International Civil Aviation Organization

EIGHTH MEETING OF THE ASIA PACIFIC REGIONAL AVIATION SAFETY TEAM (APRAST/8)

(Bangkok, Thailand, 28 March – 1 April 2016)

Agenda Item 5: Presentation – State / Industry / ICAO

INTRODUCTION TO THE WORK OF APANPIRG SAFETY SUB-GROUP

(Presented by the Secretariat)

SUMMARY

This information paper provides a briefing on the structure and outcomes of the APANPIRG's RASMAG safety monitoring body.

1. INTRODUCTION

1.1 The Fourth Meeting of the Future Air Navigation Systems Interoperability Team-Asia (FIT-Asia/4) was held on 25 May 2015 at Bangkok, Thailand and the Twentieth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/20) was held from 26-28 May 2015 at the same venue.

1.2 The structure diagram at **Figure 1** is provided to illustrate where FIT and RASMAG within the APANPIRG structure:

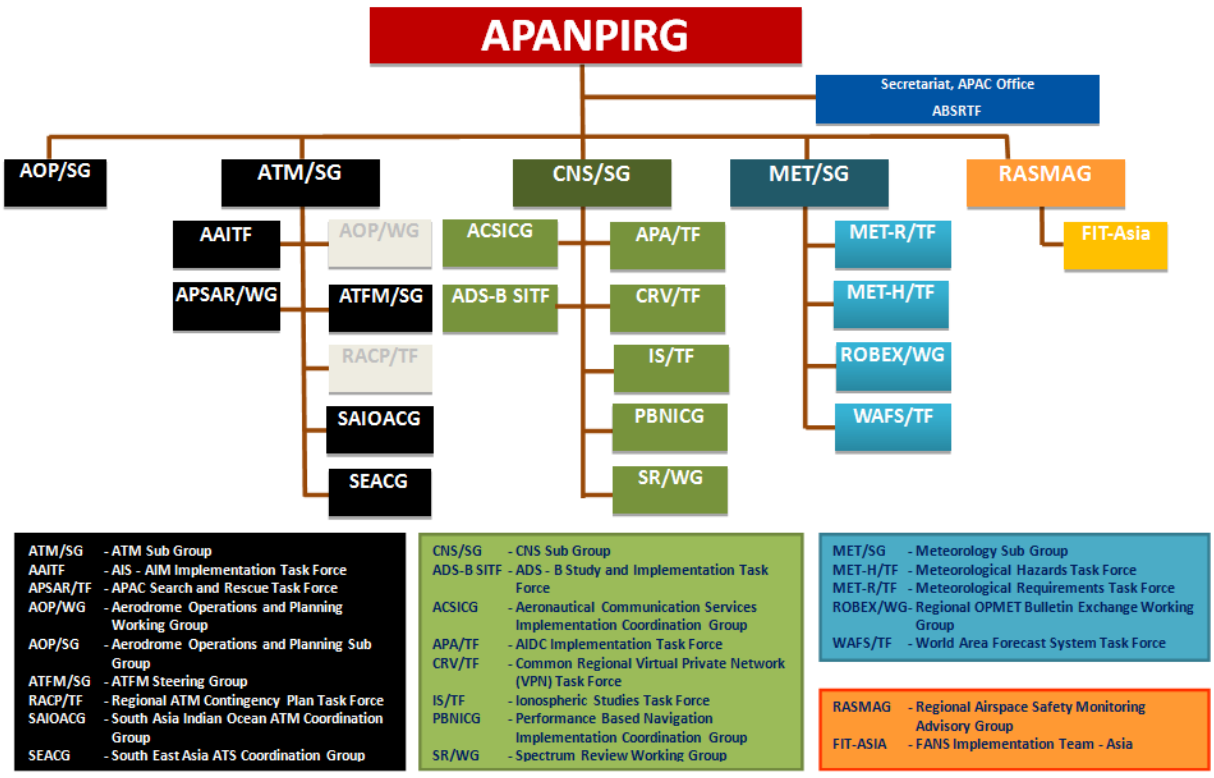

Figure 1: Transitional APANPIRG Structure (2016-2017, changes in grey)

1.3 The Asia/Pacific's five Regional Monitoring Agencies (RMAs) that monitor airspace vertical safety performance have areas of responsibility as shown in **Figure 2**:

