INTERNATIONAL CIVIL AVIATION ORGANIZATION

REPORT OF THE TWENTY-FIFTH MEETING OF THE REGIONAL AIRSPACE SAFETY MONITORING ADVISORY GROUP (RASMAG/25)

VIDEO TELECONFERENCE, 27 – 30 OCTOBER 2020

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

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

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INTRODUCTION

Meetings

1.1 The Twenty-Fifth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/25) was held from 27 to 30 October 2020 by Video Teleconference (VTC) from the ICAO Asia and Pacific Regional Office, Bangkok, Thailand.

Attendance

2.1 A total of 117 participants attended RASMAG/25 from Australia, Bangladesh, Cambodia, China, Hong Kong China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, New Zealand, Philippines, Republic of Korea (ROK), Singapore, Sri Lanka, Thailand, United States of America (USA), Viet Nam, IATA, IFALPA and ICAO.

2.2 The List of Participants is at **Appendix A** to this Report.

Officers and Secretariat

3.1 Ms. Saifon Obromsook, Engineering Manager of AEROTHAI and the Monitoring Agency for the Asian Region (MAAR), chaired the meeting.

3.2 Mr. Len Wicks, Regional Officer, Air Traffic Management/Search and Rescue (ATM/SAR), ICAO Asia and Pacific Office acted as the Secretary for the RASMAG/25 meeting. He was assisted by Mr. Shane Sumner, Regional Officer, ATM/Aeronautical Information Management (AIM), Mr. Erdenebaatar Davaasuren, Associate Officer AIM and Ms. Prakayphet Chalayonnawin, Programme Analysis Associate, ATM.

Opening of the Meeting

4.1 Ms. Saifon Obromsook welcomed participants to the meeting.

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

Documentation and Working Language

5.1 English was used as the working language for the meeting and for all documentation.

Note: airspace safety estimates in this report are measured in terms of fatal accidents per flight hour (fapfh).

5.2 A total of 40 Working Papers (WPs), five Information Papers (IPs) and three flimsies were presented to the meeting.

5.3 The List of Papers and Presentations is at **Appendix B** to this Report.

Draft Conclusions, Draft Decisions and Decisions of RASMAG – Definition

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

a) **Draft Conclusions** of RASMAG relate to matters that are not just of a purely technical or operational nature, which need to be considered by APANPIRG;

b) **Conclusions** of RASMAG relate to matters of a purely technical or operational nature, which APANPIRG had delegated authority to RASMAG to act upon;

c) **Draft Decisions** relate solely to matters dealing with the internal working arrangements of the RASMAG, which need to be considered by APANPIRG; and

d) **Decisions** of RASMAG that relate solely to matters dealing with the internal working arrangements of the RASMAG, which APANPIRG had delegated authority to RASMAG to act upon.

List of Draft Conclusions/Decisions and Draft Decision/Decisions

List of Conclusions

Conclusion RASMAG/25-1: Revised PBCS Non-Compliance Report Form Template		
What: That, the PBCS Non-Compliance Report Form Template at **Appendix C to the Report** be uploaded to the Asia/Pacific Regional Office website, to replace the previous template.		Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To include additional information, to harmonize with the template already adopted in the North Atlantic (NAT) Region, and to use MS Excel format to facilitate data handling by the RMA.	Follow-up: ☐Required from States	
When: 30-Oct-20	Status: Adopted by Subgroup	
Who: ☒Sub groups ☐APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:		

Conclusion RASMAG/25-2: RVSM MMR Update		
What: That, the Reduced Vertical Separation Minimum (RVSM) Minimum Monitoring Requirement (MMR) update at **Appendix D to the Report** be utilized by Regional Monitoring Agencies (RMAs) and States as appropriate.		Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: The Regional Monitoring Agencies Coordination Group (RMACG) had updated the MMR for RMAs/States to utilise.	Follow-up: ☐Required from States	
When: 30-Oct-20	Status: Adopted by Subgroup	
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:		

List of Draft Conclusions

Draft Conclusion RASMAG/25-3: Alphanumeric Call Sign Initiative	
What: Noting: 1) the extreme safety risks associated with pilot-ATC miscommunication and the number of Category D (ATC Loop Error) Large Height Deviations (LHDs); 2) APANPIRG Conclusion 27/15. ATMSG Conclusions 5-5 and 5-6 regarding the Asia Pacific Alpha Numeric Call-Sign (ANCS) call sign project; and 3) alphanumeric call signs were a well-established call sign confusion mitigation, that: leading Air Navigation Service Providers (ANSPs) and aerodrome operators, in coordination with CANSO and ACI, were urged to consider a trial to identify and overcome any barriers for the implementation of alphanumeric call signs, with a view to developing a project for the Asia/Pacific (APAC) Region.	Expected impact: ☒ Political / Global ☐ Inter-regional ☒ Economic ☐ Environmental ☒ Ops/Technical
Why: The Asia Pacific ANCS call-sign project had not been universally supported by aerodrome operators and ANSPs thus far.	Follow-up: ☐Required from States
When: 30-Oct-20	Status: Adopted by Subgroup
Who: ☒Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other: RASG	

List of Decisions

Decision RASMAG/25-4: Safety Reporting Assessments	
What: That, RMAs and EMAs will include within their vertical and horizontal safety reports to RASMAG an assessment of the safety reporting culture of the States concerned (including 'Just Culture'), and specifically, whether safety reports for events such as LHDs were consistently being made by pilots and ATC.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: Very few RMA and EMA safety reports include an analysis of reporting culture; yet this is demonstrably important to verify the validity of the data being used.	Follow-up: ☐Required from States
When: 30-Oct-20	Status: Draft to be adopted by Subgroup
Who: ☐Sub groups ☒APAC States ☒ICAO APAC RO ☐ICAO HQ ☐Other:	

Decision RASMAG/25-5: Rotational Responsibility for the Production of the Combined PBCS Monitoring Report	
What: That, FIT-Asia will produce an annual Combined PBCS Monitoring Report, as follows: 1. responsibility for the report production will rotate biennially amongst volunteer States, 2. Reporting Agencies, or other relevant stakeholders; the State, Reporting Agency or other stakeholder releasing responsibility for production of the report will assist the new report producer in the first year of their responsibility; and 3. until a report format is codified in ICAO documentation, producing organizations must assure the report content, format, and quality are consistent with similar reports in other ICAO regions.	Expected impact: ☐ Political / Global ☐ Inter-regional ☐ Economic ☐ Environmental ☒ Ops/Technical
Why: To improve PBCS system performance within APAC and other ICAO Regions	Follow-up: ☐Required from States
When: 30-Oct-20	Status: Adopted by Subgroup
Who: ☐Sub groups ☐APAC States ☐ICAO APAC RO ☐ICAO HQ ☒Other: FIT-Asia	

REPORT ON AGENDA ITEMS – RASMAG/25

Agenda Item 1: Adoption of Agenda

1.1 The provisional agenda (WP01) was adopted by the meeting. The meeting noted IP01 (List of Working and Information Papers).

Agenda Item 2: Review Outcomes of Related Meetings

Relevant Meeting Outcomes (WP02)

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

a) Seventh Meeting of the APANPIRG Air Traffic Management Sub-Group (ATM/SG/7) of the Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG, Bangkok, Thailand, 05 – 09 August 2019);

b) Fifty-Sixth Conference of Directors General of Civil Aviation, Asia and Pacific Region (DGCA/56, Kathmandu, Nepal, 19 – 23 August 2019);

c) Thirtieth Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/30, Bangkok, Thailand, 04 – 06 November 2019).

FIT-Asia Meeting Outcomes (WP03)

2.2 The Tenth Meeting of the FANS Interoperability Team-Asia (FIT-Asia/10) was held by Video Teleconference from 03 to 06 August 2020.

2.3 The improvement in the submission of Problem Reports (PRs) that was noted at FIT-Asia/9 continued at FIT-Asia/10. A total of 66 PRs had been raised between July 2019 and June 2020, compared with 45 in the previous 12-month period.

2.4 Among recurrent problems reported were aircraft systems receiving, acknowledging then discarding messages ('Ack'n'toss'), up-linking of UM175 message resulting in aircraft downlink error message (PANS-ATM recommended against the use of UM175), continuing poor performance of High Frequency Data Link (HFDL), and delayed or withheld authorization from aircraft operators for the Central Reporting Agency (CRA) to access data link logs.

2.5 The FIT-Asia/10 meeting was informed of an analysis of *Latency Monitor Reject* messages received from Airbus aircraft operating in the Auckland Oceanic Flight Information Region (FIR) during the period January 2019 – June 2020. On receipt of a Controller Pilot Datalink Communications (CPDLC) uplink message for which the latency exceeded the 300 second monitored value, Airbus aircraft did not present the message to the flight crew but instead sent a reject message in response.

2.6 ICAO provided an update to the FIT-Asia/10 on the status of Performance-Based Communications and Surveillance (PBCS) implementation among Asia/Pacific administrations, as reported using the APAC regional *Survey of the Status of Current and Planned Implementation of Performance-Based Horizontal Separation Minima* form.

2.7 The meeting was reminded of relevant Conclusions from APANPIRG and RASMAG. A total of 19 APAC Administrations had responded to the survey in its four years of availability. Only six had provided their annual survey response for 2020 reporting to FIT-Asia/10:

Australia, China, Philippines, Singapore, Thailand, Viet Nam.

2.8 States that were believed to have currently implemented, or intended to implement, performance based separations in the high seas airspace within their FIRs included India, Indonesia, Maldives, Myanmar, Philippines and Sri Lanka. States had been requested to notify the ICAO Asia/Pacific Regional Office so that a coordinated Proposal for Amendment (PfA) to Doc 7030 – *Regional Supplementary Procedures* (SUPPS) may be prepared. Following the receipt of information subsequent to the FIT-Asia/10 meeting, coordination had commenced on the inclusion of relevant provisions in SUPPS for Indonesia, Philippines and Sri Lanka.

2.9 Performance data provided by other FIT-Asia States, together with FIT-IPACG and FIT-ISPACG from the Pacific Region, was included in the aggregated regional data analysis. FIT-Asia/10 noted that, while most States providing data link services sent performance data to a recognized FIT, few had provided an analysis of the data, or on any investigative or rectification action taken, including the need for withdrawal of PBCS-dependent separations where appropriate in accordance with ***Conclusion RASMAG/23-2: PBCS Action List for ANSPs*** and ***Conclusion RASMAG/24-2: Continuous Data Link Performance Monitoring***.

2.10 **Table 1** summarised the aggregated Required Surveillance Performance (RSP) for the Asia/Pacific Region.

REQUIRED SURVEILLANCE PERFORMANCE						
Region	Asia-Pacific Region					
Performance Criteria	RSP180					
Time Period	2019 January-June			2019 July-December		
Colour key: Meets criteria; 99.0%-99.9%; Under criteria	No. Messages	Criteria		No. Messages	Criteria	
		95%	99.90%		95%	99.90%
Agg_RGS		% < = 90sec	% <= 180sec		% < = 90sec	% <= 180sec
KZAK	4,880,557	98.40%	99.40%	4,994,635	98.50%	99.50%
NFFF	285,717	98.40%	99.15%	265,859	98.65%	99.31%
NTTT	74,795	99.52%	99.78%	64,708	99.51%	99.73%
NZZO	428,959	98.76%	99.49%	447,371	99.04%	99.60%
PAZA	1,315,506	98.38%	99.42%	1,233,417	98.47%	99.46%
RJJJ	2,454,906	98.39%	99.48%	2,668,737	98.44%	99.52%
RPHI	232,422	98.34%	99.51%	527,755	98.74%	99.65%
VCCF	598,937	98.45%	99.46%	563,057	98.53%	99.49%
VOMM	501,815	96.75%	98.65%	491,115	97.33%	98.94%
VVTS	244,731	98.33%	99.59%	255,457	98.22%	99.61%
VYYF	312,442	98.64%	99.36%	366,077	98.92%	99.52%
WAAF	290,831	98.58%	99.39%	272,656	98.89%	99.55%
WMFC	648,166	98.28%	99.51%	429,463	97.93%	99.45%
WSJC	1,189,990	98.91%	99.74%	581,546	98.65%	99.67%
YBBB	1,325,093	99.04%	99.65%	1,329,879	99.31%	99.75%
YMMM	1,003,859	98.92%	99.55%	1,000,861	99.14%	99.65%
ZLLL	344,490	97.92%	99.55%	301,206	97.83%	99.47%
ZWWW	190,925	98.08%	99.57%	176,263	98.08%	99.55%

Table 1: Asia/Pacific Region Aggregated RSP Data.

2.11 Analysis of the RSP data indicated that:

- aggregate performance was fairly stable between the first and second half of 2019;
- performance for messages delivered via HF continues to fall below requirements for RSP180;
- performance for messages delivered via Iridium paths (IG1-ARINC, IGW1-SITA) fell below RSP180 95% in a number of APAC FIRs;
- performance for messages delivered via some Inmarsat paths fell below RSP180 95% in some APAC FIRs; and
- some aircraft operators were observed below the RSP180 95% requirements within multiple APAC FIRs.

2.12 Aircraft operators were encouraged to review all Service Information Letters (SILs) and Software Bulletins (SBs) released from their Satellite Communications (SATCOM) avionics manufacturers, taking particular care to follow advice on Operator Requirement Table (ORT) set-up for optimizing accessibility to Inmarsat Ground Earth Station (GES) resources.

2.13 **Table 2** summarised the aggregated Required Communications Performance (RCP) for the Asia/Pacific Region.

