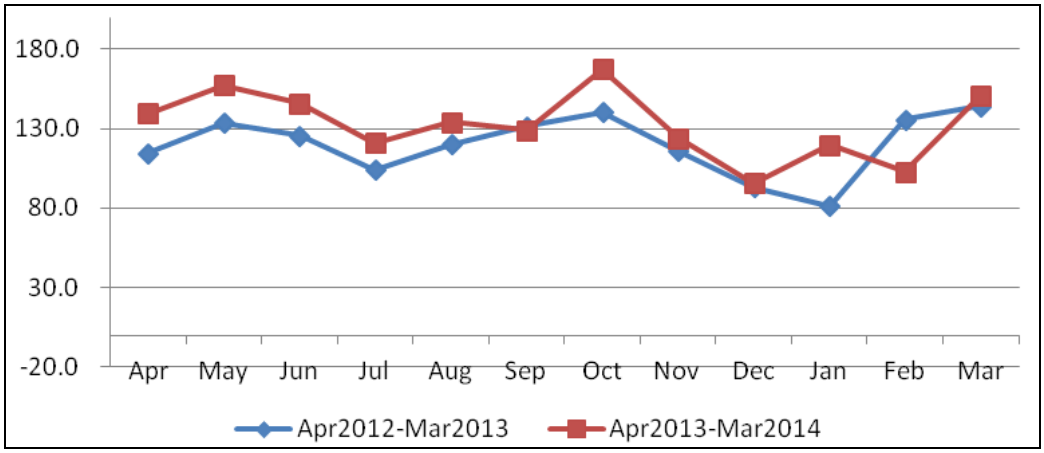

Figure 14: Mean Difference of Geometric Height (April 2012- March 2014)

2.99 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

2.100 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 15** indicated the mean ASE of each monitoring group from June 2013 until March 2014.

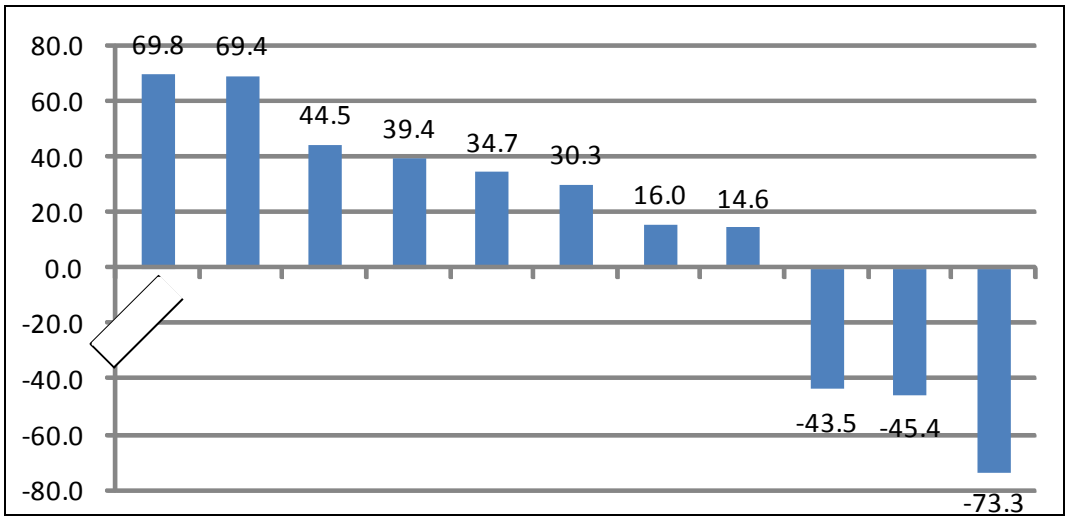

Figure 15: Setouchi HMU – Mean ASE of Monitoring Groups (ft)

PARMO RNP Database Status

2.101 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.

2.102 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

2.103 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*.

2.104 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.

2.105 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).

2.106 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 2.8);

c) discuss Draft Conclusion RASMAG/19-1: Data Link Implementation Strategy Guidance (paragraph 2.34);

d) discuss Draft Conclusion RASMAG/19-2: Contact Details for Airspace User Reporting of ADS-C/CPDLC Problems to ANSPs (paragraph 2.35);

e) note the issue of LHDs between the Lahore and Urumqi FIRs (paragraph 2.40);

f) discuss RASMAG Draft Conclusion 19/3: Submission of FPLs as Traffic Sample Data (TSD, paragraph 2.46);

g) note the LHD hot spot between the Samarkand and Kabul FIRs (paragraph 2.50);

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 2.78);

i) note the need for a Special Coordination Meeting involving Bangladesh, India, Indonesia, Malaysia, and Myanmar due to the large number of LHDs (paragraph 2.78);

j) discuss RASMAG Draft Conclusion 19-4: Asia/Pacific AIDC Implementation Task Force (paragraph 2.79);

k) discuss the apparent lack of occurrence reporting in certain FIRs (paragraph 2.84);

l) discuss the lack of progress in eliminating non-RVSM approved airframes from the RVSM stratum (paragraph 2.86);

m) discuss Draft Conclusion RASMAG/19-5: Flights in RVSM Airspace by non-approved State Aircraft (paragraph 2.104); and

n) discuss any relevant matters as appropriate.

…….