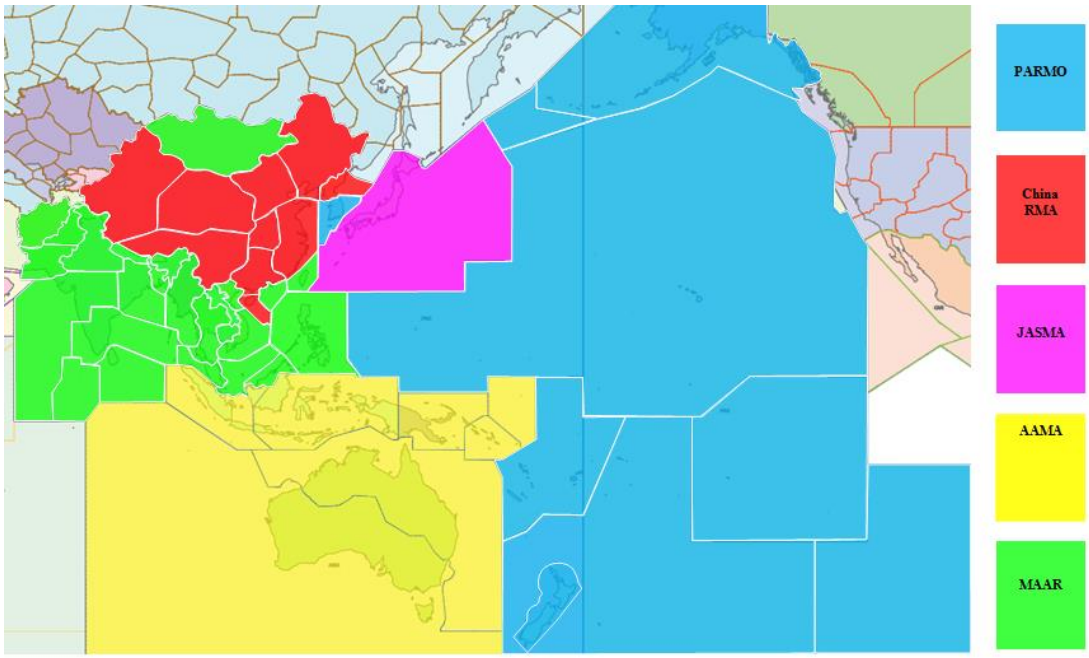

Figure 2: Asia/Pacific RMAs

1.4 The Asia/Pacific's five En-route Monitoring Agencies (EMAs) that monitor airspace horizontal safety performance have areas of responsibility as shown in **Figure 3**:

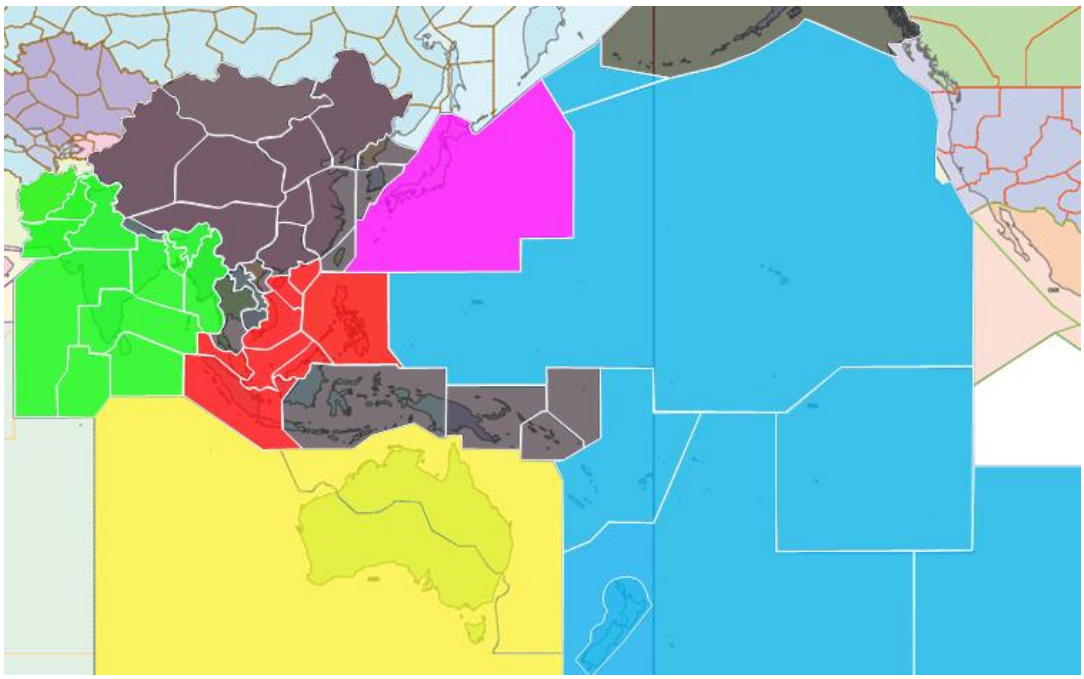

Figure 3: Asia/Pacific EMAs

1.5 The Asia/Pacific's Future Air Navigation Systems Interoperability Teams (FITs) and Central Reporting Agencies (CRAs) that monitor datalink safety performance have areas of responsibility as shown in **Figure 4**:

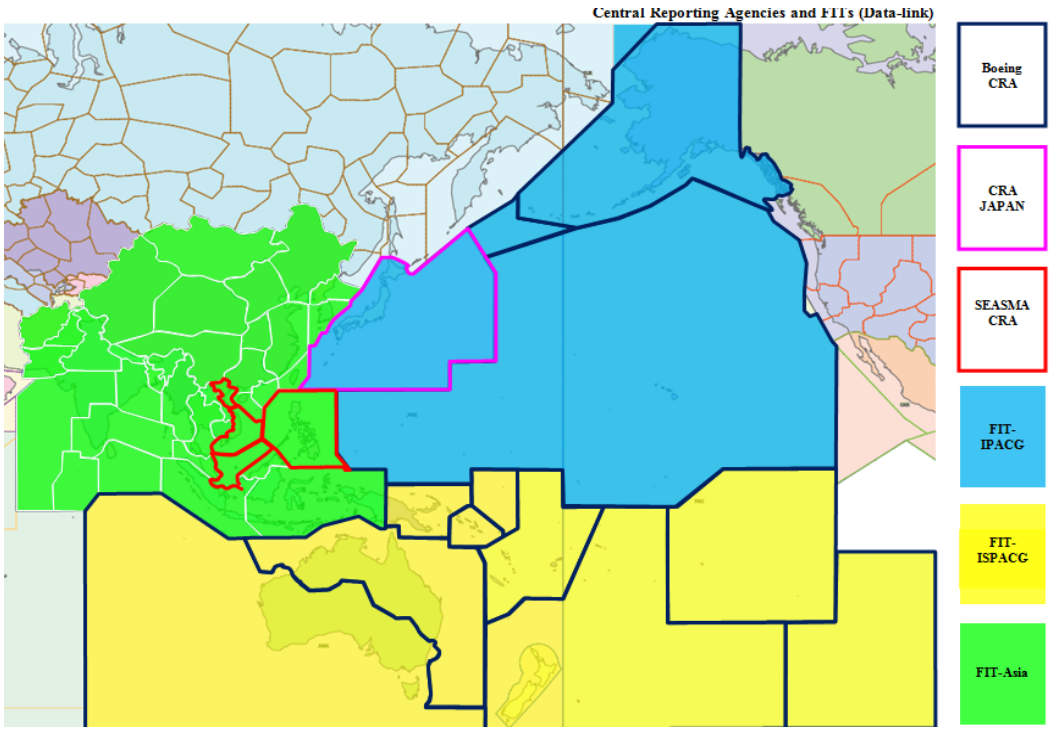

Figure 4: Asia/Pacific EMAs

2. DISCUSSION

2.1 **Table 1** lists the FIT-Asia administrations that had either implemented Automatic Dependent Surveillance-Contract (ADS-C) and Controller Pilot Data-Link Communications (CPDLC), or were expected to do so under the Asia/Pacific Seamless ATM Plan, and their FIT-Asia CRA registration status.

Administration	Data-Link (ADS-C/CPDLC) Service Status	Seamless ATM Expectation (Nov 2015)	FIT-Asia CRA Registration
China	Implemented	YES	YES
India	Implemented	YES	YES
Indonesia	Implemented	YES	**YES**
Malaysia		YES	**YES**
Myanmar	Implemented	YES	**YES**
Maldives	Implemented	YES	**YES**
Philippines		YES	SEASMA*
Singapore	Implemented	YES	SEASMA*
Sri Lanka	Implemented	YES	
Thailand			
Viet Nam	Implemented	YES	SEASMA* **YES**

* *The South East Asia Safety Monitoring Agency (SEASMA) provides CRA service for Philippines, Singapore and Viet Nam. Current SEAMA CRA arrangements expire September 2016.*

Table 1: FIT-Asia ADS-C/CPDLC Implementation and CRA Registration Status

2.2 Since FIT-Asia/3, only two administrations had submitted problem reports to FIT-Asia CRA. The FIT-Asia CRA website administrator had noted that several problem reports could not be assessed, as the data link service provider only retains logs for 90 days.