REQUIRED COMMUNICATION PERFORMANCE										
Region	Asia-Pacific Region									
Performance Criteria	RCP240									
Time Period	2019 January-June					2019 July - December				
Colour key: Meets criteria; 99.0%-99.9%; Under criteria	No. Messages	ACP Criteria		ACTP Criteria		No. Messages	ACP Criteria		ACTP Criteria	
		95%	99.90%	95%	99.90%		95%	99.90%	95%	99.90%
Aggregate All RGS		% <= 180sec	% <= 210sec	% <= 120sec	% <= 150sec		% <= 180sec	% <= 210sec	% < = 120sec	% <=150sec
KZAK	295,992	99.10%	99.40%	99.50%	99.60%	306,146	99.20%	99.50%	99.30%	99.60%
NFFF	9,533	99.55%	99.74%	99.65%	99.73%	9,731	99.44%	99.65%	99.60%	99.69%
NTTT	2,195	99.68%	99.72%	99.86%	99.86%	2,183	99.72%	99.90%	99.86%	99.86%
NZZO	12,133	99.42%	99.59%	99.60%	99.71%	11,741	99.60%	99.59%	99.77%	99.72%
PAZA	84,241	99.05%	99.23%	99.33%	99.44%	85,796	98.35%	98.16%	98.76%	98.68%
RJJJ	51,506	99.46%	99.62%	99.38%	99.62%	54,855	99.50%	99.64%	99.47%	99.70%
RPHI	9,311	97.24%	98.71%	97.47%	98.81%	17,727	97.39%	98.62%	97.58%	98.88%
VCCF	29,676	98.31%	99.27%	99.24%	99.69%	32,594	98.12%	99.21%	99.39%	99.68%
VOMM	133,127	99.29%	99.50%	99.55%	99.71%	133,189	99.29%	99.51%	99.55%	99.71%
VVTS	27,923	94.67%	99.13%	95.37%	99.48%	30,462	94.58%	99.15%	95.29%	99.48%
VYYF	59,919	98.52%	98.90%	98.85%	99.18%	67,469	98.31%	98.69%	98.66%	99.04%
WAAF	41,583	98.61%	99.21%	98.88%	99.44%	38,744	96.46%	99.63%	97.31%	99.68%
WMFC	20,441	97.97%	98.73%			30,246	97.67%	98.45%		
WSJC	31,694	98.47%	98.27%	98.93%	98.88%	47,765	98.74%	98.62%	99.16%	99.09%
YBBB	36,891	98.99%	99.26%	99.82%	99.13%	40,094	99.30%	99.52%	99.16%	99.42%
YMMM	38,326	99.43%	99.58%	99.39%	99.57%	42,827	99.48%	99.64%	99.54%	99.69%
ZLLL	2,805	99.14%	99.35%	98.36%	98.89%	3,080	99.22%	99.41%	98.40%	99.18%
ZWWW	787	97.83%	98.22%	96.56%	97.20%	558	98.74%	99.28%	97.13%	97.84%

Table 2: Asia/Pacific Region Aggregated RCP Data.

2.14 Analysis of the RCP data indicated that:

- aggregate performance was fairly stable between the first and second half of 2019, with some degradation observed in the second half for a couple of FIRs;
- performance for CPDLC transactions delivered via High Frequency (HF) and mixed media continues to fall below requirements for RCP240;
- Performance for CPDLC transactions delivered via Iridium paths (IG1-ARINC, IGW1-SITA) fell below RCP240 95% in a few of Asia-Pacific FIRs; and
- Some aircraft operators were observed below the RCP240 95% requirements in multiple APAC FIRs.

2.15 PBCS non-compliance report templates were intended for ANSPs to inform the relevant Regional Monitoring Agency (RMA) of aircraft/aircraft operators where data link performance did not comply with specifications. A revised non-compliance report form template was proposed to FIT-Asia/10 in order to include additional information, to harmonize with the template already adopted in the North Atlantic (NAT) Region, and to use MS Excel format to facilitate data handling by the RMA. RASMAG/25 agreed to the following Conclusion developed by the FIT-Asia/10:

Conclusion RASMAG/25-1: Revised PBCS Non-Compliance Report Form Template

That, the PBCS Non-Compliance Report Form Template at **Appendix C to the Report** be uploaded to the Asia/Pacific Regional Office website, to replace the previous template.

2.16 FIT-Asia/10 recommended deletion of the APANPIRG Deficiency for Myanmar related to PRs not being provided to the CRA.

RASMAG/MAWG and RMACG Reports (WP04)

2.17 The Seventh Monitoring Agencies Working Group (MAWG/7, Bangkok, Thailand, 03 – 06 February 2020) reviewed the Long Term Height Monitoring (LTHM) burden of all Asia Pacific States, which was consolidated and presented to RASMAG/25 (RASMAG/25/WP32). The APANPIRG Deficiencies related to LTHM requirements.

2.18 Monitoring agencies reported their preliminary safety assessment results of 2019, including initial Performance Based Communications and Surveillance (PBCS) implementation data.

2.19 The Monitoring Agency or the Asian Region (MAAR) updated the meeting on the new online LHD reporting system that had commenced since 1 October 2019.

2.20 The Pacific Approvals Registry and Monitoring Organization (PARMO) described difficulties obtaining related safety data from States in Pacific airspace.

2.21 The meeting discussed the potential problem of State aircraft operators incorrectly filing 'W' in their flight plans, mistaking the aircraft manufacturer's Reduced Vertical Monitoring Agency (RVSM) certification as the full RVSM approval. Moreover, these aircraft might have never been height monitored. The meeting suggested that the question be raised to the ATM/SG/8 on how to detect/handle State aircraft operators that incorrectly file 'W' in their flight plans.

2.22 The Regional Monitoring Agencies Coordination Group (RMACG) had been conducted by video teleconference during July and August 2020. the RMACG discussed a number of key issues relevant to RASMAG as follows:

- rejection of Flight Plans of Aircraft Listed on the EUR RMA Bulletin;
- Height Keeping Performance in terms of Average Altimetry System Error (ASE) by Aircraft Monitoring Groups (*note: it was agreed that reporting of the B744-10 and B767 groups was unnecessary, unless any performance degradation was observed*);
- the potential for Height Keeping Performance Monitoring (HKPM) using Space-Based ADS-B Data; and
- RVSM Minimum Monitoring Requirement (MMR) update.

2.23 The meeting urged State CAAs to liaise with State Aircraft operators (e.g. military units) regarding the verification process and status of RVSM approvals in order to prevent their flight plans from being rejected by EUROCONTROL:

i) for States that have RVSM approval processes for State Aircraft equivalent to civil aircraft's, State CAAs are encouraged to share State Aircraft's approval data or confirming the approval status upon queried by the designated RMA;

ii) for all aircraft and operators with no RVSM approvals, State CAAs should communicate with the operators to not file 'W' in item 10 of the ICAO Flight Plan.

2.24 RASMAG/25 endorsed the updated MMR in accordance with the following Conclusion:

Conclusion RASMAG/25-2: RVSM MMR Update

That, the Reduced Vertical Separation Minimum (RVSM) Minimum Monitoring Requirement (MMR) update at **Appendix D to the Report** be utilized by Regional Monitoring Agencies (RMAs) and States as appropriate.

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

AAMA Vertical Safety Report (WP05)

3.1 The Australia Airspace Monitoring Agency (AAMA) provided an airspace safety review of RVSM airspace risk within the Brisbane, Honiara, Melbourne, Nauru and Port Moresby FIRs, and Jakarta and Ujung Pandang FIRs for 2019.

Southwest Pacific - Australian Airspace

3.2 The 2019 RVSM risk estimates for Brisbane, Honiara, Melbourne, Nauru and Port Moresby FIRs indicated that the Target Level of Safety (TLS) of 5 x 10^{-9} had been met at **1.37 x 10^{-9}**.

3.3 In December 2019, there was one occurrence of long duration within the Melbourne FIR involving a military formation being provided with RVSM separation while RVSM separation was not approved. The event was assessed as duration 95 minutes. However, total risk remains below the TLS, because the risks associated with this event are low compared to an aircraft at an incorrect level.

Indonesian Airspace

3.4 The 2019 RVSM risk estimates for the Jakarta and Ujung Pandang FIRs indicated that the TLS had not been met at **10.2 x 10^{-9} (Figure 1)**.

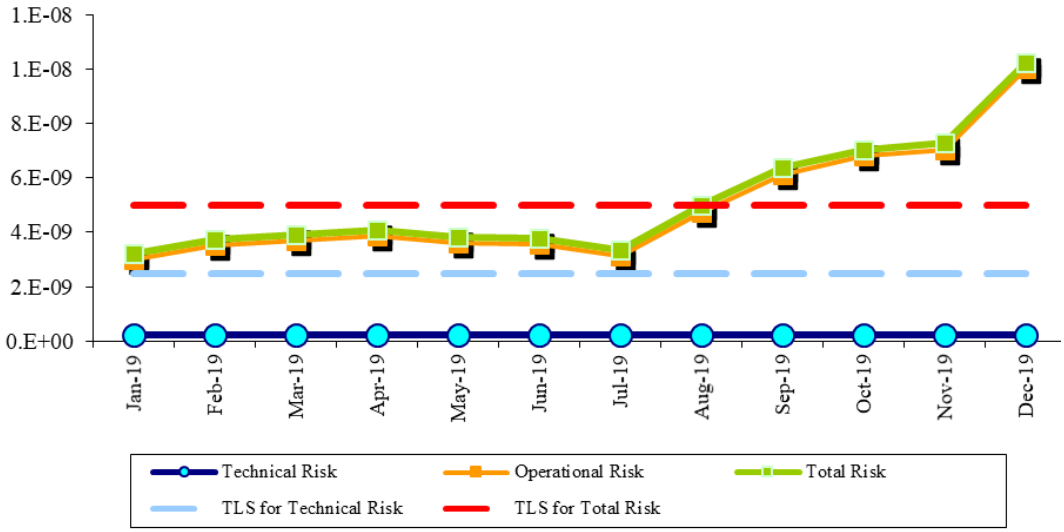

Figure 1: 2019 Vertical Risk Estimates for the Jakarta and Ujung Pandang FIRs

3.5 Since June 2019, there had been 21 non-zero-duration LHDs reported to AAMA within the Jakarta and Ujung Pandang FIRs. AAMA commented that the increase in the RVSM risk estimate since RASMAG/24 'could be due to an enhanced reporting culture'. The majority of LHDs (24 of 33, 73%) in the Jakarta and Ujung Pandang FIRs were category E (*Coordination errors in the ATC-to-ATC transfer or control responsibility as a result of human factors issues*). Indonesia informed the meeting that the status of Air Traffic Services (ATS) Inter-facility Datalink Communications (AIDC) between Jakarta and Ujung Pandang was still 'in progress'. AIDC:

a) had been installed at the Ujung Pandang ACC and implemented with Australia;

b) between Ujung Pandang and Manila had been trialled since April 2020, with implementation due at the end of 2020; and

c) would be installed in Jakarta ACC during December 2020 for operations between the Jakarta and Ujung Pandang ACCs.

3.6 **Figure 2** provides the location of all reported LHD occurrences for Jakarta and Ujung Pandang FIRs during 2019.

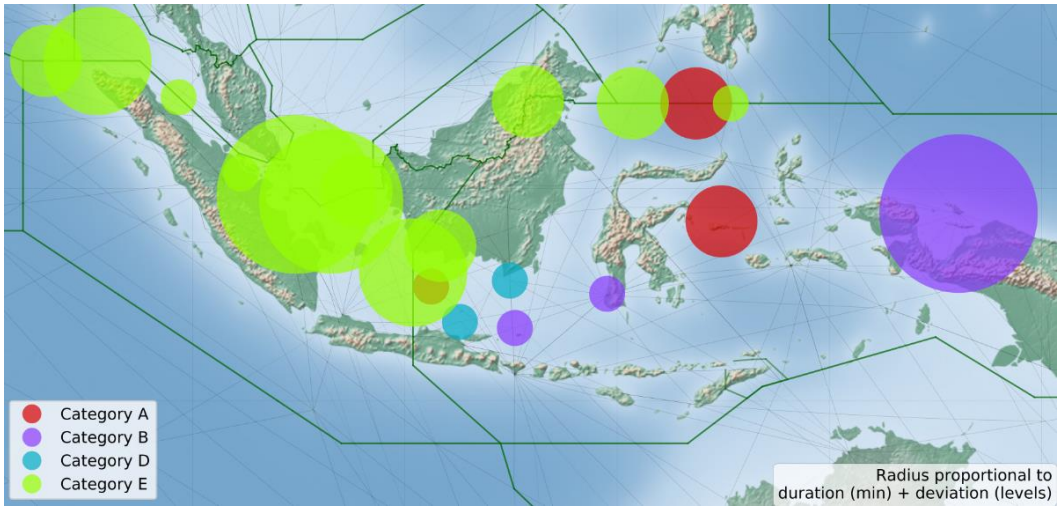

Figure 2: 2019 LHD Locations, Jakarta and Ujung Pandang FIRs, 2019

3.7 Singapore had highlighted to MAAR and AAMA on the mismatched LHD reports between both agencies and had followed -up with them to synchronise the LHD counts. Singapore would continue to work with the monitoring agencies and States to alleviate such issues in the future so that timely follow-up actions could be conducted.

China RMA Vertical Safety Report (WP06)

3.8 The China Regional Monitoring Agency (China RMA) provided an RVSM safety report for the nine Chinese FIRs (excluding Hong Kong and Taipei FIRs), and the Pyongyang FIR (Democratic People's Republic of Korea).

Chinese Airspace

3.9 The 2019 RVSM risk estimates for the Beijing, Guangzhou, Kunming, Lanzhou, Pyongyang, Sanya, Shanghai, Shenyang, Urumqi and Wuhan FIRs indicated that the TLS had been met at **1.367 x 10^{-9}**.

3.10 The risk estimate had resulted from 79 reported LHDs, including 30 Category I (*Turbulence or other weather related cause*. 38%) and 16 Category A (*Flight crew failing to climb/descend the aircraft as cleared*, 20%). There were only four reported Category E events (5%).

3.11 WP07 noted that the earlier identified hot spots within Chinese airspace between the Urumqi and Lahore FIR (Pakistan), Guangzhou/Sanya and Hong Kong FIR and within the Guangzhou FIR had all shown significant improvement. There was a total of only one reported LHD for all three Hot Spots in 2019 at position PURPA on the China– Pakistan FIR boundary.

Pyongyang FIR Airspace

3.12 The 2019 RVSM risk estimate for the Pyongyang FIR indicated that the TLS had been met at **3.02 x 10^{-9}**, as no LHD had been reported during 2019. However, the technical risk exceeds the target level of technical risk of 2.5 x 10-9, which rarely occurs. China RMA indicated that they will further investigate this.

LHD Hot Spot Analysis Report (WP07)

3.13 WP07 discussed the efforts the China RMA had made in recent years to minimise LHDs.

3.14 In Northern China, after identifying that most of the events were due to late revisions from the Beijing Area Control Centre (ACC), measures were taken to strengthen coordination with the Ulaanbaatar ACC. The paper also described coordination with Japan to reduce the mainly Category E events that occurred within the AKARA - FUKUE Corridor.

3.15 For Southern China, South China Sea Scrutiny Group meeting and a data exchange mechanism had been used to address LHDs at the Hong Kong – Guangzhou interface.

3.16 In Western China, a Very High Frequency (VHF) station with two channels and an Automatic Dependent Surveillance-Broadcast (ADS-B) station had been established at Taxkorgan in 2015 and another ADS-B station was installed in 2017 at Shache airport. These facilities had dramatically reduced the LHDs at the China – Pakistan interface.

3.17 In the circumstances, China RMA suggested that RASMAG/25 review and remove Hot Spot C (Guangzhou-Hong Kong), E (Lahore-Urumqi) and H (Guangzhou-Wuhan).