2.3 The ADS-C Downlink Latency of High Frequency (HF) failed to meet the 95% target, due to the long latency of the messages from some HF stations (**Figure 5**).

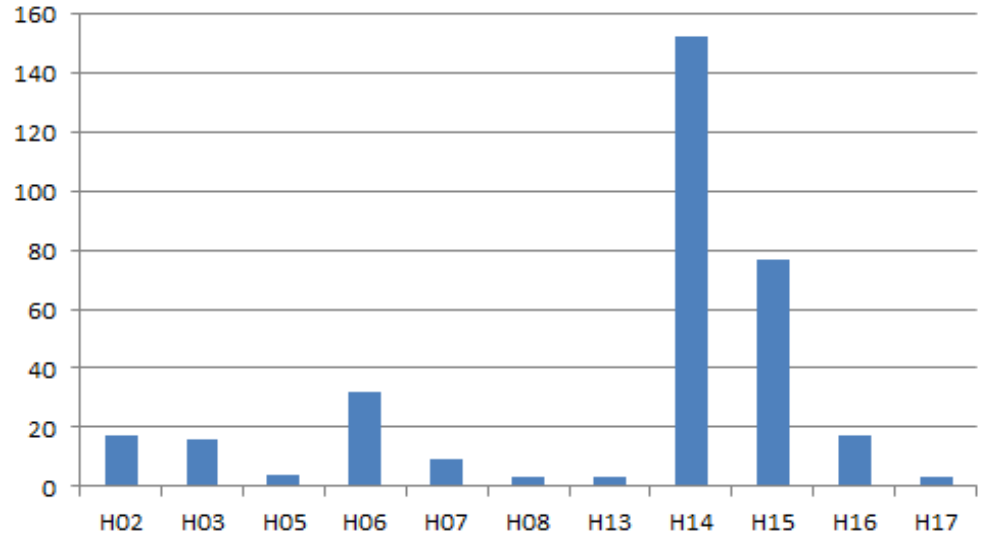

Figure 5: ADS-C Downlink Messages by HF Station (latency over 300 seconds)

2.4 In discussing the HF ADS-C Downlink Message Latency, it was agreed that China would provide information on which aircraft types were reverting to HF, and Boeing CRA would then endeavour to determine why.

2.5 It was noted that these performance monitoring criteria supported the performance objectives of the Asia/Pacific Seamless ATM Plan relating to the implementation of RNP-based separations in Category R [remote, as defined in the Asia/Pacific Seamless ATM Plan] airspace. To further support the performance objectives of the Seamless ATM Plan, and to ensure consistency of performance monitoring, analysis and reporting and CRA problem reporting among FIT-Asia States, the meeting agreed to a Draft Conclusion. The following Draft Conclusion was endorsed by RASMAG/20, for consideration by APANPIRG/26:

Draft Conclusion RASMAG/20-2: Data Link Performance Guidelines

That, FIT-Asia States are urged to:

a) Monitor data link performance against the RCP240 and RSP180 criteria specified in Appendix B of the Global Operational Data Link Document (GOLD); and

b) apply the guidelines specified in the GOLD Appendix D to determine whether fleet performance either:

i. Meets the 99.9% performance level; or

ii. Requires submission of CRA problem reports and/or investigation that will attempt to determine the cause of the degradation.

Note: Gold Version 2.0 Appendix D Paragraph D.2.4.7.5.2 refers.

2.6 RASMAG/20 noted that the following FIRs were above the vertical Target Level of Safety (TLS): China FIRs, Japan (Fukuoka) FIR, 'Bay of Bengal' (South Asia) FIRs (**Figure 6**):

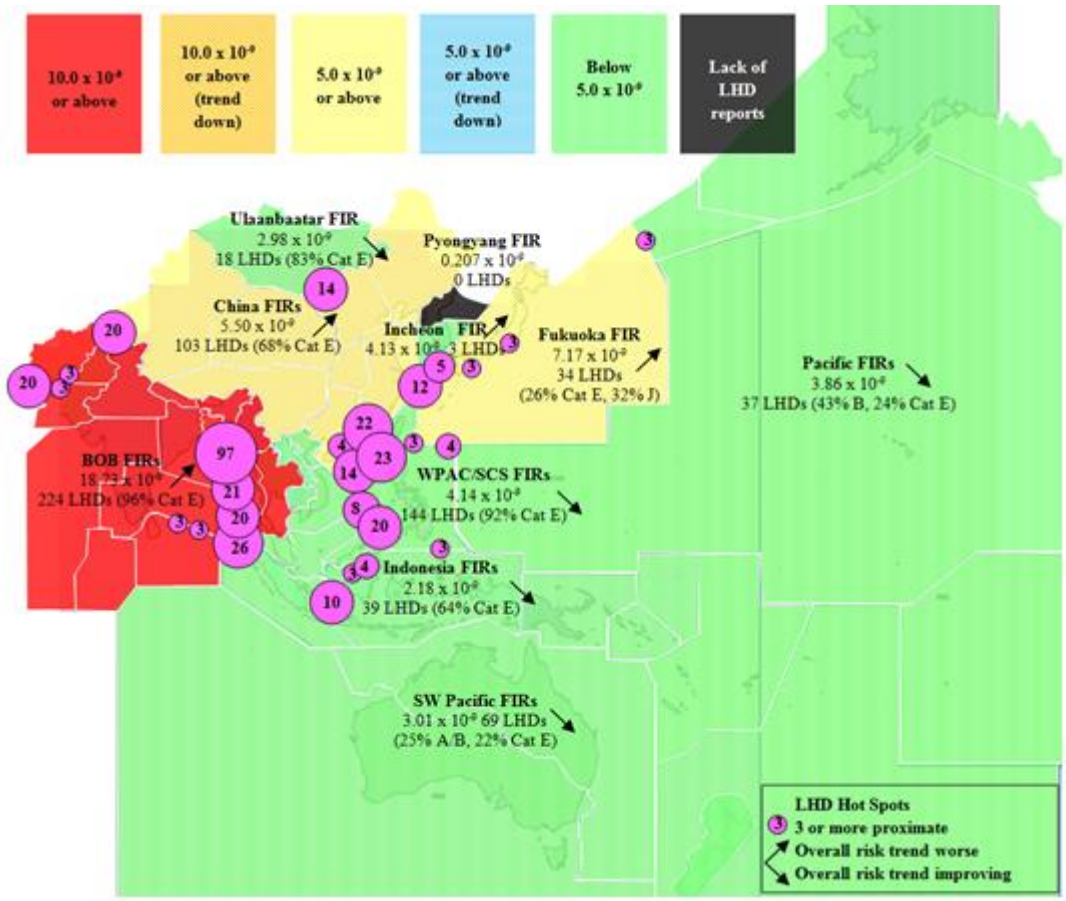

Figure 6: Asia/Pacific TLS compliance reported to RASMAG/20

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

- **South Asia**: the improved reporting by India has resulted in a further significant degradation in the Bay of Bengal (BOB) safety risk assessment to reflect the true safety performance that had been hidden – one that greatly exceeded the TLS and remained the Asia/Pacific's highest risk area. However, the States concerned were taking a number of ATM improvement actions that were expected to substantially reduce risk during 2015 and 2016 when the new systems were implemented (however, there was no confirmation as to when the new communications and surveillance systems on Great Nicobar Island would be operational).

  While the increased reporting at Indian FIR boundary Transfer of Control (TOC) points was laudable, it appeared unlikely that there could be no LHDs as reported within Indian continental airspace; thus further work was necessary to sensitise ATC to an appropriate reporting culture.

  There were a number of hot spots evident on the Kabul FIR boundary, most notably at position GADER (between the Tehran and Kabul FIRs); however since late 2014 these LHDs had markedly reduced after intervention by MAAR in coordination with the ICAO Middle East (MID) Region.