JASMA Vertical Safety Report (WP08)

3.18 The vertical safety assessment for the Fukuoka FIR's RVSM airspace by the Japan Airspace Safety Monitoring Agency (JASMA) during 2019. The 2019 RVSM risk estimate for the Fukuoka FIR indicated that the TLS had not been met at **11.57 x 10^{-9}** (**Figure 3**).

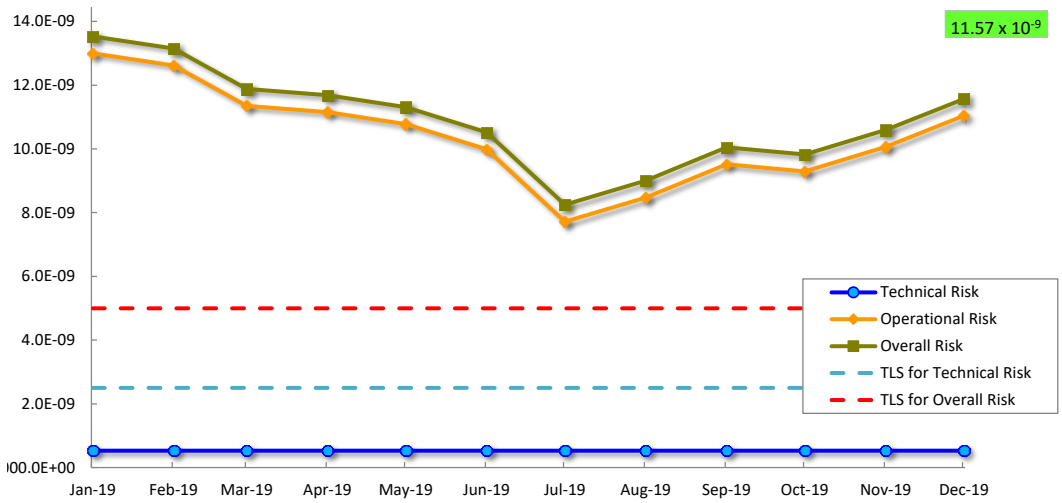

Figure 3: 2019 Vertical Risk Estimate for the Fukuoka FIR

3.19 Of the 64 LHDs reported during 2019 within the Fukuoka FIR:

- 27 were Category J *Aircraft Collision Avoidance System Resolution Advisory (ACAS RA) resolution advisory*; flight crew correctly climb or descend following the resolution advisory (42%);
- 12 were caused by Category E (19%);
- 11 were related to Category I Turbulence or other weather related cause leading to unintentional or undetected change of flight level (17%); and
- 10 were Category D (*ATC system loop error*, 16%).

3.20 **Figure 4** illustrates the location of the reported LHDs during 2019.

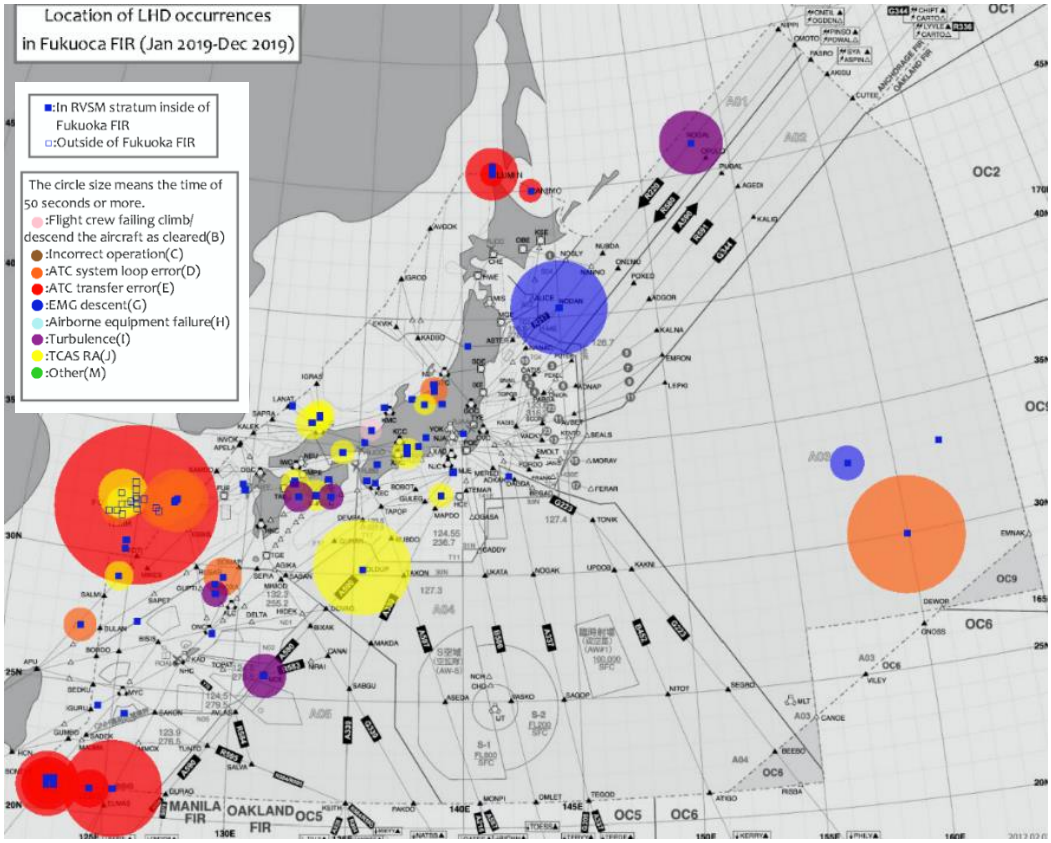

Figure 4: 2019 LHD Locations (as assessed by JASMA)

3.21 With regard to Category D events, JASMA provided more detailed analysis to the meeting after ICAO asked whether English Language Proficiency (ELP) might be an issue. While acknowledging the potential role of ELP, Japan noted that some of these incidents were due to similar call signs.

3.22 In response to a query from ICAO, IATA clarified that its successful similar call sign initiative that had been implemented in the Middle East (MID) Region had not been able to progress in the APAC Region. One of the reasons for this was the reluctance of aerodrome operators to implement change until an automated tool was available to accommodate alphanumeric call signs.

3.23 Noting the grave safety risks from such occurrences, the meeting agreed to the following Draft Conclusion (to be reviewed by the ATM/SG/8 and the AOP/SG).

Draft Conclusion RASMAG/25-3: Alphanumeric Call Sign Initiative

Noting:

1) the extreme safety risks associated with pilot-ATC miscommunication and the number of Category D (ATC Loop Error) Large Height Deviations (LHDs);

2) APANPIRG Conclusion 27/15. ATMSG Conclusions 5-5 and 5-6 regarding the Asia Pacific Alphanumeric Call-Sign (ANCS) project; and

3) alphanumeric call signs were a well-established call sign confusion mitigation, that:

leading Air Navigation Service Providers (ANSPs) and aerodrome operators, in coordination with CANSO and ACI, were urged to consider a trial to identify and overcome any barriers for the implementation of alphanumeric call signs, with a view to developing a project for the Asia/Pacific (APAC) Region.

3.24 There had been six LHDs at Hot Spot D at the FIR boundary between the Manila and Fukuoka FIRs during 2019, five of which occurred on transfer from Manila ACC to the Kobe ACC, and one occurred on transfer from Kobe ACC to Manila ACC. These LHDs were caused by a lack of the latest transfer information with the revised altitude. This represented a reduction compared to 2017 and 2018, as a result of measures taken by the Philippines.

3.25 At Hot Spot L on the FIR boundary between the Khabarovsk and Fukuoka FIRs, there were three reported LHDs as a result of an incorrect transfer from the Khabarovsk ACC to the Sapporo ACC. There were two factors – no revised transfer information for an altitude change, and a misunderstanding of the transfer altitude.

Flimsy 01

3.26 The ROK provided comprehensive information on its analysis process of the proposed changes to the AKARA – FUKUE Corridor arrangement, and its capability to provide ATS within the airspace concerned. The ROK noted that after a period of slow progress due to the COVID-19 pandemic, the States concerned had resumed negotiations. The ROK stressed that while the pandemic had temporarily reduced the air traffic volume, safety concerns may resurge at any time with the expected increase of traffic in the future. As such, ROK stated that they were convinced that the timely transition to the new ATS structure should occur now.

JASMA AKARA LHD Mitigations (WP09)

3.27 WP09 discussed mitigation measures by JASMA for LHDs that had occurred in the AKARA – FUKUE Corridor. Of the 29 LHD events reported by PARMO, there were seven Category D events reported to JASMA from the Fukuoka ACC in 2019. Japan had circulated an advisory to ATC, aircraft operators, IATA and IFALPA that emphasized the need to take particular care to avoid pilot – ATC miscommunication. JASMA also stressed the importance of sharing safety reports.

3.28 ICAO thanked JASMA for their efforts to improve safety within this airspace. Noting that mitigations of this nature were insufficient to completely reduce risk due to the Annex 11 non-compliant airspace arrangements, ICAO stated that compliant operations must urgently replace the outdated current arrangement. In this regard, it was stressed that every day that States provided ATC services within the Corridor in accordance with the current arrangements, it exposed those States to unnecessary risk. Japan was urged to complete the process of updating its coordination agreement with the ROK as soon as possible, in order to facilitate a safe and orderly change so that only one ATC unit provided services within this airspace, which will have new additional ATS routes.

3.29 Moreover, the COVID-19 lower traffic environment was probably an optimal time to consider change, and the need to assist airline recovery post-COVID-19 with greater efficiencies was an important consideration.

3.30 ICAO urged concerned States to update the ATM/SG/8 (23 – 27 November 2020) on progress made to resolve the Hot Spot. In response, Japan and the ROK responded positively by agreeing that this was an ideal time to move forward with necessary ATS changes (traffic was reportedly only one quarter that of 2019 levels). The meeting requested ICAO HQ to convene a meeting of the Technical Working Group (TWG) to agree to the finalised changes and timeline for implementation.

3.31 China RMA stated that it was a good idea to hold the meeting in the ICAO HQ, because China had established an authorised team to manage specific AKARA issues. China RMA did not have access to detailed information of these discussions; thus the China RMA could not comment on the process of discussions to resolve the AKARA – FUKUE Corridor at this meeting.

JASMA Category J LHD Investigation (WP10)

3.32 Japan provided an overview of its investigation of the high number of ACAS RA Category J LHD events reported within the Fukuoka FIR. There were 27 such events reported in 2019, about 42% of the total. Of these 27 reports, 20 were deemed to be 'nuisance' RAs, while 7 were confirmed as being genuine.

3.33 The meeting discussed the identification of Category J events as LHDs, given that these were not taken into account in risk modelling or ATC separations as an independent safety net action using the command authority of a pilot to conduct a safe trajectory, bearing in mind the Aircraft Collision Avoidance System (ACAS) Resolution Advisory (RA) and any ATC essential traffic information. The issues of so-called 'nuisance' RAs and the potential problem of RMAs treating ACAS RAs inconsistently was also discussed, as these were the majority of Category J LHDs. The meeting agreed that the RASMAG Chair would further discuss this at the RASMAG MAWG.

JASMA Supplemental Information Request (IP02)

3.34 Japan provided feedback on its request for supplemental information regarding three LHDs [within the AKARA – FUKUE Corridor] and two LLDs that had occurred during 2019. JASMA remarked that the protocol for requesting and obtaining supplemental information provided RMAs and EMAs assistance to analyse and categorize LHDs/LLDs/LLEs precisely. Japan thanked IATA and IFALPA for their patient coordination, to allow the appropriate categorisation of cause.

MAAR Vertical Safety Report (WP11)

3.35 The Monitoring Agency for the Asian Region (MAAR) provided the vertical safety assessment for the RVSM operation in South Asia/Indian Ocean Airspace (SAIO), Southeast Asia Airspace (SEA), and Mongolian Airspace during 2019.

South Asia Indian Ocean Airspace

3.36 The 2019 RVSM risk estimate for SAIO airspace indicated that the TLS had not been met at **36.78 x 10^{-9}** (**Figure 5**).

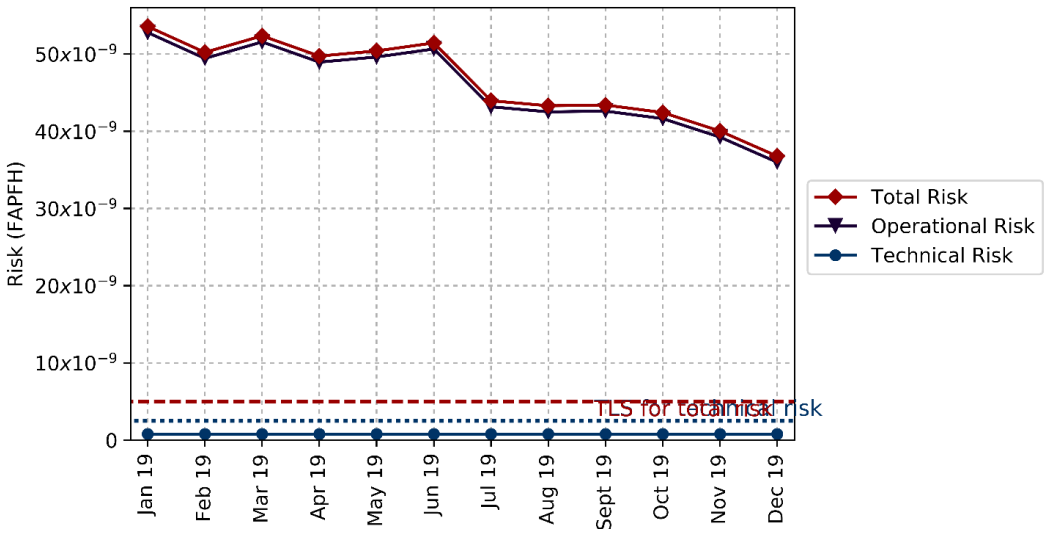

Figure 5: 2019 Vertical Risk Estimate for SAIO airspace

3.37 As had been the case in previous years, the vast majority of the 434 LHD cases that had been reported were Category E events, with 411 (95%).

3.38 LHD Hot Spot F (Mogadishu – Mumbai) and Hot Spot G (Sanaa/Muscat – Mumbai) remained as LHD hot spots. In 2019, the operational risk of this hotspot accounted for **25.65 x 10^{-9}**,

which was 71% of the SAIO area's total risk. The 2019 operational risk in SAIO airspace was dominated by LHDs at Mumbai – Muscat interface. Out of 16 long duration LHDs in SAIO airspace, 12 LHDs occurred at this interface, accounting for 38% of the total operational risk in this subregion.