- **Southeast Asia** reflected an overall improvement in safety risk, even with an increase in reported Large Height Deviations (LHDs). The Philippines airspace remained a major concern, with numerous LHDs evident at all points along the Manila FIR boundary. The greater use of AIDC and ATS surveillance in the South China Sea, and an ATM system upgrade for the Manila FIR continued to require a priority focus.
- **East Asia**: China recorded a dramatic increase in reported LHDs, resulting in its airspace being well over TLS. This reflected a much improved reporting culture, fostered by the efforts of the China RMA. Other than the known hot spots between Pakistan and Chinese airspace near PURPA and between Mongolia and China near NIXAL, new hot spots were revealed between Shanghai/Taibei, Guangzhou/Hong Kong and Sanya/Hong Kong FIRs. China had made significant progress in addressing the PURPA hot spot by improving the communication and surveillance capabilities in this area.

  Attention to the other hot spots in the congested airspace of Eastern China was also required, particularly as these were mainly operational ATC errors in general that could be improved with the use of AIDC and more robust procedures (note: the volume of occurrences between Hong Kong and the Sanya/ Guangzhou FIRs may require an urgent focus on such matters as airspace dimensions, ATS route structures, Flight Level Allocation Scheme (FLAS), ATS coordination procedures and the management of the aerodromes within the Pearl River Delta using a 'metroplex' planning methodology).

2.8 An analysis of the rate of LHD reporting in Chinese, Indian, Indonesian, Japanese (with a low reporting ratio of 1: 37,549) and Republic of Korea (ROK) airspace indicated that despite an improvement in reporting, there may be further improvements required to paint a true picture of the risk-bearing incidents (especially within Indian domestic airspace), particularly by implementation of all elements of a 'just culture' environment. The indications included a lack of reporting over an entire continental airspace, very low reporting ratios such as is evident in ROK airspace, and the reporting of LHDs by one RMA that were not reported by another on the same RMA boundary.

2.9 The Regional analysis of 'hot spots' indicated a number of priority high risk areas where APANPIRG needed to take specific action, in order to reduce risk to an acceptable level. Notwithstanding the establishment of the Asia/Pacific ATS Inter-facility Data Link Communication Implementation Task Force (APA TF/1) and on-going ATM improvement programmes designed to enhance the capability of ATC, RASMAG/20 agreed to the following Draft Conclusion related to Special Coordination Meetings (SCM) in order of assumed risk (as presented to RASMAG) to ensure an urgent reduction of risk:

Draft Conclusion RASMAG/20-4: Asia/Pacific LHD Hot Spot Action Plans

That, the following Regional Monitoring Agencies (RMAs), States and ATC units should take urgent action* to establish a scrutiny group or an alternate means to address the following Large Height Deviation (LHD) hot spot areas and present Action Plans and details of progress made to the ICAO Regional Office, prior to 01 January 2016:

a) **MAAR**, India, Myanmar and Malaysia – Kolkata/Chennai FIRs interface with Yangon/Kuala Lumpur FIRs;

b) **PARMO**, China RMA, JASMA, MAAR, China, Japan, Republic of Korea and Taibei Area Control Centre (ACC) – Incheon FIR AKARA Corridor interface with Shanghai/Fukuoka/Taibei FIRs;

c) **China RMA**, MAAR, China and Hong Kong China – Hong Kong FIR interface with Guangzhou/Sanya FIRs;

d) **MAAR**, AAMA, JASMA, Hong Kong China, Indonesia, Japan and the Philippines – Manila FIR interface with Fukuoka/Hong Kong China/ Singapore/Ujung Pandang FIRs; and

e) **China RMA**, MAAR, China and Pakistan – Urumqi FIR interface with Lahore FIR.

**Action should be taken as soon as practicable, even prior to APANPIRG/26 if possible.*

Note: the RMAs in bold were expected to take the lead in organising the scrutiny groups or alternative means to address the issues.

2.10 **Table 2** 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 reporting.

Airspace	RASMAG 19 LHDs	RASMAG 20 LHDs	RASMAG 20 Flight Hours	RASMAG 19 Reporting Ratio	RASMAG 20 Reporting Ratio
Mongolia	9	18	(NC) 108,773	1:10,876	1:6,042
India/BOB	162	(+38%) 224	(+13%) 2,110,809	1:11,540	1:9,423
WPAC/SCS	133	(+8%) 144	(-5%) 1,511,839	1:11,889	1:10,498
SW Pacific	61	69	(+33%) 795,450	1:9,835	1:11,528
Indonesia	45	39	(NC) 761,390	1:18,570	1:19,522
China	35	(+194%) 103	2,124,690	1:72,512	1:20,628
Japan	48	(-31%) 34	(+7%) 1,276,693	1:22,947	1:37,549
ROK	3	3	492,360	1:164,120	1:164,120
Pyongyang	0	0	(-16%) 5,012	0	0
Total	496	634	(-19%) 9,187,016	1: 22,829	1:14,490
Pacific	16	37	+33% 1,669,658	1:78,130	1:45,125