3.39 The majority of LHDs between Muscat and Mumbai were Category E, with a sub-category of 'No or Late FL revision' and 'Negative Transfer'. The poor communication services and lack of surveillance coverage at this interface worsened the situation, due to the slower identification that led to long-duration occurrences.

3.40 In addition, the Pakistan airspace closure from 27 February to 16 July 2019 contributed to the increase in LHDs particularly at waypoint RASKI, PARAR and TOTOX (**Figure 6**).

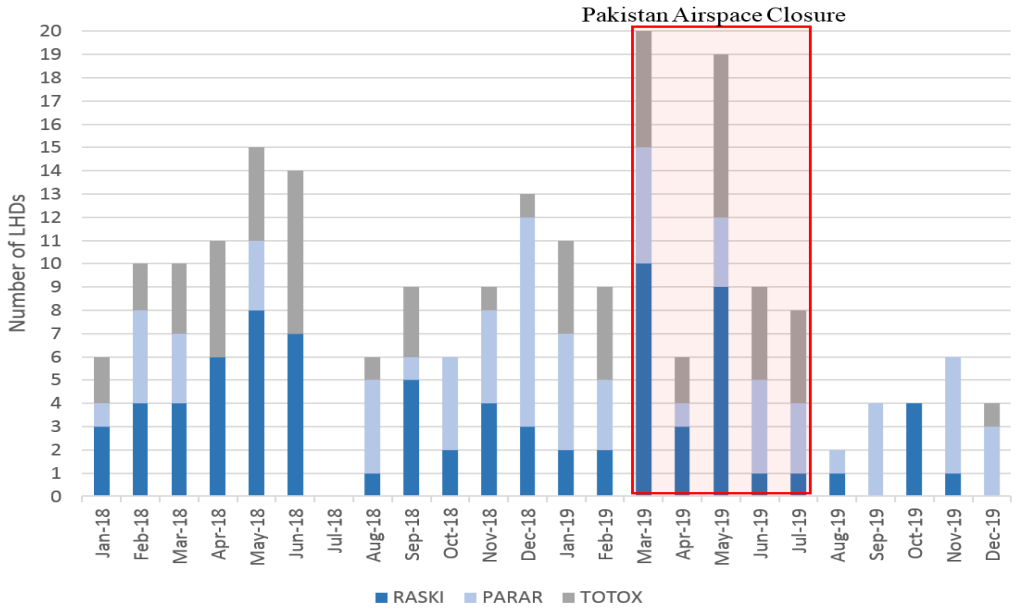

Figure 6: LHDs at RASKI, PARAR and TOTOX, January 2018 – December 2019

3.41 The geographical locations of the SAIO LHDs indicated that there had been an increase in reporting within Indian airspace, particularly between the Chennai and Mumbai FIRs (**Figure 7**). However, the Delhi and Kolkata FIRs did not appear to demonstrate the same level of LHD reporting, with Delhi reporting an implausible three LHDs internally and Kolkata an even less plausible single LHD over continental airspace over the entire year.

3.42 ICAO strongly urged BOBASMA to take the lessons of improvement from Chennai and Mumbai, and urgently conduct an intensive education programme with follow up in Delhi and Kolkata ACCs.

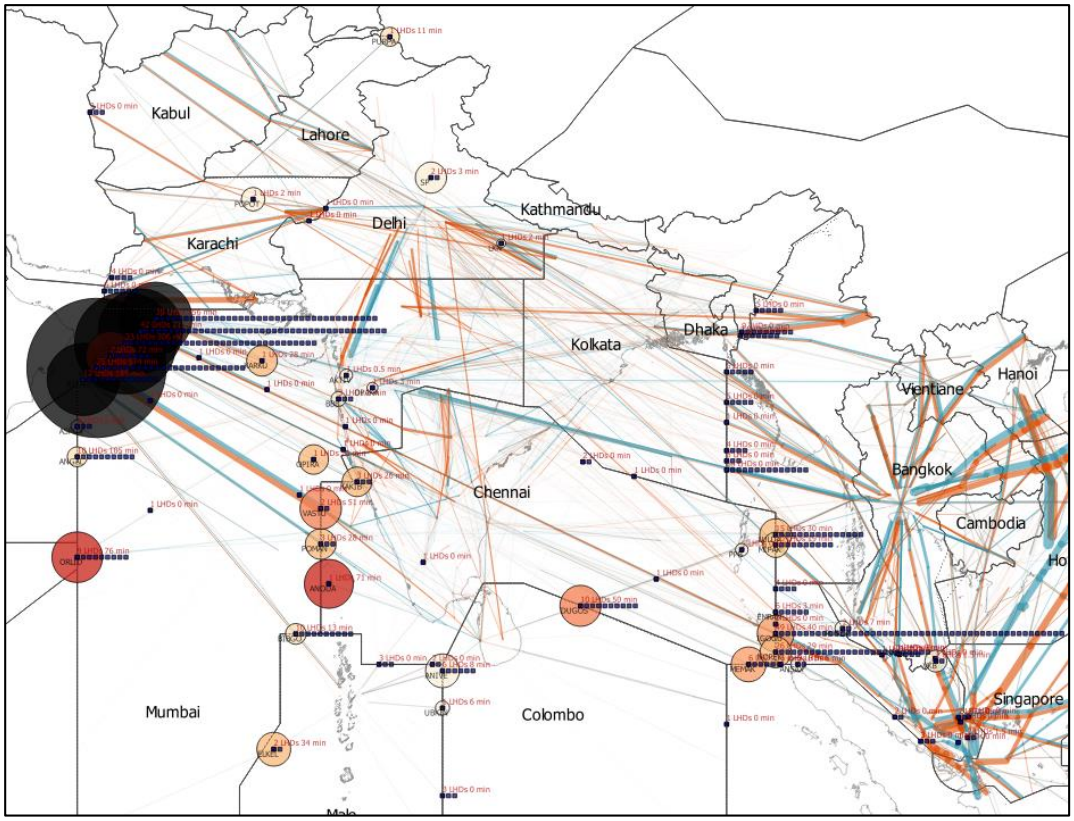

Figure 7: 2019 Geographical Locations of SAIO LHDs

3.43 The operational risk at Kolkata/Dhaka –Yangon and Chennai – Kuala Lumpur interfaces (Hot Spots A1 and A2) decreased from 2017 to 2019. The LHDs over waypoint APAGO and CHILA involved Dhaka, Kolkata and Yangon FIR. The ambiguity on handling of eastbound traffic between Dhaka FIR and Kolkata FIR (as well as coordination with Yangon FIR) was resolved by the implementation of a new procedure, which was developed by Bangladesh, India and Myanmar at the BIMT/4 ATM Coordination meeting in August 2016. This procedure was incorporated into a new ATS Letter of Agreement (LOA) signed between Bangladesh and India effective March 2018.

3.44 ADS-B data sharing between Kolkata ACC and Yangon ACC had also been implemented in June 2018, allowing controllers to detect and resolve any issues before an aircraft passed the Transfer of Control (TOC) points. This had successfully mitigated the risk at the interface between Kolkata and Yangon FIRs, with the operational risk decreasing from **2.04×10^{-9}** in 2017, to **0.6×10^{-9}** in 2018, and to **0.31×10^{-9}** in 2019.

3.45 On the other hand, the operational risk in 2019 had increased at Chennai-Yangon and Chennai-Kuala Lumpur interfaces (LULDA, MEPAK, IGOGU, NOPEK and MEMAK). At these interfaces, ADS-B data sharing had not yet been implemented.

3.46 For Hot Spot I (Karachi – Kabul), since the establishment of a new ATS route Z627 between the Tehran and Kabul FIRs in July 2019, there had been no reported LHD.

Southeast Asian Airspace

3.47 The 2019 RVSM risk estimate for SEA airspace indicated that the TLS had been met at **3.59×10^{-9}**. However, there was an upward trend towards the TLS at the end of 2019 (**Figure 8**).

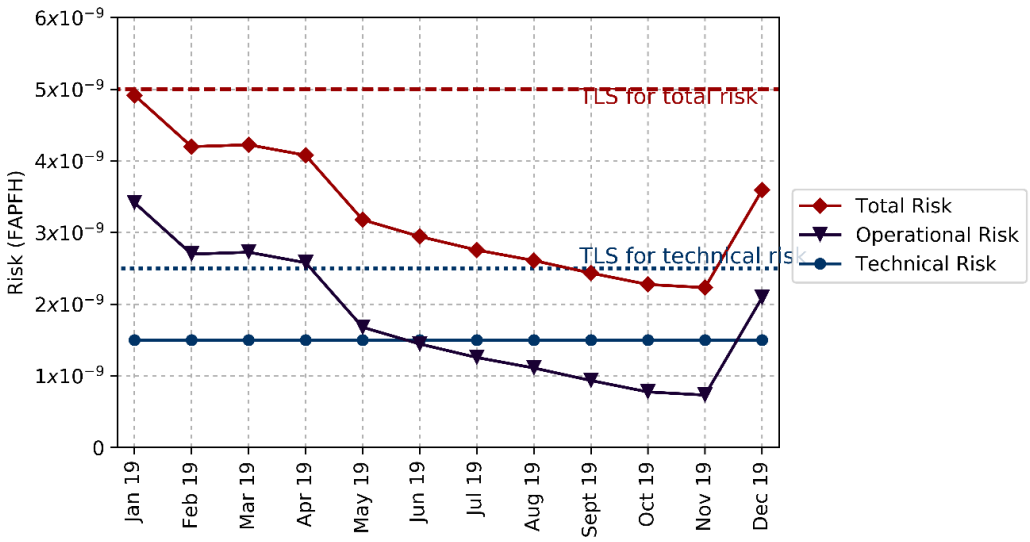

Figure 8: 2019 Vertical Risk Estimate for SEA airspace

3.48 Category E events once again formed the vast majority of occurrences, with 120 out of 145 attributed to this cause (83%).

3.49 Most of the LHDs and operational risk within SEA airspace was associated with **Hot Spot D** (Manila and all adjacent FIRs). From late 2018, the number of LHDs and operational risk in SEA airspace began reducing as the capabilities of the new ATM system were implemented, including enhanced VHF radio, radar and ADS-B coverage, and new ATC sectors. Furthermore, the ADS-C/CPDLC implementation in oceanic airspace, AIDC implementation with Hong Kong FIR, Singapore FIR and Taipei FIR commenced as indicated in **Figure 9**.

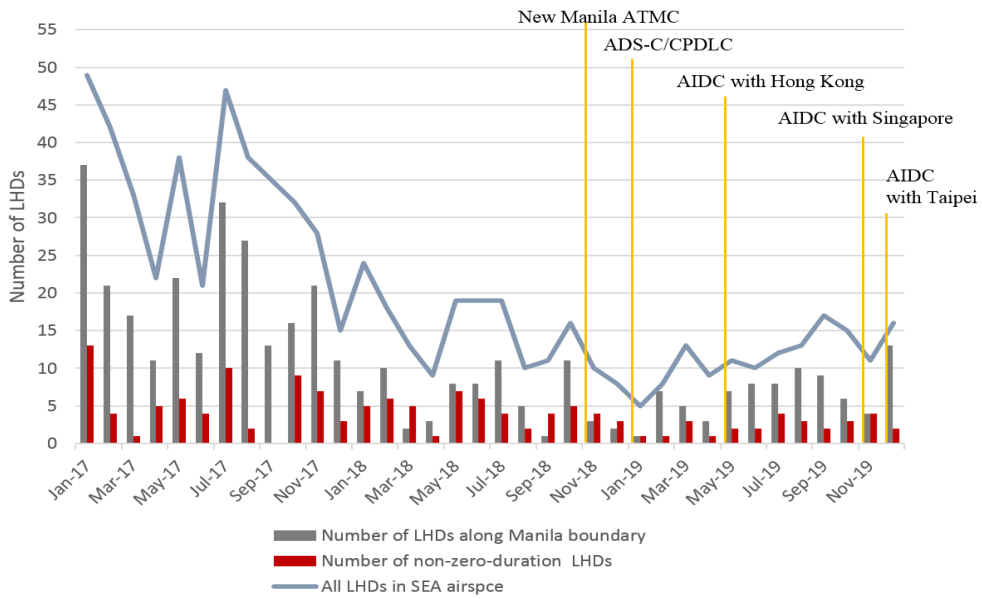

Figure 9: LHDs, Manila FIR Boundary, 2017 – 2019

3.50 However, the number of Category F LHDs (*Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical* issues) had increased in SEA airspace. There were a total of nine Category F LHDs involving the Manila FIR reported in 2019, seven of which were due to AIDC errors. The Philippines stated that this was due to the ATM system failing to alert the controller in case of unsuccessful AIDC transfer, which was being addressed.

Mongolian Airspace

3.51 The 2019 RVSM risk estimate for Mongolian airspace indicated that the TLS had been met at **1.07 x 10^{-9}**.

3.52 There were a total of two LHDs reported in 2019. One Category A LHD occurred at waypoint NIGOR, a TOC point between the Ulaanbaatar and Krasnoyarsk FIRs. Another LHD was Category I, reported at waypoint HATGA located within Ulaanbaatar FIR. None of these LHs resulted in an operational risk.

Safety Reporting

3.53 Bangladesh and Pakistan submitted 2019 TSD in timely manner. Both States also continuously submit their LHD reports up to present. **Table 3** summarises MAAR's proposal regarding the APANPIRG List of Deficiencies in the ATM/AIS/SAR fields, under *Non-Provision of Safety Related Data by States*.

State	Proposal	Reason for Inclusion/Removal
Afghanistan	No change	Submitted 2019 LHD, but did not report any 2020 LHDs
Bangladesh	Removal	Already submitted 2019 TSD in timely manner. Continuously submitted 2019 and 2020 LHDs.
Pakistan	Removal	

Table 3: Safety Reporting Deficiency Recommendations

3.54 MAAR noted that measuring how well an organization reports hazards and incidents had been a challenge and the use of reported incident numbers as an indicator of reporting culture had limitations, due to many factors apart from the maturity of reporting cultures. Low number of reported incidents could be a result of the improvement in safety level or a result of poor reporting cultures.

3.55 Notwithstanding this, MAAR advised that there were some signs of reporting culture improvement, including positive trends in India. ACCs that had always submitted NIL report were:

Phnom Penh, Hong Kong, Vientiane, Taipei, Hanoi, Ho Chi Minh, Dhaka, Karachi and Ulaanbaatar.

3.56 MAAR clarified that controllers tend to report LHDs only when affected by mistakes made by their neighbouring FIRs. In 2019, only 15% of all LHDs were reported by the AC that had made the error. ACCs with good reporting culture that submitted this type of LHD report were:

Singapore, Manila, Kota Kinabalu and Kuala Lumpur.

<u>Manila FIR AIDC Implementation LHD Mitigations Update (WP12)</u>

3.57 The Philippines presented updates on actions taken and planned measures to minimise the occurrence of LHD using the completed FORM B – *LHD Preventive/Mitigation Measures*.

3.58 The Philippines described various mitigation measures for LHDs such as meetings with stakeholders, training for operational staff, dissemination of information on flight plan formats, and improvements in the process of coordination between the ACC supervisors and debriefing with involved controllers post-incident. The Philippines noted that the new ATM system had special human machine features such as visual cues to minimise human errors.

3.59 **Table 4** provides the status of AIDC implementation in the Manila FIR.

Date	**Adjacent Centre**	Status
23 May 2019	Hong Kong ACC	Implemented
01 November 2019	Singapore ACC	Implemented
05 December 2019	Taipei ACC	Implemented
10 October 2019	Ujung Pandang ACC	Operational Trial
TBD	Kota Kinabalu ACC	Awaiting KK to upgrade ATM system
TBD	Ho Chi Minh	Awaiting response to continue technical testing as HCM is using old FPL format
TBD	Kobe ACC	Initiated contact, awaiting response
TBD	Japan ATMC	Initiated contact, awaiting response
TBD	Oakland ACC	Awaiting for migration from AFTN to AMHS for datalink connection

Table 4: AIDC Implementation Status, Manila FIR

PARMO Vertical Safety Report (WP13)

3.60 PARMO provided a vertical safety assessment for the RVSM airspace of Pacific airspace and a portion of the Incheon FIR during 2019.

Pacific Airspace

3.61 The 2019 RVSM risk estimate for Pacific airspace indicated that the TLS had not been met at **31.41 × 10^{-9}** (**Figure 10**).

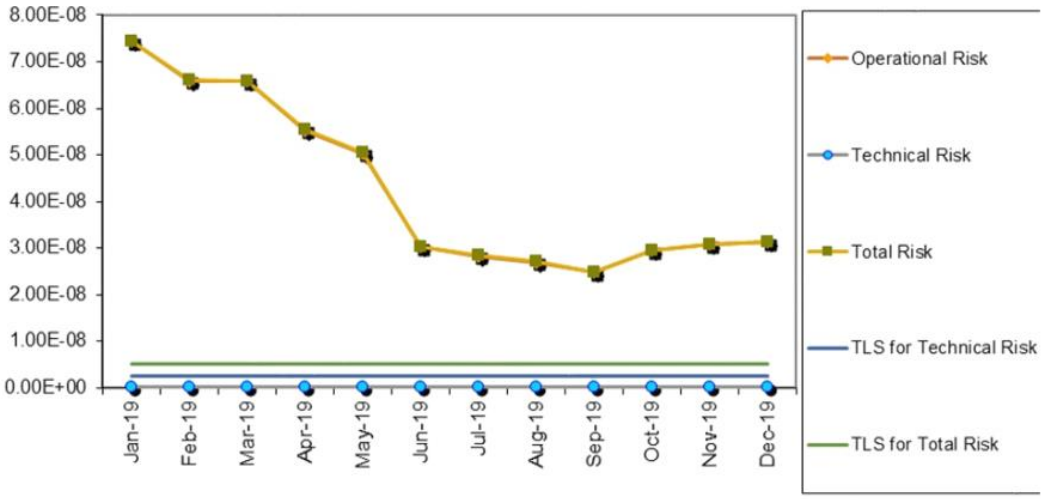

Figure 10: 2019 Vertical Risk Estimate for Pacific airspace

3.62 Of the 83 LHDs, 67 were classified as Category E (81%). There were also five Category A events and four Category B *Flight crew climbing /descending without ATC clearance* errors LHDs (11% A/B).

3.63 The geographical location of reported Pacific LHDs is depicted in **Figure 11**.

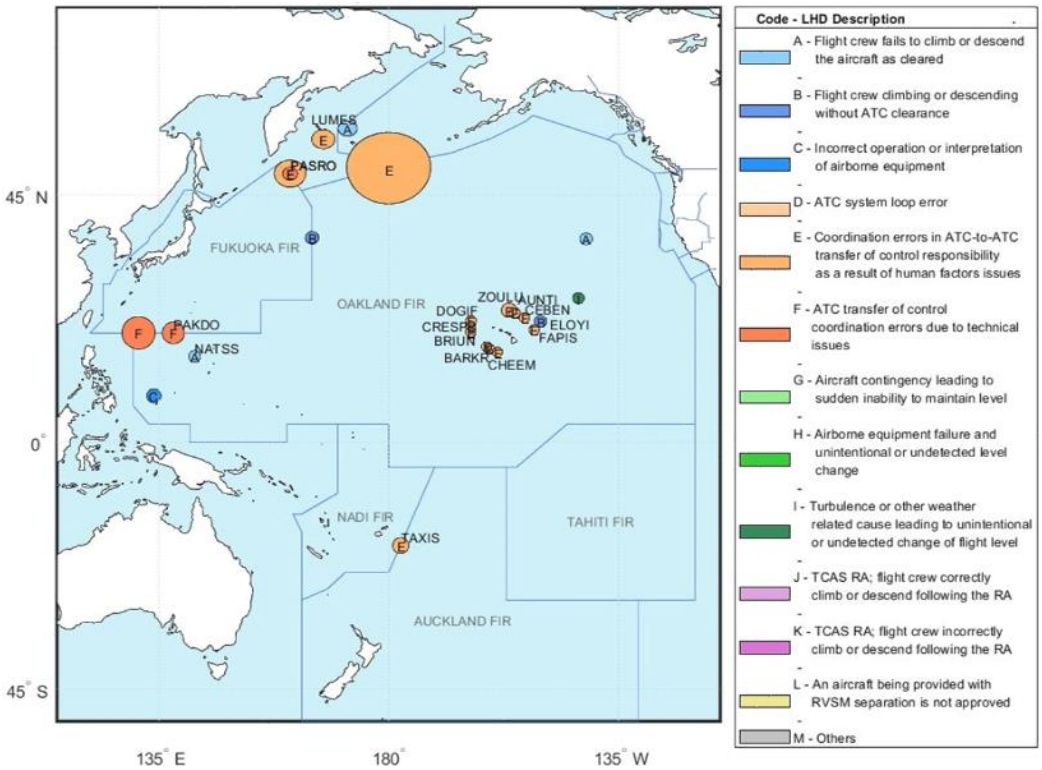

Figure 11: Location of Pacific LHDs, 2019

3.64 The analysis for Pacific airspace shows that LHD categories E and F, errors in ATC-to-ATC transfer were the top contributors to reported LHD occurrences during 2019. This was a change from previous years where air crew errors in Category A and B were the top contributors.

3.65 In 2018, the area of Pacific airspace with the largest reported LHD duration was the Central East Pacific (CEP) traffic flow, and this area was designated as Hot Spot N. There was an increase of 61 Category E LHDs from transfer errors between Honolulu Control Facility (HCF) and the Oakland Oceanic FIR. Extra resources had been provided to the ATC units concerned to investigate the underlying causes and a task force had been established that included personnel from both facilities.

3.66 WP13 described a number of improvements as a result of reported occurrences in 2019:

a) AIDC had been implemented between the Anchorage Oceanic and Magadan FIRs;

b) an ATC facility took action to organise a work group to examine 'nuisance' messages that may be disregarded by controllers as false alerts;

c) an ATC facility conducted training for controllers on the use of HOLD messages in the automation system, and is now part of the annual refresher training; and

d) the use of an ADS – Contract (ADS-C) Altitude Range Change (ARC) event contract to detect when an aircraft moves outside the prescribed altitude range.

Incheon FIR

3.67 The 2019 RVSM risk estimate for the Incheon FIR (not including the AKARA - FUKUE Corridor) airspace indicated that the TLS had been met at $\mathbf{1.07 \times 10^{-9}}$.

3.68 A total of five LHDs had been recorded during 2019, two each which were Category B

and E, and one Category J. The estimate of overall vertical risk had decreased from the 2018 estimate.

AKARA Safety Assessment (WP14)

3.69 PARMO provided an RVSM safety report for the AKARA-FUKUE Corridor airspace containing ATS route A593 with crossing routes Y711 and Y722/B576 within the Incheon FIR. The AKARA corridor airspace involved four FIRs (Fukuoka, Incheon, Taibei and Shanghai) and four RMAs and had a unique, Annex 11 non-compliant arrangement whereby two ATC units provided services within the same airspace.

3.70 There had been twelve reported LHDs during 2019 that contributed towards the estimate of operational vertical risk, with a total of 35.9 minutes of duration at an incorrect flight level and 10 flight levels crossed without an ATC clearance. This had resulted in a 57% increase in estimated vertical risk to **247.0 × 10^{-9}** (**Figure 12**).

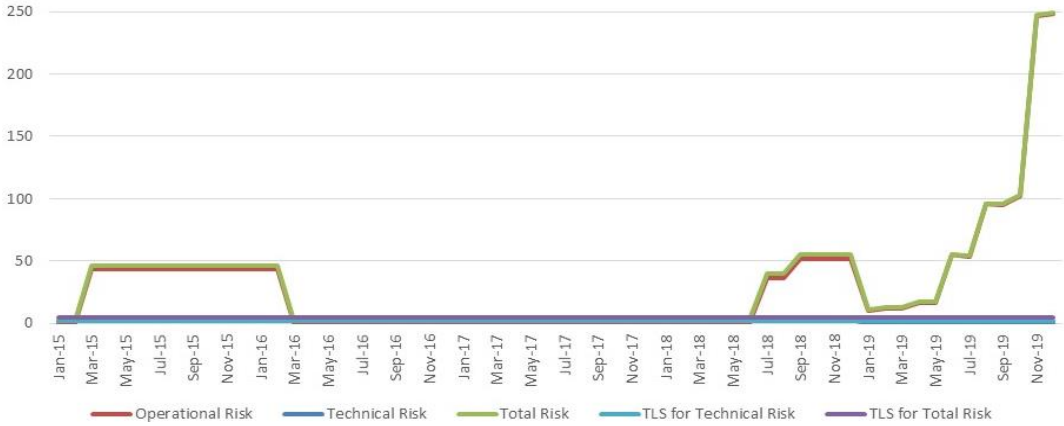

Figure 12: AKARA Twelve-month Rolling Vertical Collision Risk Estimates, 2015 – 2019

3.71 The numbers of reported LHDs within this airspace had been increasing rapidly, with only three in 2015 and 2016, and none in 2017. After discussions at RASMAG on the need for improved safety reporting, a major increase of 19 for 2018 was recorded, and again in 2019 29 LHDs were recorded, 16 of which were Category E (55%), seven were Category D (24%) and one each for Category A and Category B (7% together). Locations of the LHD events are indicated in **Figure 13**.

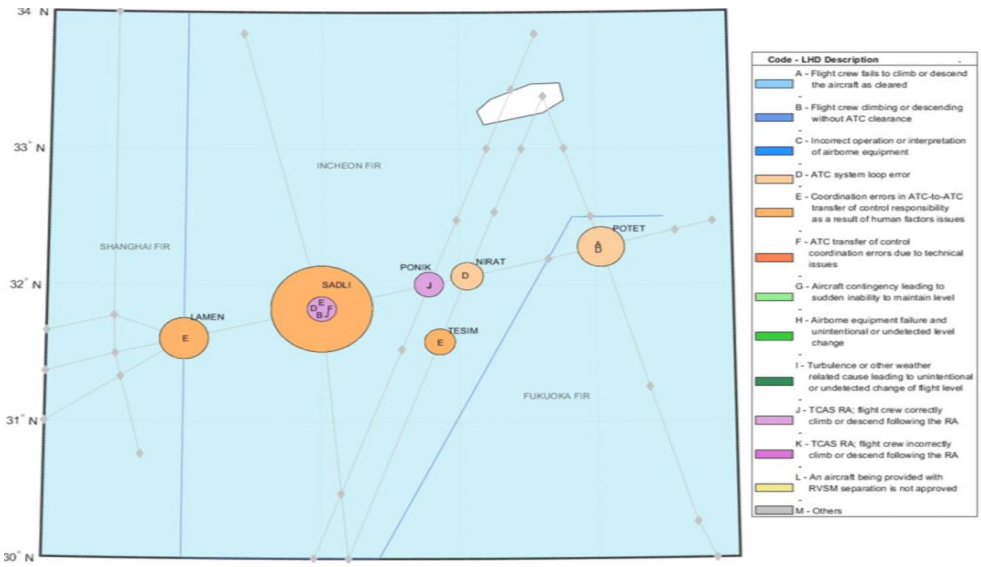

Figure 13: Locations of 2019 Reported AKARA Corridor LHDs

3.72 The meeting discussed the need for more systematic and efficient incident sharing

mechanisms, as RMAs were not always able to source data in time. The RASMAG Chair agreed to discuss this at the next RASMSAG-MAWG.

3.73 ICAO thanked PARMO for its work to consolidate the safety data from four RMAs, noting that as a result of greater scrutiny and more reporting, the vertical risk estimate result exceeded the TLS by a factor of nearly 50 times, significantly more than an order of magnitude.

BOBASMA Horizontal Safety Report (WP16)

3.74 India presented a horizontal safety assessment for the Bay of Bengal/Arabian Sea Indian Ocean airspace during the period January to December 2019. The 50NM lateral and longitudinal risks remained below the Target Level of Safety (TLS) at **1.59×10^{-9}** and **4.97×10^{-9}**. Of the ten Large Lateral Deviations (LLDs) or Large Longitudinal Errors (LLEs) reported during 2019, eight were Category E LLDs (*Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of human factors issues*).

3.75 WP16 described on-going improvements to AIDC capability, including between:

a) Chennai and Kuala Lumpur (implemented 15 May 2017 but further enhanced to include Transfer of Control and Acceptance of Control (TOC and AOC) messages;

b) Chennai and Kolkata (Phase 2 trial operations were due to be implemented shortly);

c) Mumbai and Muscat (discussion first commenced in 2018 but there had been no progress nor response from Muscat thus far; thus ICAO proposed to send a State Letter ABOUT THIS to the Sultanate of Oman via the MID Office); and

d) Mumbai and Mogadishu (the final round of testing is planned to commence soon).

3.76 India confirmed that its Space-based ADS-B (SB ADS-B) capability would be operationalised on 01 January 2021, and that its SB ADS-B service volume extended to about 50NM outside the Indian FIRs. The meeting discussed the possibility of SB ADS-B data being used for safety monitoring purposes, and for operational data sharing with adjacent ANSPs where terrestrial surveillance was not available.