Table 2: Comparison of Estimated Flight Hours and Reported LHDs (NC = no change)

2.11 There appeared to be several inconsistencies and gaps in the data provided by RMAs to RASMAG/20. AAMA and JASMA both advised they were using a 2012 TSD for Indonesian and Japanese airspace respectively due to validation issues in relation to new data. MAAR advised that they were using a 2014 TSD for Mongolian airspace, but the estimated flight hours had remained the same as 2013. There was an implausible value of 99,984 hours for the Incheon FIR, less than 10% of Japan's figure (in 2014 the figure of 492,360 hours was used).

2.12 From the comparison in **Table 4** (separating the Pacific portion of airspace because it was largely oceanic in nature and not directly comparable), the average LHD occurred approximately every 14,490 flight hours. The number of reported LHDs had substantially increased in the Chinese and Indian FIRs. As approximately 68% and 98% respectively of these LHDs were category E ATC coordination errors, this could be largely attributed to a major improvement in reporting.

2.13 China RMA was congratulated for their efforts in promoting a higher reporting culture, which has revealed a much more accurate picture of the safety problems that need urgent attention.

2.14 An analysis of the rate of LHD reporting in Chinese, Indian, Indonesian, Japanese (with a low reporting ratio of 1: 37,549) and ROK airspace indicated that despite an improvement in reporting, there may be further improvements required to paint a true picture of the risk-bearing incidents (especially within Indian domestic airspace), particularly by implementation of all elements of a 'just culture' environment. The indications included a lack of reporting over an entire continental airspace, very low reporting ratios such as is evident in ROK airspace, and the reporting of LHDs by one RMA that were not reported by another on the same RMA boundary.

2.15 The following Asia/Pacific En-Route Monitoring Agency (EMAs) reported horizontal risk assessments as follows, which all met the TLS of 5.0×10^{-9} (**Table 3**):

Separation Standard	EMA	Estimated Risk
50NM Lateral Risk	BOBASMA	1.07856×10^{-9}
	JASMA	0.751×10^{-9}
	PARMO	1.35×10^{-9}
	SEASMA	0.045×10^{-9}
30NM Lateral Risk	PARMO	0.53×10^{-9}
50NM Longitudinal Risk	BOBASMA	1.59734×10^{-9}
	PARMO	2.32×10^{-9}
	SEASMA	0.034×10^{-9}
30NM Longitudinal Risk	BOBASMA	0.127551×10^{-9}
	JASMA	0.000578×10^{-9}
	PARMO	3.74×10^{-9}

Table 3: Comparison of Horizontal Risk Assessments

2.16 The application of these horizontal standards met the TLS. The risk for 50NM lateral and 50NM longitudinal separation as calculated by SEASMA was notably lower than other implementations, while the risk for 30NM longitudinal separation was noticeably lower than other EMAs as calculated by JASMA. The meeting noted that the AAMA had not provided any assessments and requested that these be made available for the relevant Australian airspace at RASMAG/21.

2.17 **Table 4** compared 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
RASMAG/20	8	45	15	203	26

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

2.18 Overall, the number of non-RVSM aircraft had decreased by 5% in the past year. This indicated that there was still considerable work to do and APANPIRG Conclusion 24/6 (*Repetitive Non-RVSM Approved Aircraft Operating as RVSM Approved Flights* had not yet been effective.

2.19 Of note was the significant reduction in non-RVSM approved airframes detected by the AAMA and JASMA, but this was unfortunately offset by a large increase in non-RVSM approved aircraft identified by MAAR. This was probably because the most prominent States featured in the list of non-RVSM aircraft all came from the MAAR area of responsibility: India, Thailand, Malaysia, Indonesia and the Philippines.

2.20 RASMAG/20 noted that only Bangladesh had a RASMAG-related APANPIRG Deficiency recorded regarding the requirement of Paragraph 3.3.5.1 of Annex 11 (provision of data for monitoring the height-keeping performance of aircraft). RASMAG/20 agreed to propose the deletion of Bangladesh's Deficiency, but proposed new Deficiencies for non-provision of RVSM approvals safety data by India and the Philippines.

3. ACTION BY THE MEETING

3.1 The Meeting is invited to note the information provided.

— END —