Identified Airspace Risk Occurrences within Indian Airspace (WP17)

3.77 India provided a brief analysis of airspace risk occurrences within Indian airspace during 2019 and described the mitigation actions undertaken. The paper stated that there had been 18 LHDs within Mumbai FIR with durations equal to or greater than 30 minutes (and one LHD of 32 minutes within the Chennai FIR). WP17 also noted with concern the lack of progress in AIDC implementation with Muscat.

JASMA Horizontal Safety Report (WP18)

3.78 Japan provided the horizontal risk assessment results of the Fukuoka Flight Information Region (FIR) conducted by the Japan Airspace Safety Monitoring Agency (JASMA).

3.79 The horizontal separations based on Performance-Based Navigation (PBN) both met the TLS, with 50NM lateral achieving **1.45×10^{-9}** and 30NM longitudinal estimated risk at **0.015×10^{-9}**. However, the 10-minute time-based risk did not meet the TLS at **20.1×10^{-9}**, due to inaccurate trajectory data until a major programme update in June 2019. WP18 noted the expectation that the risk estimate for the 10 minutes time-based longitudinal collision modelling would be stable in 2020.

JASMA Assessment of Non-PBCS Approved Aircraft (WP19)

3.80 Japan presented a list of aircraft operating within the Fukuoka FIR with no registration of PBCS (Performance-based Communication and Surveillance) approval in the Knowledge Sharing Network (KSN) approval databases, as at March 2020.

3.81 A total of 588 aircraft had been identified with flight plan indicator P2 without a Required Communication Performance (RCP) 240 and Required Surveillance Performance (RSP) 180 authorisation registered and uploaded to the KSN website. The meeting clarified that this was more likely to be due to a failure of registration, rather than representing a true picture of non-PBCS approved aircraft. The RMAs were working to improve this through regular contact with the States concerned.

Status of RSP/RCP Approval Collection (WP20)

3.82 Thailand also shared information on the status of RCP 240 and RSP 180 approval data that MAAR had collected from 21 states since March 2018. As at August 2020, there were 13 States that had adopted the F2 Form, which included RSP and RCP information. Five of these provided RCP240 and RSP180 approvals to MAAR, while eight States had left the fields blank (**Table 5**).

States	Adopted revised F2 Form	Provided RCP240/RSP180 approval data
Afghanistan	NO	
Bangladesh	NO	
Cambodia	NO	
China (Macau)	NO	
Lao PDR	NO	
Maldives	NO	
Myanmar	NO	
Viet Nam	NO	
Bhutan	YES	X
Brunei Darussalam	YES	✓
China (Hong Kong)	YES	✓
China (Taiwan)	YES	✓
India	YES	X
Malaysia	YES	X
Mongolia	YES	X
Nepal	YES	X
Pakistan	YES	X
The Philippines	YES	✓
Singapore	YES	✓
Sri Lanka	YES	X
Thailand	YES	X

Table 5: F2 Form Usage

3.83 The meeting noted that this was a poor response to *Conclusion RASMAG/24-5: Verification of RCP and RSP Capabilities Filed in the Flight Plan*, in respect of the need for States to submit RCP and RSP approvals to monitoring agencies so that the approvals can be shared globally and used to verify RSP and RCP designators in the flight plans. MAAR urged States to adopt the revised F2 Form and encouraged an explicit declaration of RSP/RCP approval status of each aircraft in their operators' fleets.

3.84 MAAR requested that all States marked with 'NO' in Table 1 to adopt the new F2 Form and States marked with 'X' in Table 1 to explicitly check YES or NO in field 15 (RSP180 Approval) and 18 (RCP240 Approval).

PARMO Horizontal Safety Report (WP21)

3.85 PARMO submitted its horizontal safety monitoring report for 2019. The 30/50NM lateral, 30NM and 50NM longitudinal risks were both estimated to meet the TLS at **3.35×10^{-9}**, **4.08×10^{-9}** and **2.22×10^{-9}** respectively. Of the 90 reported LLDs and LLEs, 73 (81%) were due to Category E (although some of these would be categorised as Category F in future assessments), while 10 (11%) were as a result of Category A root causes (*Flight crew deviates without ATC clearance in the horizontal dimension*).

3.86 There were two long duration LLDs reported in 2019, with durations of 83 and 44 minutes. Both occurrences involved a military flight, with the transferring ATC unit not providing information to the receiving ATC unit during a special 'round robin' operation, whereby a flight returns to the original departure point. A software fix for the AIDC handling of such flights was now in place, along with a verbal procedure to ensure a valid transfer message is sent.

3.87 WP21 also described a significant increase in category E reported LLEs totalling 62 Category E events between Honolulu Control Facility (HCF) and the Oakland Oceanic FIR. A task force had been established to work on this problem.

SEASMA Horizontal Safety Report (WP22)

3.88 Singapore's South East Asia Safety Monitoring Agency (SEASMA) provided a safety report for operations on ATS routes N892, L625, N884 and M767 within the South China Sea during 2019. This assessment was based on RNP10 performance and concluded that the TLS established for lateral and longitudinal separation standards were satisfied at **0.012×10^{-9}** and **0.38×10^{-9}** respectively.

3.89 The lateral risk within the South China Sea Airspace had reduced significantly in 2019 due to there being zero LLD occurrences during 2019.

3.90 The number of LLEs had reduced from 19 in 2018 to seven in 2019. Various mitigating measures implemented by States had contributed to the reduction in numbers of errors. Category F *Coordination errors in the ATC-to-ATC transfer of control responsibility as a result of equipment outage or technical issues* had replaced Category E LLEs as the top cause on the Manila – Singapore FIR boundary, due to the implementation of AIDC between the two ANSPs. SEASMA stressed that continual safety promotion, procedure review and system improvement had also positively contributed to the reduction in these errors.

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

Estimation of Vertical Overlap Probability (Pz) Update (WP23)

4.1 Thailand submitted a review of the estimate of vertical overlap probability (P_z) using the more recent Altimetry System Error (ASE) from MAAR's ADS-B Height Monitoring System (AHMS). MAAR has been using $P_z(1000)$ of **1.7×10^{-8}** in its risk calculation, which is a conservative value based on the Global System Performance Specification (GSPS) compared to the new estimate of **1.164×10^{-11}**.

4.2 Regarding the probability of vertical overlap between two aircraft flying at the same flight level – $P_z(0)$, the new estimate resulted in a value of **0.5254**, which is slightly smaller than the currently used value of **0.538**. However, P_z re-estimation will be discussed further within the Monitoring Systems Standards Subgroup (MSSS) of the RMA Coordination Group (RMACG) before MAAR actually replaced the existing values.

4.3 MAAR noted that non-operational errors technical LHDs which are unprotected by ATC may be under-reported. These were typically of larger magnitude than ASEs and usually influenced the 'tail' of the distribution, which could result in an under-estimation of $P_z(1000)$. MAAR stressed the importance of LHD reporting, especially for Category G, H, I, J, and K events.

Changes to Global Guidance Related to Reported LHDs (IP03)

4.4 The United States presented a summary of changes made to ICAO Doc 10037 – *Global Operational Data Link (GOLD) Manual*. These changes had been highlighted during RASMAG/24 in reference to reported LHD reports. There were significant changes to the CPDLC procedures for controllers and pilots, in order to reduce human error.

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

AAMA Assessment of Non-RVSM Approved Aircraft (WP24)

5.1 The AAMA undertook a monthly check of flight plan data against the RVSM approval databases of all global RMAs to identify aircraft that operated for at least five months without RVSM approval. Two airframes – one from the United States (N91GT) and one from Indonesia (PKGHG) were identified.

China RMA Assessment of Non-RVSM Approved Aircraft (WP25)

5.2 China RMA provided a list of 24 suspected non-approved airframes grouped by RMA in its data assessment until August 2020.

5.3 The airframes from Asia/Pacific RMAs included two from Indonesia (PKLPW and PKLPY), one from India (VTSFG), one from Hong Kong China (BLDR) and five from the United States (N704GT, N621UP, N845FD, N618GA, N656FN). The Region with the most airframes was Europe (EUR RMA, 8 airframes), and the largest number of movements by a single airframe came from Bermuda, United Kingdom (VPBIN).

JASMA Assessment of Non-RVSM Approved Aircraft (WP26)

5.4 JASMA provided its assessment of probable non-RVSM aircraft operating within the RVSM stratum without approval, including one airframe from the ROK (HL8094) and five from the United States (N992WS, N474JS, N101AR, N173KB and N509BC).

5.5 The United States presented an update on PARMO registration verification (**Flimsy 03**).

MAAR Assessment of Non-RVSM Approved Aircraft (WP27)

5.6 The MAAR noted that the number of aircraft that had been recorded as having operated within RVSM airspace without evidence of a valid RVSM approval had fallen from 34 in 2018 to 26 in 2019, and States had improved their responses after Conclusion APANPIRG 28/12.

5.7 The highest number of non-compliant Asia/Pacific aircraft came from Indonesia (12 PKAZM, PKAZN. PKAZO. PKAZP. PKGTJ, PKLDY, PKLEI, PKLEJ, PKLPW, PKLPY, PKMYC, PKGHG), eight from India (VTEHB. VTFAE, VTIJG, VTIUK. VTIUM, VTMRF, VTSHG, VTIUN), two from Australia (VHCGO, VHINT) and the United States (N175J, N656FN), and one from Thailand (HSTYV).

RASMAG Deficiencies

5.8 MAAR recommended that the following changes to the APANPIRG Deficiency List related to 'Non-Provision of Safety Related Data by States', as:

a) Lao PDR and Bhutan were now providing the 2019 annual RVSM approval snapshot, deletion of their APANPIRG Deficiency; and

b) Afghanistan failed to submit the annual RVSM approval snapshot during 2018 and 2020 – addition to the Deficiency text.

5.9 In addition, MAAR requested that APANPIRG/31 inform Nepal of its non-compliance status in regard to the failure to submit the annual RVSM approval snapshot in 2020, which may result in an inclusion in the APANPIRG List of Deficiencies in 2021 if not rectified.

PARMO Assessment of Non-RVSM Approved Aircraft (WP28)

5.10 The United States provided an assessment of non-State-approved operators using the RVSM airspace overseen by the PARMO. A total of nine airframes were identified, eight from the USA (N280RA, N450LR, N595LA, N625BW, N828WG, N832LA, N906CL, N266JX) and one from Canada (CGSUR).

5.11 The meeting discussed the need for States to include aircraft registration, which is now a mandatory field, in their annual traffic sample data in accordance with the approved TSD Template Form (revised 2019).

5.12 PARMO also proposed to delete French Polynesia's APANPIRG Deficiency on the reporting of safety data.

AAMA LTHM Burden Estimate Update (WP29)

5.13 Australia presented the current monitoring burden for aircraft registered and operated by Australia, Indonesia, the Solomon Islands, Papua New Guinea and Vanuatu to meet Annex 6 requirements. The outstanding burden was 21% – 71 aircraft from a total fleet of 1,161 (resultant burden 345). This represented an increase of 24 from that reported in July 2019.

5.14 Of the total Australian civil registered and military RVSM approved fleet, 45 airframes are considered overdue in terms of the Minimum Monitoring Requirements (MMR), or 16% of the total burden. These aircraft were operated by the Australian military, as business jets or by single aircraft private operators. Some Australian military aircraft were fitted with ADS-B as required under the Australian mandate but the aircraft were not squitting geometric height in the ADS-B message and therefore could not be monitored using the AAMA's ADS-B Height Monitoring System (AHMS).

5.15 In relation to Indonesian registered RVSM approved aircraft, 24 aircraft remain overdue in terms of the MMR. Difficulties with accessing GMU monitoring in a timely way, renewing of approvals or not operating outside Indonesian FIRs underlie the overdue status for these aircraft. The AAMA will continue to source suitable ADS-B data so that more effective monitoring of Indonesian aircraft can take place. AAMA requested APANPIRG to inform Indonesia that they may be proposed for an ANS Deficiency during 2021 if the monitoring burden is greater than 30%.

5.16 The Solomon Islands had only one aircraft which had yet to be monitored (100%), while Papua New Guinea had one airframe out of 13 (8%) and Vanuatu had no airframes to be monitored.

China RMA LTHM Burden Estimate Update (WP30)

5.17 China detailed its expected monitoring burden for the aircraft registered and operated by China and Democratic People's Republic of Korea (DPRK) to meet the LTHM requirement based on the RVSM approval database by the end of June, 2020. There were 93 Chinese operators with 3987 aircraft. The biennial monitoring burden is 562, of which there were 82 aircraft remaining to be monitored (15%).

5.18 China RMA recalled that they had been using four sets of Enhanced GNSS Monitoring Units (EGMU/E2GMU) to conduct on-board monitoring for Chinese airlines and had started to adopt AHMS monitoring in 2014. The meeting was informed that the sudden outbreak of COVID-19 had affected the on-board monitoring work for China RMA, so that AHMS was mainly used in lieu of EGMU on-board monitoring. However, 28 aircraft had been monitored by the end of September 2020 and on-board monitoring work was gradually returning to normal.

5.19 For the DPRK, there were four aircraft registered with the China RMA, which had conducted on-board monitoring for three aircraft in 2018. Due to COVID-19, China RMA could not conduct on-board monitoring for DPRK's aircraft before RASMAG/25. China RMA had been coordinating with DPRK regarding a future monitoring schedule.

JASMA LTHM Burden Estimate Update (WP31)

5.20 JASMA presented the current monitoring burden for aircraft registered and operated by Japan to meet Annex 6 Long Term Height Monitoring (LTHM) requirements, as of 31 May 2020.

5.21 The total number of RVSM approved airframes was 886. Applying the MMR results in a total monitoring burden of 151 airframes, with the outstanding burden being nine airframes (6%). Most of the remaining aircraft were operated either by small airlines, the Japan Coast Guard (JCG), or the Japan Self-Defense Forces (JSDF).

APAC Consolidated LTHM Burden Estimate Update (WP32)

5.22 Thailand presented an overview of LTHM compliance status in the Asia/Pacific Region, including assessments of Asia Pacific RMAs: AAMA, CHINA RMA, JASMA, MAAR and PARMO. The assessment, which was based on RVSM approval data as at 30 October 2020, yielded a remaining monitoring burden of 379, a 20% increase from 2018:

- China RMA (22%), JASMA (2%), and PARMO (3%) States had reduced their remaining their monitoring burden, with China having the biggest improvement; and
- MAAR (54%) and AAMA (19%) States had an increased remaining monitoring burden, mainly due to aircraft being unable to be monitored using EGMU.

5.23 MAAR had a total of 206 aircraft remaining to be monitored. The total number of aircraft remaining to be monitored in APAC had risen by 20% to 379. Afghanistan had the highest monitoring burden of 85%.

5.24 As Malaysia's remaining monitoring burden had significantly dropped to below 30%, MAAR proposed to remove it from the APANPIRG List of Deficiencies for LTHM compliance.

5.25 During 2019 – 2020, seven States – Afghanistan, Bhutan, India, Indonesia, Nepal, Pakistan and the Philippines had a remaining monitoring burden over 30% (**Table 6**). However, with the unavailability of EGMU services due to travel restrictions during the COVID-19 pandemic, MAAR proposed to delay proposing new Deficiencies for States until RASMAG/26's review.

State	2017%	2018%	MMR	Burden	2019%
Afghanistan (MAAR)	**38%**	**36%**	13	11	**85%**
Pakistan (MAAR)	**69%**	**56%**	28	13	**46%**
India (MAAR)	**30%**	**25%**	245	106	**46%**
Nepal (MAAR)	**0%**	**0%**	11	5	**45%**
Philippines (MAAR)	**30%**	**26%**	70	30	**43%**
Indonesia (AAMA)	**42%**	**21%**	57	24	**42%**
Bhutan (MAAR)	**0%**	**0%**	5	2	**40%**
Malaysia (MAAR)	**38%**	**40%**	72	19	**26%**
Myanmar (MAAR)	**36%**	**0%**	6	1	**17%**
Bangladesh (MAAR)	**44%**	**14%**	14	2	**14%**

Table 6: State Monitoring Burden Comparison (red = liable for APANPIRG Deficiency)

PARMO LTHM Burden Estimate Update (WP33)

5.26 The United States provided an assessment of the monitoring burden associated with the long-term height monitoring requirements for airframes for which PARMO is the responsible.

5.27 The total of number of unique airframes identified as having a full RVSM approval from a state of registry under PARMO responsibility as of 02 June 2020 was 549, with a resultant monitoring burden of 101. A total of 11 aircraft had not been monitored within the past two years (or 1,000 flight hours, whichever interval was longer).

5.28 The United States informed the meeting that SB ADS-B had been used to monitor a Cook Islands registered airframe, and was also used to confirm all the New Zealand aircraft as being compliant (**Flimsy 04**).

NAARMO LTHM Burden Estimate Update (IP04)

5.29 The United States provided an assessment of the monitoring burden associated with the LTHM requirements for airframes for which the North American Approvals Registry and Monitoring Organization (NAARMO) is the responsible RMA. IP04 discussed NAARMO's traffic scrutiny work, including the sampling of ASE by group, which allowed the potential for specific airframes to remain unmonitored over long durations.

Consolidated Asia/Pacific Safety Report (WP34)

5.30 Thailand provided a consolidated safety review of Asia/Pacific airspace from RMA and EMA reports, based on an Asia 'subregion' using reports from AAMA, BOBASMA, China RMA, MAAR and SEASMA, and a Pacific 'subregion' using reports from JASMA and PARMO.

5.31 ICAO commented that the SW Pacific and Australian airspace overseen by AAMA was probably better placed in the Pacific in terms of Major Traffic Flows recognised within the Regional Air Navigation Plan, while Indonesian airspace (also AAMA) was correctly placed within Asian traffic flows. Moreover, the use of the terms 'region' or 'subregion' have a particular meaning so it was recommended that the MAWG discuss the use of another term to describe this subdivision, such as 'Safety Monitoring Area'.

Asia Airspace Safety Monitoring Area Summary

5.32 The following risk estimates were calculated for Asian airspace in 2019:

a) Vertical: RVSM operations were non-compliant with the TLS at **12.88×10^{-9}** (a decrease from 12.53×10^{-9} (2016), 27.30×10^{-9} (2017) and 15.50×10^{-9} (2018); and

b) Horizontal: all separations, including 30NM, were compliant with the TLS at **0.0001 x 10^{-9}** (30NM lateral) and **0.25 x 10^{-9}** (50NM longitudinal), an appreciable improvement since 2018 (0.52 x 10^{-9} and 3.91 x 10^{-9} respectively).

Pacific Airspace Safety Monitoring Area Summary

5.33 The following risk estimates were calculated for Pacific airspace in 2019:

a) Vertical: RVSM operations were non-compliant with the TLS at **30.21 x 10^{-9}** (an increase from 5.01 x 10^{-9} (2016), 7.30 x 10^{-9} (2017) and 19.40 x 10^{-9} (2018); and

b) Horizontal: all separations except for 10 minute longitudinal were compliant with the TLS at **3.35 x 10^{-9}** (50NM 1.45 x 10^{-9}, 50NM longitudinal 2.02 x 10^{-9} and 30NM longitudinal 4.10 x 10^{-9}).

5.34 The following summaries were provided for Hot Spots identified by RASMAG:

a) **Hot Spot A1** the number of LHDs and the operational risk significantly decreased at the main interface between Kolkata/Dhaka and Yangon FIRs but increased at the interface between Chennai and the Yangon FIR. ADS-B data sharing between Kolkata and Yangon commenced in June 2018. LHDs were now concentrated around LULDA and MIPAK (Chennai – Yangon), where there is no data sharing. AIDC implementation may assist, as might a review of the procedure for managing aircraft on route L759 as it briefly crosses the Chennai FIR.

b) **Hot Spot A2**: No change – AIDC between Chennai and Kuala Lumpur was fully operational 01 April 2020. Data sharing planned for 2021.

c) **Hot Spot B**: AKARA steeply increased risk due to increased reporting. D, E and F occurrences. Surveillance was available but unique complex ATC arrangements. In 2018 the FUKUE-AKARA Corridor Technical Working Group was formed.

d) **Hot Spot C**; Hong Kong – Guangzhou Greatly reducing trend from 2015 to 2019. The SCS Scrutiny Group and other coordination methods had refined procedures.

e) **Hot Spot D**: Manila FIR boundaries The operational risk decreased in 2019 after the upgrade to the Manila ACC in November 2018. IN 2019 ADS-C/CPDLC was introduced in oceanic airspace, and AIDC with Hong Kong, Singapore and Tabei FIRs was implemented.

f) **Hot Spot E**: Lahore – Urumqi reduced to only one LHD in 2019 due to improvements in communications and surveillance.

g) **Hot Spot F**: Mogadishu – Mumbai – the number of LHDs and operational risk significantly decreased in 2018 and 2019. AIDC/OLDI implementation and surveillance coverage enhancement were recommended.

h) **Hot Spot G**: Sana'a/Muscat – Mumbai the number of LHDs and operational errors decreased from 2017 to 2019. However, the risk was still very high compared to other areas. AIDC trials were conducted in 2018 but no progress had been made.

i) **Hot Spot H**: Guangzhou – Wuhan: Communications failure incidents had greatly reduced but were not considered to be LHD events.

j) **Hot Spot I**: Karachi – Kabul: the number of LHDs had significantly reduced since the introduction of ATS route Z627.

k) **Hot Spot J**: Jakarta – Singapore/Kota Kinabalu: Singapore Jakarta incidents had increased from 5 to 11, but Jakarta to Singapore had reduced from 16 to 7. Jakarta to Kota Kinabalu LHDs had also increased from 0 to 3. Most occurrences were negative

transfers and some are route deviations due to weather. Safety awareness training and lessons sharing were ongoing.

l) **Hot Spot K**: Jakarta – Ujung Pandang: increase to five LHDs possibly due to better reporting, due to readback errors and late revision of flight level.

m) **Hot Spot L**: Fukuoka – Khabarovsk: three LHDs due to transfer errors from Khabarovsk ACC to Sapporo ACC. Japan plans to introduce AIDC between Khabarovsk and Sapporo in the near future.

n) **Hot Spot M**: Colombo – Melbourne has decreased to only one LHD in 2019 due to an incorrect readback.

o) **Hot Spot N**: Oakland Oceanic FIR – this Hot Spot had changed from a predominance of Cat A. B and D events to Category E LHDs due to ATC to ATC coordination issues with the Honolulu ATS facility.

5.35 The LHD/LLD and LLE reporting rate in 2019 for various airspace is shown in **Table 7**. The DPRK had very few flying hours, so the reporting rate couldn't be accurately assessed by this means. However, it was clear that Mongolia ATC was still having reporting issues with a ratio of one report every 82,138 hours filed by aircrew.

Airspace	Flying Hours	Aircrew/Pilot		ATC		Other		Total	
		# Reports	1 Report : Flying Hrs	# Reports	1 Report : Flying Hrs	# Reports	1 Report : Flying Hrs	# Reports	1 Report : Flying Hrs
DPRK	3,341	0	-	0	-	0	-	0	-
Mongolia	164,276	1	1: 164,276	0	-	1	1: 164,276	2	1: 82,138
Indonesia	1,232,871	6	1: 205,479	30	1: 41,096	1	1: 1,232,871	37	1: 33,321
China	2,458,432	19	1: 129,391	9	1: 273,159	51	1: 48,205	79	1: 31,119
SEA	3,385,767	7	1: 483,681	138	1: 24,535	7	1: 1,692,883	152	1: 22,275
Japan	1,598,660	8	1: 199,833	28	1: 57,095	41	1: 38,992	77	1: 20,762
ROK	644,602	4	1: 161,151	26	1: 24,792	4	1: 161,151	34	1: 18,959
Pacific	1,754,212	4	1: 438,650	150	1: 11,695	4	1: 438,650	158	1: 11,103
SW Pacific	942,831	48	1: 19,642	33	1: 28,571	20	1: 47,142	101	1: 9,335
SA/IO	3,492,377	5	1: 698,475	427	1: 8,179	7	1: 498,911	439	1: 7,955
Total	**15,677,369**	**102**	**1: 153,700**	**841**	**1: 18,641**	**136**	**1: 115,275**	**1079**	**1: 14,530**

Table 7: Reporting Rate of LHDs/LLDs and LLEs

5.36 When comparing the reporting ratio since 2017 until 2019, the data indicates two factors – that Indonesia's reporting ratio had fluctuated dramatically, and that the ROK, Pacific and SW Pacific had all significantly improved safety reporting (**Table 8**):

Airspace	# Reports				1 Report : Flying Hrs			
	2016	2017	2018	2019	2016	2017	2018	2019
DPRK	0	0	0	0	-	-	-	-
Mongolia	0	4	1	2	-	1: 37,771	1: 158,891	1: 82,138
Indonesia	32	34	23	37	1: 11,520	1: 10,842	1: 53,603	1: 33,321
China	117	134	110	79	1: 20,413	1: 18,248	1: 22,229	1: 31,119
SEA	426	474	205	152	1: 5,884	1: 6,548	1: 17,757	1: 22,275
Japan	43	71	76	77	1: 33,834	1: 21,510	1: 20,632	1: 20,762
ROK	6	5	12	34	1: 93,291	1: 117,090	1: 28,365	1: 18,959
Pacific	33	42	43	158	1: 63,500	1: 54,191	1: 45,064	1: 11,103
SW Pacific	52	51	53	101	1: 16,639	1: 17,572	1: 17,817	1: 9,335
SA/IO	778	935	681	439	1: 3,689	1: 3,166	1: 3,783	1: 7,955
Total	**1,487**	**1,750**	**1,204**	**1,079**	**1: 8,905**	**1: 8,180**	**1: 12,332**	**1: 14,530**

Table 8: Reporting Rate of LHDs/LLDs/LLEs, 2017 - 2019

5.37 The Consolidated Asia/Pacific Safety Report presentation is provided at **Appendix F**.

Regional Airspace Safety Assessment (WP35)

5.38 ICAO provided a regional safety monitoring assessment summary. **Figure 14** illustrates the state of Asia/Pacific RVSM TLS compliance, as reported to RASMAG/24:

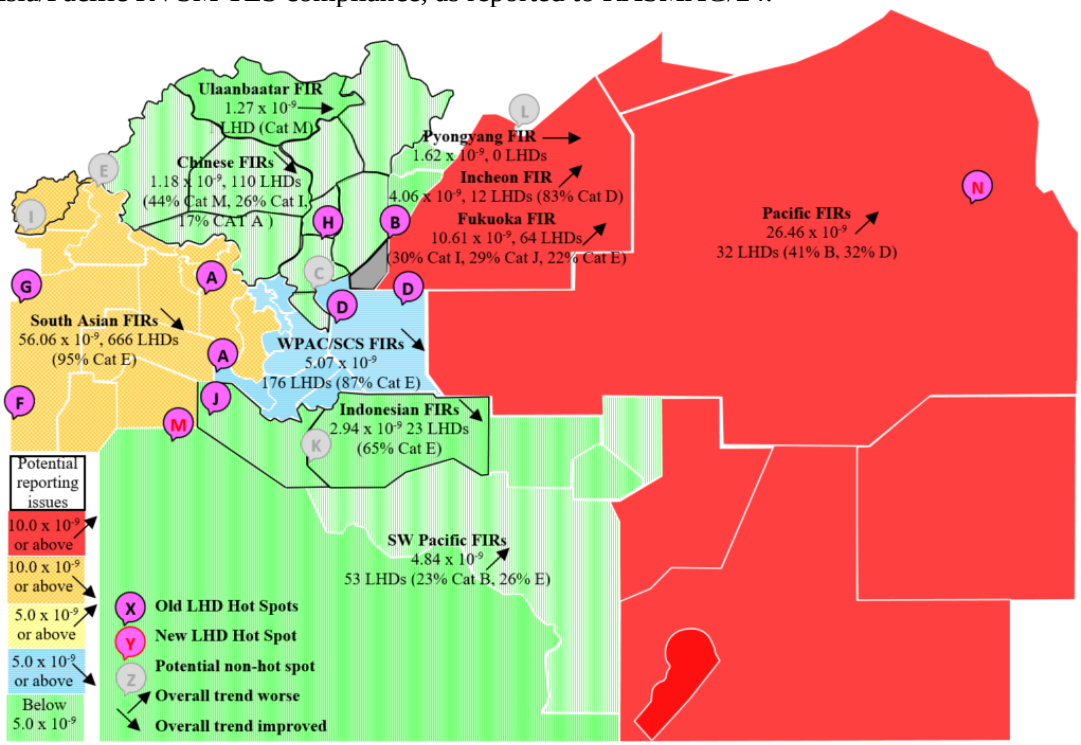

Figure 14: Asia/Pacific RVSM TLS subregion compliance reported to RASMAG/24

5.39 **Figure 15** is an Asia/Pacific RVSM TLS compliance overview, as at RASMAG/25:

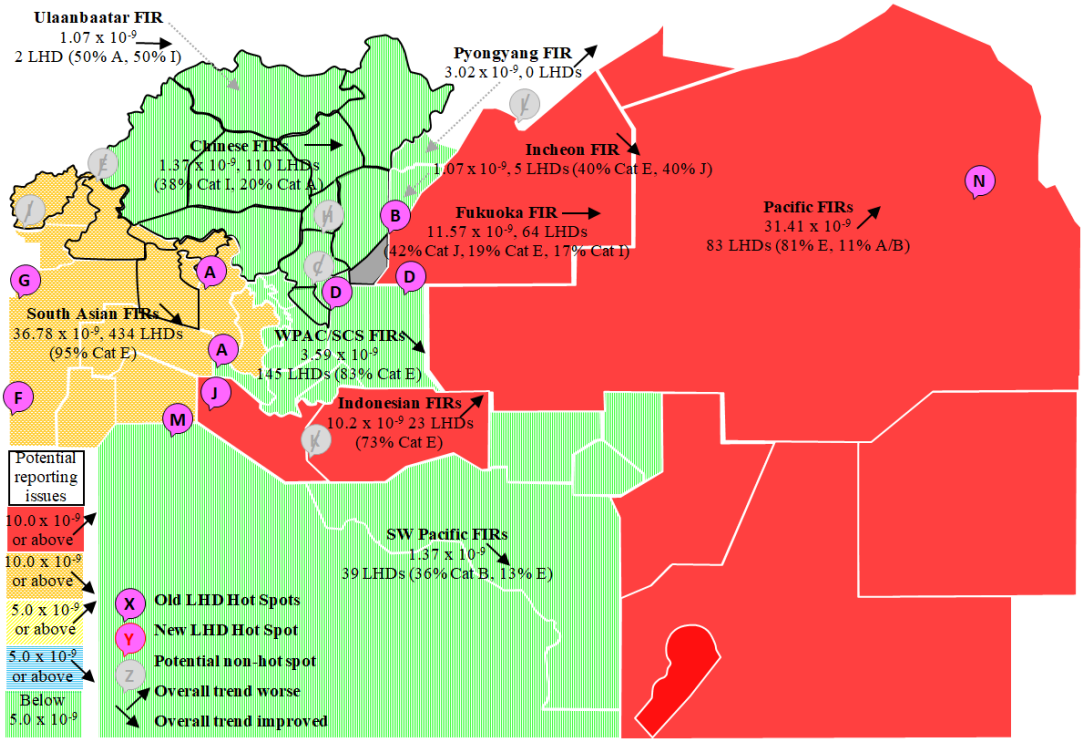

Figure 15: Asia/Pacific RVSM TLS subregion compliance reported to RASMAG/25

5.40 **Table 9** highlights the following RMA airspace subdivision aspects:

RMA Airspace Subdivision	Safety trend	Notes
Chinese FIRs	No change	Potential ATC reporting issues
Incheon FIR(excl. AKARA)	Improving	AKARA would dramatically worsen
Indonesia FIRs	Worsening	Improving reporting
Fukuoka FIR	No change	Still affected by the Manila FIR
Pacific FIRs	Worsening	Dramatic increase in CAT E LHDs
Pyongyang FIR	Worsening	Insufficient traffic to judge compliance
South Asia Indian Ocean FIRs	Improving	Still has the second worst hot spots
Southwest Pacific FIRs	Improving	Best performing APAC airspace
Ulaanbaatar FIR	No change	Potential ATC reporting issues
W Pacific/Southeast Asia FIRs	Improving	Second best performing APAC airspace

Table 9: Airspace Vertical Safety Performance Overview

5.41 **Table 10** provides a comparison of Asia/Pacific Region (APAC) RVSM risk as a measure against the TLS by grouped FIRs, according to the RMA responsibilities for airspace. Over the past six years, the performance of APAC in compliance with the TLS for RVSM had been poor overall, averaging 40% when measured by the grouped FIRs. However, of the 29 FIRs that achieved TLS, 10 FIRs had potential reporting issues (discussed later in this paper). Therefore, the compliance rate may be significantly worse than reported. In conclusion, measures taken to improve adherence to the TLS in the past six years have yielded localised improvements, but overall had failed to produce a positive result for the APAC Region as a whole.

	2014	2015	2016	2017	2018	2019
FIRs	53%	32%	51%	16% (8 FIRs)	37% (18 FIRs)	53% (26 FIRs)

Table 10: Comparison of Regional RVSM TLS Achievement

Hot Spot Summary

5.42 **Table 11** provides a summary of the Hot Spots.

Hot Spot	Involved FIRs	Identified	Remarks
A1	Kolkata/Chennai/Dhaka – Yangon	2015	Potential non-hot spot
A2	Chennai – Kuala Lumpur	2015	LHDs increased
B	Incheon	2015	AKARA Corridor
D	Manila – all adjacent FIRs	2015	LHDs reduction
F	Mogadishu – Mumbai	2015	LHDs reducing
G	Sana'a/Muscat – Mumbai	2015	Cat. E LHDs (Sana'a improved)
J	Jakarta – Singapore/Kota Kinabalu	2018	Minor, Cat. E LHDs
M	Colombo - Melbourne	2019	Potential non-hot spot
N	Oakland USA – Hawaii CEP	2019	Cat. E LHDs

Table 11: Comparison Summary of LHD Hot Spots

Non-RVSM Approved Aircraft

5.43 **Table 12** compared the number of non-RVSM airframes reported by each RMA annually:

Report	AAMA	China RMA	JASMA	MAAR	PARMO	Total
RASMAG/20	8	45	15	234	26	328
RASMAG/21	5	6	15	106	11	143
RASMAG/22	7	40	11	163	25	246
RASMAG/23	5	20	9	43	38	115
RASMAG/24	5	4	17	34	1	61
RASMAG/25	2	24	6	26	9	67

Table 12: Trend of Non-RVSM Airframes Observed by Asia/Pacific RMAs

Regional Horizontal TLS Compliance

5.44 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 13**):

ATC Separation	EMA	2018 Estimated Risk	2019 Estimated Risk
50NM Lateral	BOBASMA	2.05×10^{-9}	1.59×10^{-9}
	JASMA	0.05×10^{-9}	1.45×10^{-9}
	PARMO	-	-
	SEASMA	0.52×10^{-9}	0.012×10^{-9}
30NM Lateral	PARMO	0.16×10^{-9}	3.35×10^{-9}
50NM Longitudinal	BOBASMA	4.21×10^{-9}	4.97×10^{-9}
	PARMO	2.22×10^{-9}	-
	SEASMA	0.38×10^{-9}	0.38×10^{-9}
30NM Longitudinal	BOBASMA	-	-
	JASMA	0.001×10^{-9}	0.015×10^{-9}
	PARMO	4.08×10^{-9}	4.08×10^{-9}

Table 13: Comparison of Horizontal Risk Assessments

5.45 In addition, JASMA's assessment of the 10-minute longitudinal standard without Mach Number Technique, which had <u>not</u> met TLS at 20.1×10^{-9}.

<u>Safety Reporting</u>

5.46 RASMAG/25/WP11 and WP34 indicated that the following States had reporting issues:

a) Afghanistan, which did not report any LHDs during 2020;

b) India – Delhi and Kolkata FIRs (although Mumbai and Chennai had made distinct improvements); and

c) Mongolia had a rate of reported LHDs per hour that was very low, many factors less than that expected.

5.47 MAAR had also noted: In most cases, ATCO report LHDs only when they are affected by mistakes made by ATCO in their neighbouring FIRs. However, in 2018, the MAAR started to receive LHD reports which occurred inside an FIR.

5.48 Significant improvements in safety reporting had been noted in within the AKARA – FUKUE Corridor. Previously, some States had insisted that there were no safety issues within the Corridor, and it had been very rare to receive safety incident reports. RASMAG/25/WP14 illustrated the level of data that showed the Corridor was a Hot Spot with very high latent safety risks.

5.49 AAMA also noted that Indonesia had probably improved its safety reporting culture.

5.50 **Table 14** provides an overview of the proportion of Category E (ATC – ATC Transfer Errors) over the period 2016 – 2019.

	SW Pacific	Indonesia	China	Japan	S Asia	SE Asia	Pacific	Incheon
2017	18%	44%	14%	30%	96%	69%	30%	60%
2018	26%	65%	3%	22%	95%	87%	22%	0%
2019	13%	72%	5%	19%	95%	83%	81%	40%
Ave.	19%	60%	7%	24%	95%	80%	44%	20%

Table 14: Category E Proportions of Reported LHDs, 2017 - 2019

5.51 **Table 14** indicates data for the period 2017 – 2019 showing that for areas that do not generally use AIDC, Category E LHDs constituted 60 – 95% of the total (78% average), whereas in areas that do utilise AIDC, Category E events normally constituted a much smaller proportion of between 19 – 44% (average 29%).

5.52 As China had not comprehensively implemented AIDC, the very low proportion of 7% Category E events on average was plausibly low at 3% during 2018 and 7% in 2019, thus indicating a possible safety reporting issue within Chinese airspace. Noting China RMA's past work to increase improve reporting culture that resulted in a steep increase in reports, China RMA is urged to consider steps to further strengthen its 'Just Culture' policies and effective implementation of those policies to support open reporting of safety occurrences.

5.53 It was always difficult to compare reporting rates between States. However, the methods used to analyse the data had successfully highlighted poor reporting in the past, and after action by States the reporting had changed dramatically.

5.54 It was appropriate to remind States, even those which had taken significant positive steps to improve reporting, to continually monitor their reporting culture and systems to optimise reporting. Experience from developed nations had shown that educating operational personnel was not enough to achieve the open reporting objective of the 'aviation culture', as described in the *Asia/Pacific Seamless ATM Plan*.

5.55 Given that operational errors constituted by far the vast majority of safety risk in both the vertical and horizontal planes, the assurance of having an appropriate safety reporting culture was one of the most critical functions of airspace safety monitoring agencies. Yet, analysis of safety reporting culture, associated policies and the identification of potential missing reports remained almost non-existent in RMA/EMA safety reports.

5.56 In order to be more proactive, ICAO recommended that RMAs and EMAs better analyse safety data to identify potential under-reporting and undertake safety culture surveys and audits to monitor safety reporting culture. RASMAG/25 agreed to the following Decision on safety reporting as part of RMA/EMA safety reports.

Decision RASMAG/25-4: Safety Reporting Assessments

That, RMAs and EMAs will include within their vertical and horizontal safety reports to RASMAG an assessment of the safety reporting culture of the States concerned (including 'Just Culture'), and specifically, whether safety reports for events such as LHDs were consistently being made by pilots and ATC.

Summary Report of Identified Airspace Risk Occurrences (IP05)

5.57 Singapore presented an analysis of LHDs and Gross Navigation Errors, the impact of COVID-19 on ATC operations, and associated mitigations. Examples of lessons learnt were the:

a) use of available aide memoirs as reminders to controllers of any outstanding task such as checking for AIDC transfer failures at boundary points; and

b) minimisation of last minute flight levels revisions near transfer boundaries.

5.58 Due to the reduction in air traffic as a result of the COVID-19 pandemic, key safety hazards were identified. Their corresponding mitigations for ATC were as follows:

a) mental fatigue, reduced alertness and distractions were mitigated by merging ATC positions to increase the sector area and maintain a healthy level of stimuli;

b) limited On-Job-Training (OJT) opportunities and challenges making realistic and accurate assessments of trainees' competency were addressed through OJT revision and a validation assessment framework to allow the use of ATC simulators; and

c) skill fade of controllers related to the handling of pre-COVID traffic volume and scenarios was managed with a revised programme for proficiency checks and continuous training (comprised of various exercises using pre-COVID traffic volume and complexity which are made available at all simulators).

Competent Airspace Safety Monitoring Organizations List (WP36)

5.59 The meeting updated the *RASMAG List Of Competent Airspace Safety Monitoring Organizations* (**Appendix E**).

Agenda Item 6: Air Navigation Services Deficiencies

ANS Deficiencies List (WP37)

6.1 The meeting reviewed the APANPIRG ANS Deficiency List and agreed to make the following recommendations to APANPIRG/31 in accordance with **Appendix G**:

a) deletion of the Deficiency for Myanmar related to PRs not being provided to the Central Reporting Agency (CRA);

b) deletion of the Deficiency for Bangladesh, Bhutan, French Polynesia, Lao People's Democratic Republic (PDR) and Pakistan related to non-provision of the annual RVSM approval snapshot;

c) deletion of the LTHM Deficiency for Malaysia; and

d) amendment of the LTHM Deficiency for Pakistan to reflect the remaining monitoring burden of 46% and for Afghanistan for failing to submit the annual RVSM approval snapshot for 2018 and 2020.

Agenda Item 7: Review and Update RASMAG Task List

RASMAG Task List (WP38)

7.1 The meeting reviewed and updated the RASMAG Task List (**Appendix H**).

Agenda Item 8: Any Other Business

ATM Points of Contact (WP39)

8.1 Meeting participants reviewed and updated the ATM Points of Contact as appropriate. The List was circulated by email to meeting participants.

Production of the Asia/Pacific Region Combined PBCS Monitoring Report (WP40)

8.2 USA presented a recommended process for the production of the Asia/Pacific Region Combined PBCS Monitoring Report, proposing the retention of a PBCS Report format harmonized with other ICAO regions, and the biennial rotation of the report generation responsibilities amongst States and Monitoring Agencies.

8.3 It was noted that the consolidated performance report format currently used by FIT-Asia was also used in the North Atlantic (NAT) Region, and was also used by FIT-IPACG and FIT-ISPACG. Rotating responsibility for the production of the report would assure that, over time, multiple States and organizations would gain the knowledge and develop the skillset to improve system performance. Ideally, the proposed biennial rotation would allow for the outgoing State/Agency to assist the incoming organization in the first year, followed by independent production in the second year.

8.4 The meeting agreed to the following Decision (**Flimsy 02**):

Decision RASMAG/25-5: Rotational Responsibility for the Production of the Combined PBCS Monitoring Report

That, FIT-Asia will produce an annual Combined PBCS Monitoring Report, as follows:

1. responsibility for the report production will rotate biennially amongst volunteer States, Reporting Agencies, or other relevant stakeholders;
2. the State, Reporting Agency or other stakeholder releasing responsibility for production of the report will assist the new report producer in the first year of their responsibility; and
3. until a report format is codified in ICAO documentation, producing organizations must assure the report content, format, and quality are consistent with similar reports in other ICAO regions.

Agenda Item 9: Date and Venue of the Next RASMAG Meeting

9.1 The venue and dates for the next MAWG meeting was tentatively planned as a Video Teleconference for early 2021.

9.2 Subject to the COVID-19 pandemic abating to allow travel, the RASMAG/26 meeting is tentatively planned for the July – August 2021 period in Bangkok, Thailand.

Closing of the Meeting

10.1 In closing, the Chair thanked participants for their contributions to the meeting.